Introduction: It is well accepted that ischemia/reperfusion (I/R) injury is accompanied by an increase in mitochondrial Ca2+ that triggers the opening of mitochondrial permeability transition pore (MPTP), the subsequent depolarization of the mitochondrial membrane potential (∆Ψm), leading to cardiomyocyte death. However, the mechanisms that control mitochondrial Ca2+ entry in that context are far to be understood. Having shown that the cAMP binding protein Epac1 contributes to I/R injury, we therefore addressed whether Epac1 would play a role in such a process.

Purpose: To investigate the role of mitochondrial exchange protein directly activated by cAMP (Epac1) in ischemia/reperfusion injury.

Methods: Isolated adult cardiomyocytes from Epac1 knockout (KO) and wild-type (WT) littermates were exposed to hypoxia (HX) for 4h followed by a 2h of reoxygenation period (HX + R). Cell death was determined by Trypan blue staining and LDH release. MPTP opening was monitored by the calcein loading CoCl2-quenching technique. Mitochondrial Ca2+ uptake was measured with Rhod-2-AM fluorescent dye.

Results: Our data showed that HX + R induced a decrease in calcein fluorescence corresponding to MPTP opening in WT cardiomyocytes. Genetic deletion of Epac1 prevented MPTP opening in HX + R conditions. In addition we found that Epac1 was expressed in mitochondria and its activation induced a robust increase in mitochondrial Ca2+ accumulation in WT cardiomyocytes but not in those of Epac1−/− cardiomyocytes. Furthermore, treatment of Epac1−/− cardiomyocytes with 50 μM Ca2+ induced much less mitochondrial Ca2+ overload compared to WT suggesting that Epac1 regulates Ca2+ entry into the mitochondria. During ischemia, Epac1 favors Ca2+ exchange between the endoplasmic reticulum (ER) and the mitochondrial, by increasing interaction with VDAC1/GRP75/IP3R1 protein complex leading to cardiomyocyte death. However, the cardiotoxicity of the cell therapy, porcine allogeneic MSCs were transfected with virus-free minicircle plasmid driving HIF1α decreases LV adverse remodelling via release of cardioprotective miRNAs and pro-angiogenic factors.

Conclusion: Epac1 regulates different aspects of mitochondrial function such as Ca2+ uptake and MPTP opening. Our findings suggest Epac1 as a promising target for the treatment of ischemia- induced myocardial damage.

31 Prophylactic combined heart failure treatment attenuates the development of doxorubicin induced systolic and diastolic dysfunction in rats

Methods: Domestic male pigs (n = 16) underwent closed-chest purpured acute myocardial infarction (MI) via balloon-occlusion of the mid-LAD for 90 minutes, followed by reperfusion. One month later (chronic ischemic left ventricular remodelling), the animals were randomized to receive either MSCs alone (n = 6) or MSC-MiCi-HIF1α (n = 10) (15 ± 3 x 105 cells). Cells were injected into the border zone of infarction by using the 3D guided NOGA electro-anatomical mapping system (9 ± 1 locations). One animal at 3, 12, 24 hr, and 1 week of the MSC-MiCi-HIF1α group was harvested to prove the HIF1α expression and early angiogenesis in the heart. Magnetic resonance imaging with late enhancement was performed in the surviving 6 animals of each group. Angiogenesis proteome profiling were performed and RT-PCR quantified mRNA (Angiopeptin-2, VEGFA, CD31) and mRNA (miR-1, miR-24, miR132) expressions. Immunohistology sections were stained with anti-caspase-3 antibody and apoptosis was quantified.

Results: Success of transplantation procedure was confirmed by Western blots of the cell culture medium, showing HIF1α expression. Proteome profiling of the short-term follow-up hearts revealed upregulation of angiogenesis-related protein expressions (angiopoietin, endoglin, VEGF-A and TGFP-alpha) up to 12 hr post-delivery, while the angiogenetic apelin expression increased after 12 hr. Anti-hypertrophic miR-1, pro-angiogenic miR-132, and anti-fibrotic miR-24 levels were increased in response to MSC-MiCi-HIF1α treatment (fold-changes vs control: 7.51 ± 0.61 miR1, 23.01 ± 4.87 miR132, and 6.50 ± 2.95 miR24) between 12 and 24 hr post-transfected cell injections. MSC-MiCi-HIF1α delivery resulted in moderate improvement of LV ejection fraction, and reduced infarct size and LV end-diastolic volume (111 ± 17 vs 133 ± 16 mL, p<0.05) at 1 month post treatment. Apoptosis in infarct border zone also decreased after MSC-MiCi-HIF1α delivery (fold-change vs control: 0.75 ± 0.07).

Conclusions: In a pre-clinical translational model of chronic post-infarction heart failure, therapy combining MSCs transfected with minicircle plasmid expressing HIF1α significantly decreases infarct size and improves adverse remodeling via modulation of angiogenic and anti-fibrotic processes of the heart.
study by the tail-cuff method. DOX ccs were calculated from human doses of exist-
ing chemotherapy protocols and were corrected to the body surface of rats. Effective DOX doses were validated by in vitro electrochemical measurements. For in vivo studies, baseline echocardiography, animals in the prophylactic group received a daily com-
bination of oral bisoprolol (2.5 mg/kg), perindopril (2 mg/kg) and spironolactone (6.25
mg/kg) before (PHE), while those in the post-exposure group 1 month after DOX
treatment (POST). Drugs were applied in a mucous vehicle by oral gavage. Positive
controls received both DOX treatment and drug-free vehicle (D-CON), while nega-
tive controls received drug-free vehicle only (CON). DOX exposure was carried out
by administering 1.5 mg/kg iv. DOX into the tail veins of the animals on 6 occasions.
Follow-up echocardiography was carried out 1 and 2 months after the DOX treat-
ment.

Results: Systolic and diastolic BP, as well as HR were significantly lower in the
PRE group, compared to all other groups. Follow-up echocardiography revealed a
gradually reducing ejection fraction (EF) in the D-CON and POST animals over the
2-month-period compared to CON (84.3 ± 3.5 and 67.4 ± 4.7% vs. 72.2 ± 3.2%,
respectively; p < 0.05). While the prophylactic treatment prevented any significant
drop in the EF in the PRE group (79.2 ± 6.4%). At 12 months, a restrictive filling pattern
was observed in the D-CON and POST groups but not in the CON and PRE animals.
NPA7, but not pre-exposure supportive treatment was capable of attenuating the
DOX induced systolic and diastolic dysfunction. This model seems eligible for future investigations to further elu-
cidate cardiotoxic side-effects of DOX, as well as for the development of early drug
intervention protocols to eliminate myocardial injury induced by DOX chemotherapy.

32 NPA7, an innovative multivalant designer natriuretic peptide: Co-therapy with
Furosemide to mediate noreprotection in experimental ADHF
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Acute decompensated heart failure (ADHF) is a heart failure syndrome with high
morbidity and mortality. Current initial therapy focuses on relief of signs and
symptoms using diuretics, such as Furosemide (FURO). Diuretic therapy however
may induce Cardiorenal Syndrome, which itself is a predictor of mortality and
morbidity. FuRO post-exposure supportive treatment was capable of attenuating the
DOX induced systolic and diastolic dysfunction. This model seems eligible for future
investigations to further elucidate cardiotoxic side-effects of DOX, as well as for the
development of early drug intervention protocols to eliminate myocardial injury induced by
DOX chemotherapy.

33 Eosinophils have an essential role in promoting a type II innate immune
response and cardiac repair following myocardial infarction.
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Funding Acknowledgements: Wellcome Trust, British Heart Foundation

Background: Eosinophils contain prefilled IL-4 within their cytoplasmic granules,
a cytokine which can mediate alternative activation of myofibroblasts and promote
tissue repair. Patients develop peripheral blood eosinopenia within 24 hours of
the onset of myocardial infarction (MI) symptoms, but whether eosinophils are recruted
to the infarct and have a role in regulating infarct repair is currently unknown.

Purpose: This study sought to investigate the role of eosinophils, a source of the
Th2 cytokine IL-4, in infarct healing.

Methods: Mi was induced by permanent coronary artery ligation in 12-15 week-old
male wild-type (WT) BALB/c mice and ΔdblGATA mice that are deficient in
eosinaphils (BALB/c background). Cardiac function was assessed 7 days later by
high-resolution ultrasound, and flow cytometry was performed on single cell digests
of infarct zone tissue.

Results: Histochomatic staining (Sligie F) and single cell digestion of infarcted WT
BALB/c hearts revealed significant recruitment of (CD11b + F4/80 + CD206 +
ΔdblGATA) eosinophils to the infarcted heart. Genetic eosinophil deficiency in ΔdblGATA mice
led to greater left ventricular dilatation relative to WT mice (find-Systolic Area: 29 ± 2
mm2 vs 22 ± 2 mm2; p < 0.02) and worse cardiac function (Ejection Fraction: 22 ± 4% vs.
34 ± 4%; p = 0.04) at Day 7 post-MI, despite comparable plasma troponin I (infarcted
BALB/c WT: 26 ± 4 ng/l vs. Infarcted ΔdblGATA: 25 ± 5 ng/l; p < 0.74), indicative of
similar injury, at 24 hours after coronary artery ligation. Expression of CD206, a
surface marker for pro-repair alternatively activated macrophages, was reduced on
infarct zone CD11b + F4/80 + Ly6G- macrophages from ΔdblGATA mice. Eosinophil
replenishment of ΔdblGATA mice restored expression of CD206 on infarct zone
macrophages after coronary artery ligation (Mean Fluorescence Intensity [MFI] for
CD206: 2134 ± 536 a.u. in eosinophil replenished ΔdblGATA mice vs. 277 ± 134 a.u.
in PBS treated ΔdblGATA mice; p = 0.04). Furthermore, treatment with IL-4 com-
plexes was able to rescue the adverse cardiac remodelling of eosinophil deficient
ΔdblGATA mice (ejection fraction: 32 ± 2% vs. 23 ± 2% in IL-4 complex and PBS
treated ΔdblGATA mice, respectively; p = 0.02, n = 8-15 per group).

Conclusions: This study provides the first evidence for an essential role of
eosinophils in modulating the inflammatory response and cardiac remodelling fol-
lowing MI, likely through provision of IL-4. Peripheral blood eosinopenia is a common
feature of heart failure patients. Correcting a deficiency for eosinaphils or specifically
IL-4 therapy may offer a novel immune-modulatory intervention in the setting of heart
failure.

34 NADPH oxidase-4 promotes adaptive cardiac remodelling in the chronically
stressed heart by driving protein O-GlcNAcylation and enhancing cardiac
fatty acid oxidation
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Heart Foundation, UK (BHF, UK)

Background: Reactive oxygen species (ROS) production contributes to both adap-
tive and maladaptive remodelling pathways in the heart and is involved in the
pathophysiology of cardiac hypertrophy and failure. NADPH oxidase-4 (Nox4), a
specialised ROS-generating enzyme has beneficial effects by promoting adaptive
remodelling during pressure-overload cardiac hypertrophy.

Purpose: To understand how Nox4, a specialised ROS-generating enzyme has beneficial
effects in the chronically stressed heart.

Methods and Results: An unbiased global overview of putative Nox4-oxidised
changes, from cardiac-specific Nox4 transgenic (TG) and wild-type (WT) mouse
hearts was first characterised through a 2D-DIGE proteomics approach. The Pro-
tome of TG hearts demonstrated a significant over-representation of changes in
protein levels of enzymes involved in glucose and fatty acid utilisation. Targeted
LC-MS approaches identified a differential accumulation of glycolytic intermedi-
es in the proximal part of glycolysis both in unstressed and pressure-overloaded
hearts. LC-MS/MS approaches identified a differential accumulation of glycolytic
intermediates in the proximal part of glycolysis both in unstressed and pressure-
overloaded hearts.

In conclusion, in experimental ADHF, NPA7 is a vasodilatory therapeutic with cardiac
unloading, diuretic and natriuretic actions. FURO is more diuretic, but is associated
with significant renal impairment, vasoconstriction and RAAS-activation. In addi-
tion, pre-treatment with NPA7 enhances natriuresis and diuresis while preserving
kidney function. Priming with NPA7 may therefore represent a novel renoprotective
strategy for treatment of ADHF. Importantly, this study underscored the need for
future studies assessing the impact of timing of diuretics on treatment effects of
novel therapies in patients with ADHF.
as well as pressure-overloaded heart (3.6 fold increase; n = 6/group; p = 0.01). Glucose uptake was unaltered but glycolysis and oxidation rates were decreased, suggesting diversion of glucose away from fatty acid oxidation. An increase in palmitate oxidation was not detrimental either for in vivo cardiac energetics (31P-NMR) or contractile function during pressure-overload hypertrophy. We found that activity of the hexosamine biosynthesis pathway (HBP), an alternative route for glucose metabolism, was increased in TG hearts as assessed by the O-GlcNAc/protein levels. MCP therapy showed no beneficial effect, partial or complete remodeling post-MI, and this effect is related to the inhibition of mitoNox/ PKC activity.

Gal-3 expression level and effects of anti-Gal-3 interventions in dilated cardiomyopathy (DCM) have not been investigated. We determined Gal-3 expression in TG hearts and studied effects of pharmacological (MCP) and genetic interventions on their activation.

Methods: Mst1 TG and wild-type (WT) littermates were used in MCP treatment study. MCP therapy was for a period of 4 months (2 to 6 months of age) at 200 mg/kg/day for 2 months and then 500 mg/kg/day for a further 2 months. Gal-3 gene deletion was achieved by cross-breeding TG mice with Gal-3 knockout (KO) mice and TG and WT/Gal-3 KO mice as well as mice with relevant control genotypes. Echocardiography was performed using Vevo2100 system. RT-PCR was applied for gene expression and Gal-3 protein level was detected by ELISA kit. Collagen content was determined by hydroxyproline assay.

Results: Relative to WT control (n = 12/group), TG mice had atrial dilatation (by 3-fold), increase in weights of atria, lungs, liver and spleen due to congestion, suppressed left ventricular (LV) ejection fraction (EF, 27% vs 55%) and cardiac output (CO, 10 vs 15 mL/min), higher myocardial collagen content (by 3-fold), and upregulated fibrotic genes (by 8-fold). These phenotypes were stable over 2-6 months of age. Gal-3 expression increased in TG than NTG hearts by 35-40-fold at mRNA and protein levels, higher myocardial collagen content (by 3-fold), and increased weights of atria, lungs, liver and spleen due to congestion. Importantly, an increase in mitoNox activity was induced by 3.6 fold increase in cardiac expression of Gal-3 and beneficial effects by mitoNox inhibitors, such as modified citrus pectin (MCP). However, GALC expression was increased in TG hearts as assessed by the O-GlcNAc/protein levels (by 2.4-fold). These data identify a novel redox mechanism that drives beneficial effects of MCP-the ability to reduce apoptosis, their activation.

Conclusions: MIT-induced AMPK increase significantly improves cardiac remodeling post-MI, and this effect is related to the inhibition of mitoNox/ PKC activity. Cardiomyocytes under biomechanical stress activate the fibroblasts in a paracrine manner.

36 Metformin prevents cardiac fibrosis by attenuating mitochondrial NADPH oxidase 4/PKC-alpha/Gal-3 signaling pathway in myocardial infarction

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Background: The antiabetic mechanism of metformin (MET) is incompletely understood. We have determined the role of MET in cardiac fibrosis following myocardial infarction and characterized the molecular mechanism.

Methods: Eight-week-old male rats (Spraque-Dawley) were subjected to left ventricular systolic dysfunction by permanent ligation of the anterior coronary artery. Rats received MET (250 mg/kg/day) or normal saline for 4 weeks. An experimental model of biomechanical strain and a coculture, to allow cross talk between primary cultures of cardiomyocytes and cardiac fibroblasts (all obtained from C57Bl6J mice using a Langendorff system), were established to characterize the underlying molecular mechanisms involved in the MET antiabetic actions. The role of AMPK was determined via siRNA-mediated knockdown while those of the NADPH oxidase 4 (mitoNox) and PKCalpha were determined using the inhibitors GITK137831 and Chelerythrine, respectively. The mRNA and protein expression of different markers were measured by quantitative RT-PCR and Western blot, respectively. The enzymatic activities of mitoNox and PKCalpha were also assessed using spectrophotometry.

Results: MET treatment following MI, was associated with a reduction of myocardial fibrosis, Gal-3 mRNA and protein levels, as well as macrophages infiltration. MET also increased AMPK mRNA levels (p < 0.001) and blocked the mitochondrial expression of both mitoNox and PKCalpha as their enzymatic activities (p < 0.001, in all cases). Follow- ing MI, the increase in expression and activity of both enzymes was associated with an increase in the accumulation of the superoxide anion (p < 0.001) which positively correlated with mitoNox and PKCalpha activities (p = 0.362, p = 0.018), as well as an increase in the lipid peroxidation (p < 0.001) and the activation of the apoptotic death program characterized by the activation of effector procaspase 3 (p < 0.001). The ability of MET to protect adult cardiomyocytes from biomechanical strain, in terms of mitoNox and PKCalpha activities, cardiac fibrosis levels, percentage of viability and proliferation and levels of reactive oxygen species (p < 0.001, in all cases). The use of the inhibitors GITK137831 or Chelerythrine supported that PKCalpha is downstream of mitoNox, and the activation of this pathway results in Gal-3 up-regulation. The Gal-3 secreted by cardiomyocytes has a paracrine effect on cardiac fibroblasts, inducing their activation.

Conclusions: MET-induced AMPK increase significantly improves cardiac remodeling post-MI, and this effect is related to the inhibition of mitoNox/ PKCalpha/Gal-3 pathway. Cardiomyocytes under biomechanical stress activate the fibroblasts in a paracrine manner.

37 Effects of acute intravenous infusion of nitrosyl donor BMS-986231 on left ventricular function and cardiac rhythm in anaesthetised dogs with intracoronary microembolisation-induced heart failure

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Background: BMS-986231 is a novel nitrosyl donor in development for the treatment of acute decompensated heart failure (HF).

Purpose: Assess the effects of BMS-986231 on left ventricular (LV) function and induction of arrhythmias in dogs with HF.

Methods: Chronic LV failure was produced in dogs via sequential embolisations until an LV ejection fraction of <30% was achieved. In Study 1, seven isoflurane-anaesthetised animals each received continuous intravenous (IV) infusions of three different doses of BMS-986231 (0.7, 2 and 7 µg/kg/min) as well as vehicle for 4 hours; haemodynamic, angiographic and echocardiographic measurements were obtained. Animals were monitored for 1 hour post-infusion. In Study

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B, another seven animals with induced HF received BMS-986231 (7 μg/kg/min) and vehicle over 2 hours, before undergoing programmed ventricular stimulation (PVS). PVS was terminated when it provoked ventricular fibrillation (VF) or a sus- tained monomorphic ventricular tachycardia (SVT) lasting >30 seconds. Threshold data for SVT or VF were quantified in which progressively increasing scores were indicative of higher magnitudes of required stimulation.

Results: With vehicle, all measured/calculated variables were stable from baseline through 4 hours. At 4 hours, BMS-986231 resulted in significant (p < 0.05) increases in early-to-late diastolic velocity-time integral ratio (Δt, a trum baseline across doses: 1.6 to 2.7) and deceleration time of early mitral valve inflow velocity (Δt0.4 to 12.4 msec), and significant decreases in LV and diastolic wall stress (Δt = 9.3 to 13.4 gm/cm²) versus baseline, all suggesting positive lusitropy. BMS-986231 also led to significant increases in LV ejection fraction (Δt = 5.6 to 8.8%), LV fractional area shorten- ing (Δt = 11 to 13%), stroke volume (Δt = 3.7 to 5.9 ml) and cardiac output (Δt = 0.24 to 0.47 L/min). The significant increases in early mitral valve inflow velocity and LV fractional area shortening was significantly reduced below baseline with the high dose (Δt = 73.1 ± SD). During PVS, BMS-986231 increased the mean threshold score for SVT or VF twofold versus vehicle (18.0 ± SD, 9.6) and had no impact on subsequent cardiovension to restore sinus rhythm.

Conclusions: BMS-986231 was associated with outcomes suggestive of inotropic, lusitropic and vasodilatory effects without an impact on heart rate, and with a reduc- tion in myocardial oxygen consumption. BMS-986231 did not induce arrhythmic arrhythmias and significantly increased the threshold for triggering such episodes with PVS. Based on these findings, BMS-986231 may be a suitable candidate for further development in acute decompensated HF.

38 Activation of the innate immune receptor toll-like receptor 4 (TLR4) by fibroblastin fragments negatively regulates cardiac myofibroblast differentiation

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Activation of the innate immune system receptors such as Toll-like receptors (in particular TLR4) during post-MI cardiac remodelling and progression to heart failure is generally regarded as pro-inflammatory and pro-injury, leading to adverse remodelling, increased fibrosis and decreased cardiac function. However, these adverse effects are primarily driven by activation of TLR4 on professional immune cells such as monocytes and macrophages in the inflammation-infiltrate which secretes pro-inflammatory cytokines. Our work on isolated, cultured resident cardiac fibroblasts/endothelial cells has shown that activation of TLR4 actually inhibits myofibroblast differentiation, inhibits endothelial to mesenchymal transition (EndMT) in response to TGFb and reduces the expression pro-fibrotic markers. Fibroblast TLR4 activation upregulates the expression of an anti-fibrotic, positive wound healing phenotype. This phenotypic switching is mediated by signal integration between the Ca2+ dependent protein phosphatase calcineurin (CN) and protein kinase C epsilon (PKCε) and controls the transcription of genes involved in cardiac protection and wound healing. This signalling occurs following activation of TLR4 by fragments of extra cellular matrix (ECM) proteins including specific type III repeats of fibronectin (FN), such as FN-EDA and FN-III1–3. This results in CN and PKCδ-dependent activation of the transcription factors (TFs) Nuclear Factor of Activated T-cells (NFAT) and Activator Protein-1 (AP-1) and synergistic induction of Cyclooxygenase-2 (COX-2), Lipocalin-2 (LCN2), Interleukin-6 (IL-6) and Tissue Inhibitor of MetalloProteinase-1 (TIMP-1). At the same time TLR4 activation inhibits the expression of pro-fibrotic genes including Connective Tissue Growth Factor (CTGF), several collagen isoforms and fibronectin itself. Whereas the activation of CN alone is pro-fibrotic, the co-activation of PKCδ converts this signal into an anti-fibrotic response. Interestingly, knockdown of PKCδ using siRNA or ectopic expression of DN-PKCδ causes a compensatory upregulation of PKCδ which is pro-fibrotic. Furthermore, we have shown that the POU IV class POU domain TF POU4A/Brn3a in expressed in cardiac fibroblasts and is upregulated in the border zone 24 hours after MI. Brn3a controls myofibroblast differentiation and regulates collagen fibrillogenesis generally regarded as pro-inflammatory in the fibrin clot. This TF activates the expression and activity of Brn3a and downregulates collagen expression. Therefore, TLR4 activation by specific FN type III repeats leads to the activation of perivascular myofibroblasts from a pro-fibrotic ECM secreting phenotype to a reparative wound healing phenotype and thus promotes beneficial myocardial remodelling.

39 MicroRNA-21 attenuates post-ischemic inflammation triggered by DMAPs through targeting KBTBD7

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Objective: MicroRNA-21 (miR-21) has been shown to inhibit apoptosis of cardiomyo- cytes and promote cardiac fibrosis. However, the role of miR-21 in post-ischemic inflammation remains obscure. Our aim is to determine whether miR-21 regulates DMAPs-triggered inflammation after MI in mice and investigate the underlying signal mechanism.

Methods: We engineered miR-21 knockout (KO) mice. For in vivo experiment, miR-21 KO mice or WT mice subjected with myocardial infarction which induced by left coronary ligation. The inflammatory cytokines in peri-infarct heart tissues were evaluated by Q-PCR, ELISA, IHC and double immunofluorescence staining. The LVEF, LVESS, LVEDD and LVEDD were detected by echocardiography 14 days after MI induction and the myocardial infarct size was analyzed by Masson trichrome and TTC staining. The expression of inflammatory cytokines and the activation of MAPK and NF-κB signal in macrophage triggered by DMAPs were determined.

Results: In peri-infarct heart tissues of miR-21 KO mice, the expression of IL-1β, IL-6 and TNF-α were higher than that in WT mice. LVEF and LVFS were significantly decreased, and LVESS, LVEDD and myocardiad infarct size were apparently increased in miR-21 KO mice compared with WT mice. Macrophages from miR-21 KO mice have an increased production of IL-1β, IL-6 and TNF-α which was followed upregulation of P38 and NF-κB in miR-21 KO mice. Furthermore, we found that miR-21 mimics markedly decreased the luciferase activity of wild type KBTBD7 luciferase (KBTBD7-Luc) and the expression of KBTBD7 was reduced.

Conclusions: These data show that miR-21 down-regulates inflammatory response by miR-21 KO mice, the expression of IL-1β, IL-6 and TNF-α was significantly increased in miR-21 KO mice compared with WT mice. Macrophages from miR-21 KO mice have an increased production of IL-1β, IL-6 and TNF-α which was followed upregulation of P38 and NF-κB in miR-21 KO mice. Furthermore, we found that miR-21 mimics markedly decreased the luciferase activity of wild type KBTBD7 luciferase (KBTBD7-Luc) and the expression of KBTBD7 was reduced.

40 Hypoosia induces gene-specific epithigenic modifications in human cardiac fibroblasts which are associated with the development of myocardial fibrosis and aberrant post-ischemic cardiac remodelling

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Introduction: Ischemia caused by coronary artery disease and myocardial infarction leads to aberrant ventricular remodelling and cardiac fibrosis. This occurs partly through accumulation of gene expression changes in resident fibroblasts, result- ing in an overactive fibrotic phenotype. Long-term adaptation to a hypoxic insult is likely to require significant modification of chromatin structure. We have recently shown that human myocardial tissue hypoosia is associated with an enhanced pro-fibrotic gene profile in the tissue and, more significantly, that hypoosia-induced pro-fibrotic changes in cardiac fibroblasts are associated with global DNA hypermethylation. Based on this epigenetics data, we have conducted a gene-specific methylation study to investigate methylation changes that occur in human fibro- blasts and to gain novel insights into pathways and mechanisms that may contribute to post-ischemic cardiac remodelling.

Methods: Human ventricular cardiac fibroblasts were exposed to 1% oxygen for up to 8 days. Global methylation changes were assessed using anti-5-methylcytosine (5MeC) staining, flow cytometry, QPCR, and western blot. Gene-specific methylation changes associated with hypoosia and an increased fibrotic state were determined by 5MeC immunoprecipitation and GeneChip human promoter arrays (Affymetrix).
and validated by bisulfite genomic sequencing (BGS). Gene functional classification and pathway analysis were performed (DAVID, FUNRich).

Results: Hypoxia-induced pro-fibrotic changes in cardiac fibroblasts included increased cell proliferation and increased alpha smooth muscle actin (αSMA), collagen I, DNA methyltransferase 1 (DNMT1) and DNMT3B expression which associated with global DNA hypermethylation. In specific, 32 gene-specific hypomethylation changes and 101 hypomethylation changes occurred in hypoxia. Fifteen pathophysiologically relevant genes (5 hypermethylated, 10 hypomethylated) were identified by functional classification and pathway analysis to have a role in cardiac fibrosis, extracellular matrix remodeling, transforming growth factor β (TGF-β) signaling, cell proliferation and fate, wound repair, ischemia, hypertrophy, and heart failure. These were validated by BGS.

Conclusion: Epigenetic modifications and changes in the epigenetic machinery identified in cardiac fibroblasts during prolonged hypoxia may contribute to the pro-fibrotic behavior during myocardial infarction. Therefore, using the hypoxia-inducible factor-1α (HIF-1α) may provide therapeutic benefit.

41 Studying beta-adrenergic signaling in a patient-specific induced pluripotent stem cell model for Takotsubo syndrome
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Funding Acknowledgements: DZHK, Heidenreich von Siesbold, IRTG1816, SFB1002

Purpose and Aim: Takotubso syndrome (TTS) is characterized by acute transient left ventricular dysfunction in the absence of responsible obstructive coronary lesions. The pathogenic mechanism leading to TTS is still unknown. However an adrenergic overstimulation seems to play an important role in TTS. The aim of the study was to use an in vitro induced pluripotent stem cell (iPSC)-TTS model to prove the hypothesis of an altered β-adrenergic signaling under high catecholamine stress.

Methods and Results: Human somatic TTS cells and controls were reprogrammed to iPSCs. Low and high quality iPSC clones were directly differentiated into pure functional cardiomyocytes (CMs). 3-month-old iPSC-CMs were treated with catecholamines to mimick a TTS-specific phenotype. TTS-specific cardiomyocytes (ps-iPSC-CMs), to gain a comprehensive understanding into the pathophysiology of TTS.

In conclusion, the response of cardiomyocytes to FGF23 and ATII were comparable at multiple levels (cell hypertrophy, increased cellular and nuclear CaT integral, effect of InsP3R inhibitor). Overall, our results suggest a crosstalk between FGF23 and ATII mediated calcium-dependent hypertrophic signaling in cardiomyocytes.

42 Crosstalk between FGF23 and angiotensin II-mediated calcium handling in cardiac hypertrophy.
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The hormone fibroblast growth factor 23 (FGF23) is strongly linked to heart failure-related cardiovascular mortality. It is a mediator of left ventricular hypertrophy which may involve calcium-regulated transpositional pathways. High circulating levels of FGF23 are associated with an altered systemic renin-angiotensinaldosterone system (RAAS) response. Our aim was to compare and study FGF23 and angiotensin II (ATII)-mediated calcium-dependent signaling in ventricular cardiomyocytes. Neonatal rat ventricular cardiomyocytes (NRVMs) were isolated and cultured for 5 days. ATII (1μM) or FGF23 (25ng/ml) were used as hypertrophy stimuli. Cell surface area was studied by immunostaining with NRVM specific desmin antibody. Time-dependent changes in gene expression (1-24h) were accessed by qPCR. Calcium transient (CaT) amplitude (F/F0peak at 1Hz; F0 = 4 AM) and integral were quantified in cytosol and nucleus. Phospholipase C (PLC-) phosphorylation levels were detected by Western blot.

Both ATII and FGF23 treatment induced hypertrophy in NRVM as reflected by cell area and pro-hypertrophic gene expression. Cell area was increased by 46.8% with ATII and by 37.4% with FGF23 after 48h (p <0.001). ATII showed peak increase at 1h in ACTA-1 (1.9fold; p = 0.08) and RCAN-1 (1.9fold; p <0.05) gene expression. For FGF23, peak increase was observed at 6h for ACTA-1 (6.0fold; p <0.05) and RCAN-1 (2.4fold; p <0.05).

NRVMs treated (15 mins-1h) with ATII or FGF23 showed similar early changes in CaT. Both the treatment elicited increase in F/F0peak (1.5fold) and integral (2-2.8fold) in cytosol (p <0.01). However, there was more pronounced rise in integral for ATII (2.9fold) and FGF23 (3.7fold) in the nucleus (p <0.001) than in cytosol, suggesting augmented calcium release into the nucleus with both treatments. Further, this effect of ATII and FGF-23 on nuclear CaT integral was decreased with inositol trisphosphate receptor (InsP3R) inhibitor 2-APB (5-10μM), implyinginvolvement of InsP3R in the nuclear calcium release.

Further, we used ATII receptor antagonist, losartan (1μM) on the FGF23 treated NRVMs to decipher the overlap between FGF23 and ATII signaling. Losartan inhibited FGF23-induced increase in cell surface area after 48h (p <0.001) and completely attenuated the FGF23-mediated alterations in CaT. These outcomes indicate an involvement of intracellular ATII in FGF23-mediated signaling. On the other hand, FGFR4-PLC--Calcineurin pathway is known to mediate FGF23 induced cardiomyocyte hypertrophy.Losartan inhibited PLC- phosphorylation in presence of FGF23 (p <0.005) suggesting a possible mechanism by which it obstructs the effects of FGF23 treatment.

In conclusion, the response of cardiomyocytes to FGF23 and ATII are comparable at multiple levels (cell hypertrophy, increased cellular and nuclear CaT integral, effect of InsP3R inhibitor). Overall, our results suggest a crosstalk between FGF23 and ATII mediated calcium-dependent hypertrophic signaling in cardiomyocytes.

43 Cardiotrophin-1 is associated with perivascular fibrosis, increased collagen cross-linking and diastolic dysfunction in Dahl salt-sensitive hypertensive rats with heart failure with preserved ejection fraction
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Funding Acknowledgements: Instituto de Salud Carlos III (CIBERCV CB16/11/00483; FIS PI15/01909); European Commission FP7-FIBRO-TARGETS.

Background: Myocardial interstitial fibrosis, characterized by increased deposition and stiffness (i.e. collagen cross-linking or CCL) of collagen fibres, is a common feature in patients with heart failure with preserved ejection fraction (HFp EF). On the other hand, cardiotrophin-1 (CT-1) has been shown to be associated with myocardial fibrosis in experimental models but its role has been poorly analysed in HFp EF.

Purpose: This study was designed to analyse the expression of CT-1 in a rodent model of hypertension and HFpEF and to evaluate its association with myocardial fibrosis and left ventricular (LV) morphology and function.

Methods: Dahl salt-sensitive male rats started receiving a high salt diet at 7 weeks of age (HS; n = 18) until sacrifice (at 23 weeks). A control group (n = 8) was fed with a normal diet all along the study. Blood pressure was evaluated in a subgroup of animals (n = 3 per group) by telemetry. LV mass, morphology, systolic and diastolic
function were evaluated by echocardiography. Total, interstitial and perivascular myocardial fibrosis was measured in picrosirius red-stained sections using an image analysis software (Cell D). CCL was evaluated by colorimetric and enzymatic techniques. CT-1 mRNA and protein levels were analysed by real time RT-PCR and western blotting, respectively. Lysyl oxidase (LOX) protein levels were analysed by western blotting.

**Results:** Compared to control rats, HSD animals showed increased (P < 0.05) mean arterial pressure, LV hypertrophy (increased left ventricular mass [P < 0.001] and relative wall thickness [P < 0.05]), and diastolic dysfunction (decreased E/A [P < 0.05] and increased isovolumetric relaxation time [P < 0.05]) with similar ejection fraction. These rats presented higher LV fibrosis (P < 0.01) with an increase both in interstitial (P < 0.05) and perivascular (P < 0.001) fibrosis. They also showed increased CCL (P < 0.01) and increased expression of LOX (P < 0.05), the main enzyme responsible for CCL. The myocardial expression of CT-1 was higher in HSD rats than in control rats both at mRNA (P < 0.05) and protein (P < 0.05) level. CT-1 protein was directly correlated with total (r = 0.438; P < 0.05) and perivascular (r = 0.481; P < 0.05) LV fibrosis, with CCL (r = 0.493; P < 0.05) and with LOX (r = 0.721; P < 0.001) in all animals. Moreover, it was inversely correlated with the E/A ratio (r = -0.457; P < 0.05) in all rats.

**Conclusions:** CT-1 is increased in the myocardium of hypertensive HSD rats with HFPEF and is associated with LV perivascular fibrosis and increased CCL, as well as with diastolic dysfunction. These results suggest that CT-1 facilitates the development of myocardial fibrosis and stiffening which may contribute to the development of LV diastolic dysfunction and the progression to HFPEF in this experimental model.
44 Daytime periodic breathing patterns and risk of appropriate cardioverter defibrillator therapies in heart failure patients

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Background: Although Central Sleep Apnea (CSA) is a recognized risk factor for life-threatening arrhythmias (T Bitter and coll. Int J Cardiol 2014), Abnormal breathing patterns in the form of periodic breathing (PB) - are frequently observed during daytime in patients with heart failure (HF) but their contribution to an increased malignant arrhythmia susceptibility is not known.

Methods: We analysed data from 378 patients with clinically stable, optimally treated moderate-to-severe HF (age 59 ± 9 years, NYHA class 2.7 ± 0.5, LVEF 31 ± 9%) who had a cardioverter defibrillator implanted according to current guidelines. All patients were submitted to a 10-minute daytime supine respiratory recording. PB was defined as an oscillation of tidal volume with regularly recurring hyperventilation and apnea or hypoapnea, with a greater than 25% variation in peak to trough values of tidal volume occurring in more than 75% of the min record. Cox-regression models were used to assess the association between PB and appropriate ICD discharge.

Results: PB was observed in 158/378 (42%) patients. Patients with PB were older (60 ± 9 vs 57 ± 9 years, p = 0.002), with a lower ejection fraction (29 ± 6 vs 31 ± 9%, p = 0.04) and a higher NT-proBNP (2611 ± 3747 vs 1988 ± 2390, p = 0.008) and creatinine value (1.5 ± 0.6 vs 1.4 ± 0.5, p = 0.03). During a median of 33.5 months, 71 patients had an appropriate ICD discharge. No significant differences were observed in clinical predictors between patients who did or did not receive appropriate ICD discharge. At univariate analysis PB was a significant predictor of ICD discharge (Relative Risk 1.72, 95% CI 1.08-2.77, p = 0.01). The presence of PB remained significant (p = 0.003) in a multivariable model including LVEF, creatinine, NT-ProBNP, serum potassium level, NYHA class, and six-minute walking test.

Conclusions: The presence of PB has a relevant impact on the occurrence of malignant arrhythmic events requiring ICD discharge in patients with heart failure.

46 Global longitudinal strain (GLS) by speckle-tracking echocardiography (STE) predicts appropriate defibrillator therapy in patients with dilated cardiomyopathy (DCM)

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Background: Patients (pat) with DCM have an increased risk for sudden cardiac death (SCD) which may be prevented by an implantable cardioverter-defibrillator (ICD). Current guidelines link the indication to implant an ICD in DCM pat to a left ventricular ejection fraction (LVEF) of <35%, LV GLS as assessed by STE, directly measuring myocardial deformation in the longitudinal dimension, is a new method to characterize global LV function.

Aim: The aim of this study was to assess whether GLS measurements predict the rate of appropriate ICD therapies in DCM-pat.

Methods: Pat with DCM who underwent primary prophylactic ICD implantation from 2011-2016, who had baseline echocardiographic scans for STE analysis, and a follow-up duration of >6 months were included. ICD interrogation data were retrieved from our electronic records. Pat with secondary preventive ICD indication were excluded.

Results: 115 pat were included (26% females, age: 61.3 ± 12.4 years, LVEF 27.9 ± 5.4%, NYHA functional class 2.7 ± 0.5). During a follow-up time of 35.2 ± 12.3 months 30 pat had at least one appropriate ICD therapy (25 pat had anti-tachycardia pacing (ATP), 8 pat had ICD-shocks). Mean GLS in pat with ICD therapy was significantly worse than in those without ICD therapy (−6.4% vs. −7.8%, p = 0.016). Multivariate logistic regression analysis showed that GLS (odds ratio 1.31, 95% confidence interval: 1.07-1.60, p = 0.01) and FU duration (OR 1.05, 95% CI 1.02-1.07, p = 0.001) but not LV-EF (OR 0.99, p = 0.17) were the only independent predictors of appropriate ICD therapy.

Conclusion: Our findings indicate that LV GLS is a useful marker to risk stratify pat with DCM, outperforming the current standard LV-EF.

47 Remote ischemic conditioning in ST elevation myocardial infarction as adjuvant to primary angioplasty: one-year results of a randomized clinical trial

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Funding Acknowledgements: Portuguese Foundation for Science and Technology; European Commission Grant FP7-Health-2010; Jos de Melo Sade.

Background: Despite a significant improvement in STEMI care, mortality and morbidity remain high. One of the possible reasons is that reperfusion itself may paradoxically cause additional myocardial injury, through the so-called ischemia-reperfusion injury (IRI). Remote cardiac ischemic conditioning (RICIC) has shown encouraging results in reducing IRI.

Purpose: To evaluate the clinical impact of RICIC as an adjuvant to primary angioplasty in STEMI.

Methods: We conducted a randomized clinical trial to evaluate RICIC versus no intervention in patients with STEMI with <12 h of symptom evolution (exclusion criteria: shock, post-cardiorespiratory arrest status or indication for surgical revascularization rather than angioplasty). RICIC consisted of intermittent left thigh ischemia through three cycles of 5-min inflation followed by 5-min deflation of a blood-pressure cuff. The primary endpoint was a combined endpoint of cardiac death or hospitalization for heart failure (including device implantation: implantable cardioverter defibrillator, cardiac resynchronization, or left ventricular assist device).

We report an interim evaluation at one-year follow-up.

Results: 516 patients were randomized, of which 448 were retained for analysis (231 in the RICIC group and 217 in the no-intervention group). There were no differences in baseline characteristics between the 2 groups. Patients without RICIC evolved more frequently with heart failure during the initial hospitalization (24.4% vs. 16.9%, p = 0.08). There were also more in-hospital deaths of cardiac cause among patients not submitted to RICIC (1.8% vs. 0.6%, p = 0.10). At follow-up, patients not submitted to RICIC had more frequently an EF <40% (18.8% vs. 10.1%, p = 0.03). At one-year follow-up, the combined endpoint was more frequent in nonconditioned patients (8.2% vs. 2.3%, p = 0.007).

Conclusion: In this randomized study, RICIC as an adjuvant to primary angioplasty was associated with a better prognosis.
Echocardiographic criteria for HFpEF were used according to the 2016 ESC HF guidelines. A total of 1039 patients were included, complete echocardiography and ECG at 4-8 weeks were available in 356 patients. The primary study endpoint was time to death from all causes or first hospitalisation for HF.

Results: Signs of structural dysfunction (LAVI ≥ 34 ml/m² or UVIM ≥ 50/115 g/m²) were found in 92% (n = 329) and diastolic dysfunction (DD) (E/e' ≥ 13, or < 9 cm/s, or TR ≥ 2.8 m/s) in 82% (n = 290). At least one criterion for HFpEF was found in 98% (n = 331) and 94% (n = 333) had ≥ 2 criteria. Grading was possible in 352 (99%): 107 patients (30%) had mild DD, 97 patients (27%) had moderate DD and 124 patients (35%) had severe DD. Normal diastolic LV function was found in 24 patients (7%) and 4 (1%) were non-classifiable. After multivariate analyses with adjustment for age, gender, LVEF and natriuretic peptides we found two independent predictors of worse prognosis for event-free survival: moderate to severe diastolic dysfunction (p = 0.0037) or a high number (≥4) of abnormal echocardiographic parameters (p = 0.0033).

Conclusion(s): A vast majority of patients presenting with acute suspect HFpEF met objective echocardiographic criteria for HFpEF according to ESC guidelines. Our findings support the use of ESC guidelines for diagnosis and risk prediction in HFpEF.

<table>
<thead>
<tr>
<th>Number of pathological diastolic parameters</th>
<th>Hazard ratio 95% CI</th>
<th>L 95% CI</th>
<th>U 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8 vs 1-3 pathological parameters</td>
<td>0.51</td>
<td>0.32</td>
<td>0.79</td>
</tr>
<tr>
<td>Grade of diastolic dysfunction (DD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate/severe DD vs none/mild DD</td>
<td>0.56</td>
<td>0.37</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Multivariate analysis of 1) the nr of diastolic parameters and 2) grade of diastolic dysfunction, with adjustment for age, gender, EF and BNP/NT-pro-BNP. CI L / CI U = lower/ upper control limit of 95% confidence interval.

Survival vs nr of abn. diast. parameters

Heart failure with a preserved ejection fraction in Asia

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Funding Acknowledgements: Boston Scientific, National Medical Research Council of Singapore, A*STAR Biomedical Research Council ATTReC, Bayer

Background: Asia has the largest proportion of the worlds population, and has the highest global burden of hypertension and diabetes, both known risk factors for heart failure with preserved ejection fraction (HFpEF). However little is known about the clinical characteristics of HFpEF across different parts of Asia.

Purpose: To compare the clinical characteristics and outcomes of HFpEF across Asia.

Methods: The baseline clinical characteristics and outcomes of 1203 patients with HFpEF (LVEF ≥ 50%) from 11 Asian countries, grouped as East Asia (Hong Kong, Taiwan, China, Japan and Korea, n = 543); South Asia (India, n = 252); and Southeast Asia (Malaysia, Thailand, Singapore, Indonesia, Philippines, n = 408) were analyzed. Outcomes were independently adjudicated.

Results: The mean age was 68 ± 12 years (37% were > 65 y), 50% were women, body mass index was 27 ± 6 kg/m² and 80% were in NYHA Class II/III. South Asian patients (63 ± 13 years) were the youngest, and East Asians the oldest (72 ± 12 years). Comorbidities were highly prevalent albeit varying by region (Figure): 70% of patients had 2 or more comorbidities, with hypertension (71%) being the most common, followed by anemia (57%), chronic kidney disease (50%), diabetes (45%), coronary artery disease (29%), atrial fibrillation (AF; 29% by history; 24% by ECG) and chronic lung disease (9%). Notably, Southeast Asian patients had the highest prevalence of all comorbidities except AF. South Asians had the lowest prevalence of all comorbidities except anemia. These regional differences in the burden of comorbidity were associated with differences in echocardiographic characteristics and outcomes. Concentric remodeling and hypertrophy were most prominent among South and Southeast Asians respectively, whereas East Asians had the most eccentric remodeling (Figure; p < 0.001). Among 883 patients who completed 6 months follow-up, 69 (7.8%) patients died or were hospitalized for HF, with the highest number of events in Southeast Asians (14.1%).

Conclusion: These first prospective multinational data from Asia show that Asian patients with HFpEF carry a high burden of co-morbidities despite relative youth, with approximately a third of patients being under the age of 65 years. There is striking diversity of HFpEF in Asia, with the highest rates of comorbidities, concentric hypertrophy and adverse outcomes observed in Southeast Asia. These findings have important implications for public health measures and global HFpEF trials.
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Do patients with acute heart failure and preserved ejection fraction have heart failure at follow-up, impact of Framingham criteria
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On behalf of: KaRen group

Purpose: Heart failure with preserved ejection fraction (HFpEF) is heterogeneous and poorly defined. We assessed prevalence and consistency of Framingham signs and symptoms in acute vs. stable HFpEF.

Methods: In the multi-center Karolinska-Rennes HFpEF study, patients with acute HF according to Framingham criteria, EF ≥55% and elevated brain natriuretic peptides (BNP; NT-proBNP >300 ng/L; BNP >100 ng/L) were assessed again in stable condition 4-8 weeks after hospitalization. Logistic regression was used to assess association between baseline characteristics and types and number of Framingham criteria in acute HFpEF, and the presence of HF at follow-up defined according to four models based on Framingham, the ESC and the PARAGON trial echo criteria (TABLE 1).

Results: In 398 patients, all met Framingham criteria for HF in acute HFpEF and the number of Framingham “points” (2 for major criterion; 1 for minor) were in median 8 (Interquartile range 6-10) in acute HFpEF and 2 (1-4) at stable follow-up (p <0.01). The most common criteria in acute HFpEF were dyspnoea at exertion (35%) and pulmonary rales (71%), which were present in 70% and 13% respectively at follow-up. At follow-up HF was present according to the four models in 27%, 22%, 22% and 22% respectively. Associations between acute characteristics and presence of HF at follow-up are shown in TABLE 2.

Conclusions: Among patients with acute HFpEF, only a quarter meet the HF defini- tion at stable follow-up according to different contemporary criteria. Characteristics of acute HFpEF that predict persistent HF at stable follow-up were higher age and JVD but not severity of HF. Pleural effusion and tachycardia may yield “false positive” HFpEF diagnoses. This has implications for HFpEF trial design and patient screening.

Table 1
<table>
<thead>
<tr>
<th>Variable at baseline</th>
<th>Framingham criteria only</th>
<th>Framingham criteria + NP criteria</th>
<th>Framingham criteria + NP criteria + ESC</th>
<th>NP criteria + ESC + Paragon</th>
<th>Paragon heart disease criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=107 (27%)</td>
<td>n=82 (22%)</td>
<td>n=61 (22%)</td>
<td>n=69 (22%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age per year</td>
<td>1.02</td>
<td>1.04*</td>
<td>1.05*</td>
<td>1.04*</td>
<td></td>
</tr>
<tr>
<td>NYHA I–II vs. III–IV</td>
<td>0.76</td>
<td>0.80</td>
<td>1.10</td>
<td>1.03</td>
<td></td>
</tr>
<tr>
<td>NT-proBNP per log</td>
<td>1.30</td>
<td>1.23</td>
<td>1.29</td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td>BNP per log</td>
<td>1.09</td>
<td>1.40</td>
<td>1.34</td>
<td>1.37</td>
<td></td>
</tr>
<tr>
<td>Framingham per point</td>
<td>1.06</td>
<td>1.09</td>
<td>1.09</td>
<td>1.10*</td>
<td></td>
</tr>
<tr>
<td>Jugular venous distension</td>
<td>1.80*</td>
<td>2.56</td>
<td>2.89*</td>
<td>2.58</td>
<td></td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>0.45</td>
<td>0.41*</td>
<td>0.34*</td>
<td>0.35*</td>
<td></td>
</tr>
<tr>
<td>Tachycardia (&gt;100 bpm)</td>
<td>0.87</td>
<td>0.61</td>
<td>0.51</td>
<td>0.52*</td>
<td></td>
</tr>
</tbody>
</table>

Odds ratios for presence of HFpEF: *p <0.05

51
Capnography in spontaneously breathing chronic heart failure patients: resting partial pressure of end-tidal carbon dioxide a new non-invasive factor on heart failure.
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Introduction: Given the elevated risk of adverse events in patients with heart failure (HF), identifying clinical variables with prognostic value that are also easily obtainable and cost-efficient is a high priority. The partial pressure of end-tidal CO2 (PetCO2) measured by cardiopulmonary exercise testing (CPX) at rest and during exercise has been shown to accurately reflect disease severity and cardiac function in HF patients. The partial pressure of end-tidal CO2 (PetCO2) measured by capnography was introduced by Fletcher during the early 1980s and most clinical applications concerning intubated and ventilated patients. The use of capnography in spontaneously breathing patients resulted however in additional technical and clinical challenges.

Purpose: The purpose of the current study was to evaluate the pattern of behavior of resting PetCO2 measured by LifeSense Tabletcap in spontaneously breathing HF patients, compare to PetCO2 measured in resting and exercise by CPX (rest PetCO2CPX and peak PetCO2CPX) and evaluate the correlation with important prognostic parameters in HF (peak Oxygen consumption peak VO2 and the minute ventilation–carbon dioxide production relationship VE/VCO2 Slope).

Methods: A total of 155 patients with reduced left ventricle ejection fraction (LVEF < 50%) in current standard medical therapy were included in this analysis. All patients collected the resting PetCO2CAP after one, two and three minutes of rest, followed by a symptom limited CPX in bicycle for the measured of resting PetteCO2CPX, peak PETCO2CPX, peak VO2 and VE/VCO2 slope. The data were analyzed in SPSS 21 and significance was considered as < p<0.05. The strength of reproducibility between three measures of resting PETCO2CAP was evaluated by the intra-class coefficient (ICC) of correlation. The association between PetCO2CAP, PetCO2CPX and VE/VCO2 slope was made by the Pearson correlation test.

Results: One hundred fifty-five HF patients (gender =60.01%, male; age =56.3 ± 12.9 years; 35.5% ischaemic HF, 39.4% NYHA class III, peak VO2 =13.8 ± 5.5 ml/kg-1-min-1, VE/VCO2 Slope =35.9 ± 12.5, LVEF = 38.0 ± 5.1%) were evaluated. The ICC between the three measures of resting PetCO2CAP demonstrate con-cordance among observations (ICC = 0.983 (0.978-0.987), p < 0.001). There was positive correlation between mean resting PetCO2CAP and peak VO2 (r = 0.352, p < 0.001), resting PetCO2CPX (r = 0.373, p < 0.001) and peak PetCO2CPX (r = 0.431, p < 0.001) and inverse correlation between resting PetCO2CAP and VE/VCO2 Slope (r = -0.481, p < 0.001).

Conclusion: Data supporting the potential clinical utility of capnography in spontaneously breathing chronic HF patients. Our results of the study support the cor-relation between resting PETCO2CAP by capnography and measured during CPX and the VE/VCO2 slope. We are describing a new non-invasive parameter that could be a useful prognostic marker in HF patients resting PETCO2CAP by capnography.

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The left ventricular noncompaction syndrome in fifty adults: clinical variants, follow-up and outcomes
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Purpose: To study clinical variants, follow-up and outcomes of the left ventricular noncompaction (LVN) syndrome in adult patients.

Methods: The diagnosis of LVN was established in 50 adults (22 females, 18-76 years, on the average 42.8 ±14.9) on the basis of visual criteria, in 12 patients using three methods (ECHO-CG, MRI, CT), in 32 patients using any two methods. Were also performed myocardial biopsy and autopsy (n =10/4) with viral DNA detection (real-time PCR), anti-heart antibody measurement. The mean follow-up was 12 [5, 25, 55] months.

Results: There was a high frequency of the association of LVN syndrome and other heart disease by adults; 7 patients (14%) had congenital heart disease (atrial and ventricular septal defects, pulmonary artery stenosis, bicuspid aortic valve, vascular malformations), 3 (6%) hypertrophic cardiomyopathy, 2 (4%) arhythmogenic right ventricular dysplasia, 1 (2%) systemic myxodystrophy, 1 (2%) restrictive cardiomyopathy, 1 (2%) Danon disease. Only one patient with LVN syndrome had no symptoms, but signs of dilated cardiomyopathy (DCM). In 9 patients (18%) LVN had “idiopathic” arrhythmia mask, in 15 patients (30%) mask of DCM, in 7 patients (14%) LVN was first identified at the same time with acute myocarditis. In 6 cases (12%) LVN was associated with coronary atherosclerosis, but in 2 patients (4%) the initial diagnosis “ischemic heart disease” was false. The associated myocarditis was in 28 patients (58%) detected, incl. 12 patients by morphologic study of myocardium and one patient with sarcoïdosis. The virus was found in 6 patients in the myocardium (parovirus B19 in 5, human herpes virus type 6 in 2, herpes simplex virus type 1, 2 in 1 and Epstein-Barr virus in 1) and in 12 patients in the blood. Heart failure was in 86% of patients and angina pectoris in 32% diagnosed; 7 patients had a typical signs of the myocardium infarction. The incidence of atrial fibrillation was 30%, stable and unstable ventricular tachycardia 78%. The average LV diastolic size was 61.3 ± 0.8 cm, LV ejection fraction 34.8 ± 14.0. Eleven patients (23%) without anticoagulants had intracardiac thrombi; 15 of them had LV ejection fraction less than 40%. Six patients (12%) had embolism (renal,
53 Causes and consequences of longitudinal left atrial dysfunction assessed by 2D-strain echocardiography in patients with cardiac amyloidosis

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**Background:** In cardiac amyloidosis (CA), left atria (LA) enlargement, dysfunction (LASD) and intra atria thrombi have been described mostly in systemic light chain CA (AL). The prevalence and physiopathological causes and consequences of these alterations are unclear.

**Purpose:** Demonstrate that LA 2D strain echocardiography (2D-SE), a new tool, is useful to analyse LA systolic dysfunction and to explore its causes, consequences and association with thromboembolic events in different types of CA.

**Methods:** CA patients in sinus rhythm were included. At baseline, history of thromboembolic event, clinical and biological characteristics and echocardiography were recorded. Global and regional LA longitudinal strain (LS) by 2D speckle-tracking echocardiography (2D-SE) were measured. Patients were followed-up to identify independent predictors of mortality.

**Results:** Seventy-six CA, of whom 21 had AL, 42 hereditary transthyretin (m-TTR) and 13 wild-type (wt-TTR) were included. Peak atrial longitudinal strain (PALS-4C) was negatively correlated to NT-proBNP ($r = -0.6$, $p < 0.0001$) and to LA end-diastolic volume ($r = -0.48$, $p = 0.001$). LA volume was higher and PALS-4C more altered in wt-TTR compared to the AL and m-TTR. The 19 patients who presented a history of thromboembolic event at baseline, had a significantly lower PALS-4C compared to those without ($p = 0.003$). No association of PALS-4C and LA infiltration estimate by Cardiac MRI and by bone scintigraphy was observed. Multivariate analysis identified PALS-4C as the only left atrial echocardiographic independent factor of mortality with an optimal cutoff value of 9.5% (AUC 0.75, IC95% 0.60-0.89). Therefore including all the variables, only NT-proBNP was an independent marker of prognosis.

**Conclusions:** Atrial function estimated by strain is useful to identify patients at risk of death and might be helpful to select patients that may benefit from preventive anticoagulant treatment.
Acute heart failure with eosinophilia is not a common presentation but may signal an underlying reversible myocarditic process if recognised early. Making a diagnosis of the aetiology of the heart failure in this situation involves investigating the several causes of eosinophilia. We present such a patient who presented many learning points to the heart failure team looking after him.

A 65 year old lady with a previous history of asthma and skin rashes presented with a clinical picture of a respiratory tract infection with marked eosinophilia of 9.06 x 10^9 /L but no pneumonia. She later developed signs of acute heart failure with a higher eosinophil count of 22.94 x 10^9 /L and a large Troponin T rise of 3153 ng/L with a normal ECG and severe left ventricular systolic dysfunction on echocardiography. Myocarditis was suspected and confirmed on cardiac MRI which showed patchy late gadolinium enhancement with myocardial oedema and a LVEF of 28%. Coronary angiography was normal and the vasculitis screen showed an indeterminate pattern anti-neutrophil cytoplasmic antibodies (ANCA) and raised IgE. Other causes of eosinophilia such as parasitic and other infections, haematological malignacies (including bone marrow biopsy, trefoil and cytogenetic studies) and drugs were excluded but peripheral neuropathy was diagnosed on neurophysiology investigations. The differential diagnosis at this point was between hyperesinophilic syndrome and Eosinophilic Granulomatosis with Polyangiitis (EGPA). An endomyocardial biopsy was undertaken which showed eosinophilic myocarditis. Finally, EGPA was felt to be the most likely diagnosis. She was successfully treated with high dose steroids and azathioprine along with tacrolimus, mycophenolate mofetil and prednisone, undergoing outpatient follow-up.

Conclusion: The patient with Chagas disease, after cardiac transplant, must me submitted to immunosuppressant therapy aiming to inhibit the graft rejection. Therefore, he becomes susceptible to the disease reactivation. The focus, in this case, is the early diagnosis, once further damages must be avoided, between them, the loss of cardiac function. Thus, a classical sign as the presence of cutaneous lesions, easily seen to the ectoscopy, can’t become unnoticed, for the treatment to be soon begun and the reactivation reversed.
Acute myocarditis and myositis after immune checkpoint inhibition

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A 74 year old man with metastatic malignant melanoma presented to the emergency department with exertional dyspnea, fever, diplopia images, and muscle weakness nineteen days after intravenous infusion of nivolumab and ipilimumab. There were no abnormalities in the examination of heart and lung. Edema and signs of a deep venous thrombosis were absent. Neurological examination revealed bulbary deviation and ptosis on the left side. An ECG showed sinus rhythm tachycardia (110/min), new atrioventricular block I, complete right bundle branch block, and left anterior hemiblock. The blood work revealed ten-fold elevated troponin T and creatininase levels. Initial transthoracic echocardiography showed sepsis and hypokinesia. Suspected non-ST-segment elevation myocardial infarction was immediately ruled out by invasive coronary angiography. As D-dimers were not elevated, pulmonary embolism was unlikely. Neurological symptoms gave rise to perform a cerebral MRI scan, which did not show any abnormalities. Further analyses revealed strongly elevated anti-myoelmal, anti-sarcolemmal, anti-titin, and anti-voltage gated calcium-channel-(VGCC, N-Type) antibodies. Cardiovascular MRI showed a slight, but insignificant myocardial gadolinium uptake. The findings led us to suspect autoimmune related adverse events after administration of nivolumab and ipilimumab. Thus, oral glucocorticoid therapy was initiated. Septal dyskinesia, atrioventricular block disappeared. During short term follow up, the patient reported amelioration of dyspnea, but still suffered from diplopic pictures. An intravenous immunoglobulin therapy was performed over five days, but the patient still was compromised and creatinkinase and troponin levels did not decrease. Finally, skeletal and endomyocardial biopsy were performed.

The diagnosis of myocarditis and myositis was confirmed and most likely attributed to the past therapy with nivolumab and ipilimumab. PCR for typical cardiotropic viruses was negative. Both, the myocardium and skeletal muscle showed intense fibrosis and inflammatory cell infiltration dominated by lymphocytes. Immunohistochemical staining revealed that about 80% of the cells were CD3 + T-lymphocytes and accounted in equal parts to the CD4 + and CD8 + subgroup. Morphophagocytosis was seen in areas where CD68 + macrophages were infiltrating skeletal muscle and myocardium. Interestingly, there was a significant membranous expression of Programmed Cell Death Protein 1 (PD1) ligand on cardiomyocytes and myocytes whereas about 50% of the infiltrating lymphocytes were positive for PD1 receptor. Nivolumab blocks the PD1 receptor on T-lymphocytes, thereby inhibiting immuno-suppressive signaling throughout cancer cells overexpressing PD1 ligand in order to evade the hosts immune system. Accordingly, PD1 receptor blockade on lymphocytes with nivolumab might not only have lead to an intensified immune attack against cancer cells, but also to an intensified autoimmune attack against the patients self tissues including striated muscle cells with the result of a cytotoxic and humoral immune reaction.

Immune checkpoint inhibitors actively belong to the most promising therapy options for patients with end stage melanoma and probably many other cancer entities. Accordingly, the absolute number of IRAE might increase in the future challenging inpatient and outpatient physicians.

Managing acute heart failure (AHF) in severe dengue-leptospirosis coinfection - Walking a tightrope

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Introduction: Acute myocarditis often caused by a viral infection, and less common non-viral pathogens. It is usually mild and self-limiting, but may rarely manifests as a severe fulminant form, resulting in cardiogenic shock with a high mortality.

Case: We present a 68 year-old man complaining of fever and lethargy for 5 days. He was febrile, dehydrated and hypotensive. Fluid resuscitation was given but he developed acute pulmonary oedema shortly after. ECG showed diffuse ST depressions over leads V3-V6. An echo showed global LV hypokinesia EF 35%, elevated LV filling pressure (elevated E/e’a 15, eWCP of 17mmHg). Cardiac troponins were markedly raised. He denied chest pain and there were no symptoms of heart failure prior to this. Investigations showed severe thrombocytopenia and lactate acidosis. He was reviewed by cardiologist and ID team, and was diagnosed with fulminant myocarditis secondary to severe dengue-leptospirosis coinfection, based on positive serology for the two disease.

His condition remained critical, required BIPAP respiratory support. Antibiotic was started. He was in the critical phase of an acute dengue infection with potential plasma leakage, hence, the use of diuretic would risk of further depleting the intravascular volume and causing distributive shock. Calcium carbobal was maintained with inotrope infusion (noradrenaline,dobutamine) and continuous hemodynamic (CO,CI,SVRI,SVR) monitoring were used to guide fluids/diuretic therapy during the critical phase.

He presented to improve after 48 hours. Serial echo showed good LV function recovery (EF 52%). He did not agree for angiogram and was discharged after one week. CMR which was done 3 days later showed no LGE in the myocardium.

Discussion: In this patient who presented with acute febrile illness and thrombo-cytopenia; dengue hemorrhagic virus and zoonotic-leptospirosis infection need to be considered as it is highly prevalent in the South East Asia, and acute myocarditis has been reported in both conditions, resulting in AHF. Differentiate acute myocardi- tis from an acute myocardial infarction can be challenging, and to perform a diagnostic procedure such as endomyocardial biopsy or angiongram here would certainly carry a high risk of bleeding and complications. Therefore, diagnosis of fulminant myocarditis here could only be made clinically, and the absence of chest pain would make the diagnosis of Type 1 spontaneous MI less likely.

Dengue shock syndrome has a high mortality and it is often due to plasma leakage during the critical phase, causing hypovolaemic shock which would require fluids resuscitation. However, in this patient who also complicated with severe LV dys-function and cardionic shock, excessive fluids had resulted in acute pulmonary oedema. Therefore, managing this patient was extremely challenging, as on one hand it was essential to maintain adequate cardiac output and perfusion, but on the other hand, overzealous fluid replacement could lead to worsening pulmonary congestion. The use of continuous hemodynamic assessment (CO,CI,SVR) here has become invaluable in determining the inotropic/fluids/diuretic therapy.

Fulminant myocarditis is associated with a higher mortality, but following the acute phase, LV function usually recover. Mechanical circulatory support with VAD as a bridge to recovery has been successfully used in intractable HF.

Conclusion: In summary, identifying the underlying aetiology of AHF is crucial, in order to tailor the individualise treatment for AHF. In this case, a multidisciplinary care is important, and resulted in a favourable clinical outcome.

Endomyocarditis as a rare complication of toxocariasis

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We present a case of a patient with rare and life-threatening cardiac complication of toxocariasis. A 53-year-old man was admitted to neurological department of hospital for recent motor weakness, ataxia, priapus and increased body temperature to 37.5. He had a previous history of asthma, but did not take any medications. The vital signs were blood pressure 110/70 mmHg, heart rate 110/min, respiratory rate 19/min, body temperature 37.5. Initial laboratory investigations showed leukocytosis (29.805/µL), erythrocyte sedimentation rate 35, prolonged prothrombin time was 29.73 ng/mL. Serum total IgE level was 401 IU/mL, C-reactive protein was 158.59 mg/L. Chest x-rays was unremarkable. An electrocardiogram showed sinus tachycardia and nonspecific T wave and ST depression on inferior and posterolateral leads. Computer tomography of the brain did not reveal pathology and computer tomography of the chest and abdomen showed a splenomegaly and an increased number of normal-sized mediastinal and retroperitoneal lymph nodes. Echocardiogram revealed increased left ventricle (LV) wall thickness (12

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A case of myocardial infarction in a patient with crohn’s disease who responded promptly to selenium supplementation

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Introduction and case report description: A 44-year-old woman was evaluated for progressive, severe dyspnea and tachycardia while she had been hospitalized for crohn’s disease with multiple intestinal fistules and perianal abscesses in the gastroenterology department. Physical examination revealed an under-nourished cachectic and orthopneic woman. She had a blood pressure of 100/60 mmHg and a persistent sinus tachycardia at a rate of 140 beats per minute, respiratory rate of 23 breaths per minute and an oxygen saturation of 90% despite continuous oxygen therapy given at a rate of 4 liter per minute. She had an elevated jugular venous pressure and third heart sound heard at apex but no pericardial friction rub. Fine crackles and decreased breath sounds were heard at bilateral bases of her lungs, left greater than right. Laboratory studies revealed a hematocrit of 32-4%; a white blood cell count of 11.3 X 10³ and a normal platelet count. Her high-sensitivity troponin and NT-proBNP levels were elevated, at 78.1 ng/ml (normal range < 15 ng/ml) and 35,000 pg/ml, respectively. The erythrocyte sedimentation rate was 22 mm/h, C-reactive protein concentration 182 mg/L, and the albumin level 2.8 g/dL. Serum selenium level was 3.62 microgram per liter (normal range 46-143). The electrocardiogram showed sinus tachycardia with non specific ST-T wave changes. A chest radiograph revealed interstitial pulmonary edema and left-sided pleural effusion. Transhoracic echocardiography (TTE) revealed global hypokinesis of left ventricular (LV) walls, severe LV systolic dysfunction with an ejection fraction of 30% and a mild- to moderate-sized pericardial effusion without evidence of tamponade physiology (Figure 1). Angiography showed normal coronary arteries. Description of the problem: This patient had decompensated heart failure most probably due to subacute myocarditis. She also had selenium deficiency due to malnourishment. Answers and discussion: Myocarditis in this patient could be related to enhanced systemic inflammatory immune response which is a well known condition in crohn’s disease. Myocarditis and cardiomyopathy could also be due to selenium deficiency which is usually described in crohn’s disease. She was treated with ramipril, kaneveldil, spiranilactone and furosemide. After that, dyspnea diminished and she was discharged with selenium supplementation. After one month of discharge, she was seen in the outpatient clinic. Echocardiographic measurements were within the normal limits as well as the serum selenium level. Conclusions and implication for clinical practice: The case was unique in the way she responded to treatment with selenium supplementation for subacute myocarditis and selenium deficiency in crohn’s disease with a rapid recovery of cardiac function in a matter of weeks. The possibility of selenium deficiency should be considered in all malnourished patients with myocarditis and crohn’s disease.

Introduction: Immune checkpoint inhibitors (ICI) have improved clinical outcomes associated with numerous cancers, but high-grade, immune-related adverse events can occur, particularly with combination immunotherapy. Pembrolizumab (PEM) is an ICI, an antiprogrammed death-1 (PD-1) antibody that have individually improved survival in patients with melanoma. Case-report: 53 years old caucasian man with personal history of arterial hypertension, light alcohol consumption up to 2014 and no previous heart disease known. Diagnosed of advanced melanoma (debut in 2007 with right foot skin lesion) stage N1BRAF wild-type enrolled in a clinical trial receiving PEM 200 mg iv QW3 plus Epacadostat 300 mg BID for the two previous months. Admitted to Emergency Room complaining sudden paroxysmal nocturnal dyspnea and oedema in lower limbs with chest pain. No flu-like symptoms the previous days. A 3-millimeter ST elevation was detected throughout the precordial series in ECG with evidence of myocardical necrosis (Troponin T us 5341 ng/L, CKP 981 mL/m) and myocardial wall stress (NT-ProBNP 8452 pg/ml) biomarkers elevation. Red and white blood cells count and platelets were normal. Urgent coronary angiography was performed without evidence of epicardial coronary artery obstructive lesions neither vasospasm. A transthoracic echocardiogram was carried out showing a dilated left ventricle with global hypokinesis and severely depressed LVEF(29%) with mild functional central mitral regurgitation, and dilated right ventricle with severe systolic dysfunction along with severe tricuspid insufficiency due to tricuspid ring dilatation. Acute pulmonary tromboembolism (APE) was ruled out with angio-Ct. Cardiac magnetic resonance showed biventricular enlargement with systolic dysfunction (22% RVEF and 30% LVEF) with signs of acute inflammation (edema) and necrosis (pathological late gadolinium enhancement -LGE-) with a patchy non-coronary intra myocardium LGE pattern with main RV involvement compatible with toxic myocarditis by drug (Fig.1). Evolution with medical treatment including steroids was adequate and the patient could be discharged. Discussion: Acute myocarditis diagnosis is sometimes a challenge. Acute coronary syndromes, APE, stress cardiomyopathy, e.g. should be ruled out. Clinical data along with image techniques as CMR improves accuracy of diagnosis. A toxic aetiology of myocarditis always should be considered as the patient is enrolled in a clinical trial. Conclusion: The development of myocarditis from ICI does have biologic plausibility. In studies in mice, PD-1 plays a role in myocardial...
immune responses and protects against inflammation and myocyte damage in models of T-cell-mediated myocarditis. Genetic deletion of PD-1 in mice leads to cardiomyopathy that is caused by autoreactivities against cardiac tropinin I. As nivolumab, another antiprogrammed death-1 (PD-1) antibody, PEM can be related to toxic myocarditis due to an autoimmune mechanism.

61 A new phenotype of immune related cardiac adverse events induced by immune checkpoint inhibitors
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Introduction: Anti-PD-1 antibody, nivolumab, is a new anti-cancer drug which works as an immune checkpoint inhibitor. Despite the impressive benefits of this drug, its use can cause serious immune related adverse events (irAEs), characterized by abnormal invasion of immune cells into normal tissues. Some cases of myocarditis with infiltration of CD8+ immune cells into cardiac tissue have already been reported as the cardiac manifestation of irAEs. We report cases of two patients who developed cardiomyopathies during treatment with nivolumab. Interestingly, clinical courses and histopathological analyses of hearts were different from those of previously reported. Case reports: Patient 1: A 56-year-old woman with lung adenocarcinoma was admitted to our hospital due to acute decompensated heart failure two months after the initiation of the treatment with nivolumab. Her chest X-ray showed bilateral pleural effusions and cardiac dilatation. The plasma BNP level increased to 1600 pg/ml, and the echocardiogram revealed diffuse left ventricular hypokinesia with an ejection fraction of 32%. CT coronary angiogram showed no stenosis in her coronary arteries. Biopsy samples from her heart showed mild myocardial hypertrophy without any evidence of inflammation nor fibrosis. Cardiac MRI showed no apparent late gadolinium enhancement and T2 high spots. Cardiomyopathy caused by nivolumab was suspected, thus the interruption of the drug and the initiation of Jloibcker and ACE inhibitor were undertaken. 2 months later, her left ventricular systolic function improved to normal range. Patient 2: A 71-year-old man with lung adenocarcinoma was admitted to our hospital with anorexia after receiving the treatment with nivolumab for a month. His ECG showed ST segment elevation in leads V2-V6. The high sensitive troponin I level increased to 400 pg/ml, and the echocardiograms showed preserved left ventricular systolic function. No significant stenosis was found with coronary angiography. Biopsy samples from his heart revealed myocardial hypertrophy and subtle replacement of myocardium with fibrotic tissue. He was treated with hydrocortisone for 5 days and his symptom was gradually improved. ST segment elevation was resolved and he was discharged to home after two weeks of hospital stay. Discussion: Some cases of myocarditis during treatment with immune checkpoint inhibitors were already reported. Most of them resulted in death in spite of treatment with high-dose steroid. Furthermore, in those cases, histopathological analyses of hearts did not show lymphocytic infiltration. These two cases suggest the existence of new phenotypes of cardiac adverse events induced by immune checkpoint inhibitors, distinguished from previously reported lymphocytic myocarditis with histopathological findings.
Impact of Iron Deficiency on exercise capacity and outcome in heart failure with reduced, mid-range and preserved ejection fraction.

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Background: Both iron deficiency and anemia are prevalent in heart failure with reduced ejection fraction (HFrEF) and affect clinical outcome. Little information is available about the prevalence, impact on exercise capacity and outcome of iron deficiency in Heart failure with mid-range (HfMRF) and preserved (HFpEF) ejection fraction in comparison to HFrEF. Furthermore, no data is available about the progression of iron deficiency in patients without baseline anemia.

Methods: We evaluated baseline iron and hemoglobin (Hb) status in a single center, prospective heart failure database. Baseline functional status including New York Heart Association (NYHA) class, VO2max, echocardiography data and clinical outcome defined as all-cause mortality and heart failure admission were evaluated. Iron deficiency was defined according to established criteria (a ferritin below 100 μg/L or a ferritin between 100 - 300 μg/L with a transferin saturation below 20%). Anemia was defined according to WHO-criteria (Hb < 12 g/dl in females and Hb < 13 g/dl in males). LVEF was used to categorize patients in HFrEF (<40%), HfMRF (40-50%) and HFpEF (>50%).

Results: a total of 1197 patients (71% male) were evaluated (HFrEF: n= 897, HfMRF: n= 229, HFpEF: n= 73). The overall prevalence of iron deficiency was 53% (panel A depicts prevalence for HFrEF, HfMRF, and HFpEF and 36% for iron deficiency). Iron deficiency was associated with a lower VO2max in patients with HFrEF, HfMRF and HFpEF (panel B). Iron status more closely related to a poor VO2max than anemia status (p < 0.001). Furthermore, poor clinical outcome was more strongly associated with iron status than anemia status. Iron deficiency without anemia was associated with an adjusted HR = 3.24 (2.31-4.56;p < 0.001) and iron deficiency with anemia associated with an adjusted HR = 4.93 (3.47-7.00;p < 0.001) for heart failure admission and all-cause mortality. While patients with anemia in the absence of iron deficiency had an adjusted HR = 1.74 (1.09-2.58;p = 0.02) for the same combined endpoint. Exposing 8 patients without anemia to iron deficiency for 39 months resulted in one patient developing new-onset anemia (defined as progression of iron deficiency). Patients with progression of iron deficiency exhibited a significant higher risk of heart failure hospitalization and all-cause mortality (HR = 1.4; CI = 1.01-1.94; p = 0.046) than patients without progression.

Conclusions: iron deficiency is common in patients with HFrEF, HFpEF, and HFpEF and negatively affects VO2max and clinical outcome. Progression of iron deficiency parallels an increased risk for worsening of heart failure.

Panel A: prevalence of iron deficiency in HFrEF, HfMRF and HFpEF

Panel B: impact of iron deficiency on exercise capacity.

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Background: There is a strong reciprocal relationship between Heart Failure (HF) and Diabetes Mellitus (DM). Shared pathophysiological mechanisms might be a possible explanation. Therefore, we hypothesized that biomarkers that have been linked to new onset HF might also predict new onset DM in the general population.

Methods: The study cohort consisted of 6087 participants of the Prevention of Vascular and Renal End-stage Disease (PREVEND) study that were free of DM and HF at baseline. To study the relationship between HF and DM, we evaluated the incidence of new onset DM in subjects who developed new onset HF and vice-versa. Multiple HF-related, inflammation-related and renal function-related biomarkers were evaluated regarding their predictive value for new onset DM. These biomarkers included: N-terminal-pro B-type natriuretic peptide (NT-proBNP), MR-pro-atrial natriuretic peptide (MR-proANP), Mid-regional pro-Adrenomedullin (MR-proADM), c-terminal pro Endothelin-1 (CT-proET-1), Plasma Minister activator inhibitor-1 (PAI-1), high sensitivity Troponin-T (hs-TnT), Galectin-3, Copeptin, Procalcitonin (PCT), hs-C-Reactive Protein (hs-CRP), Cystatin-C, Urinary Albumin Excretion (UAE), Renin and Aldosterone.

Results: Out of the total cohort, the incidence of new onset DM was 7.5% versus 3.2% in those who had not developed HF (p < 0.001). Incidence of HF in patients who first developed HF was 11.6% versus 6.0% in those who had not developed HF (p < 0.001). There was no difference in incidence between patients with isolated post-capillary PH and post-/pre-capillary PH in HFpEF using invasive hemodynamics as gold standard. However, a subset of patients developed combined post- and pre-capillary PH, which might be an explanation. Therefore, we hypothesized that biomarkers that have been linked to the development of HF-related, inflammation-related and renal function-related biomarkers might predict new onset HF do not predict new onset DM, suggesting that other, indirect, pathophysiological mechanisms may explain their strong relation.

Conclusions: Out of the 14 biomarkers that we examined, the classical HF biomarkers NT-proBNP and hs-TnT were not associated with increased risk for new onset DM. However, the inflammation biomarkers hs-CRP [HR 1.12 (95% CI 1.04-1.21)], procalcitonin [HR 1.20 (95% CI 1.00-1.44)] and PAI-1 [HR 1.46 (95% CI 1.32-1.61)] were predictive for new onset DM. This association remained significant after multivariable adjustment and after correcting for the effects of age, sex, smoking, hypertension, waist circumference and family history of DM.

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Definition of iron deficiency based on the gold standard of bone marrow iron staining and treatment effect of ferric carboxymaltose in heart failure patients

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On behalf of: the DEFINE-HF study group

Background: The most commonly used definition of iron deficiency (ID) (ferritin < 100ng/ml or ferritin 100-300ng/ml and transferrin saturation (TSAT) < 20%) has not been validated in patients with heart failure (HF).

Purpose: We aimed to validate and possibly optimize the biomarker-based definition of ID in HF, using bone marrow iron staining as the gold standard. Second, we aimed to apply this optimized definition to the treatment response to ferric carboxymaltose in patients with HF.

Methods: Bone marrow aspiration with iron staining was performed in 42 patients with HF and a reduced ejection fraction (LVEF<45%) undergoing median sternotomy for coronary artery bypass grafting. Subsequently, an individual patient data meta-analysis of clinical trials (N=837) on the effects of intravenous ferric carboxymaltose in patients with HF was used to test if the optimal definition of ID identified treatment responders from non-responders on cardiovascular morbidity and mortality.

Results: Patients in the bone marrow study were mostly male (76%), mean age was 68±10 years, median NT-proBNP 914ng/L. Bone marrow ID was found in 17 (40%) of the HF patients. The most commonly used definition of ID (ferritin < 100ng/ml or ferritin 100-300ng/ml and TSAT < 20%), had a sensitivity of 82% and a specificity of 72%. A definition solely based on TSAT (optimal cut-off 19.8%) had a sensitivity and specificity of 94% and 84% (p<0.05 compared to the former definition). In the meta-analysis, TSAT<19.8%, and not ferritin, distinguished responders from non-responders to intravenous ferric carboxymaltose (interaction p=0.05; rate ratio for cardiovascular morbidity and mortality [RR] [95%CI]): 0.45 (0.29-0.71) for patients with TSAT<19.8% and RR (95% CI): 1.05 (0.69-1.47) for patients with TSAT>19.8%.

Conclusions: The conventional definition of ID performs reasonably in diagnosing ID. However, a single value (TSAT<19.8%) alone performs at least as good in selecting patients with true ID and identifies responders to ferric carboxymaltose.

Diagnostic characteristics for ID

<table>
<thead>
<tr>
<th>Value</th>
<th>95% CI</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Ferritin &lt; 100ng/ml</td>
<td>91.1</td>
<td>0.015</td>
</tr>
<tr>
<td>Ferritin 100-300ng/ml</td>
<td>94.1</td>
<td>0.032</td>
</tr>
<tr>
<td>TSAT &lt; 20%</td>
<td>84.0</td>
<td>0.001</td>
</tr>
<tr>
<td>ROC-AUC</td>
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<td>0.891</td>
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<tr>
<td>Positive Predictive Value</td>
<td>66.7</td>
<td>85.0</td>
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<tr>
<td>Negative Predictive Value</td>
<td>85.7</td>
<td>95.5</td>
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</table>

The diagnostic characteristics for the diagnosis of iron deficiency of the conventional definition and TSAT<19.8% ID-iron deficiency: TSAT=transferrin saturation; ROC-receiver operating characteristics; AUC-area under the curve.
Circulating miRNAs as biomarkers for familial dilated cardiomyopathy

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Purpose: We aimed to identify novel diagnostic biomarkers of LMNA-related DCM.

Methods: An initial screening study was performed in 8 patients with DCM carrying the mutation in the LMNA gene and 8 age-matched healthy subjects without the LMNA mutation. Validation study was performed in three study groups: i) 20 DCM patients with a LMNA pathogenic variant; ii) 20 idiopathic DCM (iDCM) patients without LMNA pathogenic variant; iii) 20 age-matched healthy subjects. Clinical and echocardiographic information was obtained from each subject. The panel of 179 miRNAs evaluated in the screening study, a total of 111 miRNAs were specifically deregulated in patients with DCM compared to healthy controls, even after adjusting for multiple comparisons. The expression level of 22-candidate miRNAs was then assessed in the validation study. Following post-hoc analysis, thirteen miRNAs were significantly upregulated in both DCM groups, iDCM and DCM, compared with healthy group. Five miRNAs were significantly increased in DCM group compared to healthy and DCM control groups (let-7a-5p, miR-125a-5p, miR-142-3p, miR-145-5p and miR-454-3p). Two miRNAs (miR-191-5p and miR-222-3p) were different expressed between all study groups. Differences remain statistically significant even after adjusting for potential confounders. These miRNAs signatures were associated with molecular pathways potentially implicated in the disease pathology. The levels of the established clinical parameter NT-proBNP differed between healthy and DCM groups; however, similar levels were observed between iDCM and DCM groups.

Conclusions: We have identified, for the first time, a specific circulating miRNA profile which is differentially expressed in patients with DCM. Interestingly, the miRNA signature of DCM could serve as novel non-invasive biomarker for risk stratification in this challenging population and provide clinical information about the pathophysiology of LMNA-related DCM.

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Total left atrial emptying fraction determined by real time 3-dimensional echocardiography is an independent predictor of new-onset atrial fibrillation in patients with Chagas disease

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Background: Changes in LA function are common in heart failure and Chagas disease. LA function parameters predict risk of atrial fibrillation (AF) in several conditions. Therefore, LA function analysis can yield new prognostic indicators in Chagas disease.

Purpose: Evaluate if LA function indexes derived from new echocardiographic techniques, including real time three-dimensional echocardiography (RT3DE) and strain (S) analysis, can predict new-onset AF in patients with Chagas disease.

Methods: This is a prospective longitudinal study including adult patients with indeterminate and cardiac forms of Chagas disease. All patients underwent echocardiographic evaluation including 2-dimensional echocardiography, evaluation of left ventricular (LV) diastolic function (mitral inflow, pulmonary vein flow, color M-mode echocardiography, and tissue Doppler analysis), and LA function by RT3DE and strain analysis. New echocardiographic indexes studied included LA minimal, maximal and pre-A volumes, total, passive and active LA emptying fractions, and LA total, positive and negative A. A multivariate Cox proportional-hazards regression analysis was performed to identify independent predictors of new-onset AF. ROC (receiver operating characteristic) curves were generated to determine the optimal cut-offs, with corresponding sensitivities and specificities, to predict new-onset AF. Cumulative survival curves were constructed using the Kaplan-Meier method in combination with log rank test. P values of 0.05 or less were considered significant.

Results: A total of 391 patients with Chagas disease (age 53 ± 11 years old; 40% male) were included and followed prospectively for the occurrence of new-onset AF during 3.9 ± 1.9 years. From those, 145 patients presented the indeterminate form and 246 presented the cardiac form of Chagas disease. A total of 24 events occurred during the study period. Cox proportional-hazards regression revealed that total LA emptying fraction (HR 0.93, 95% CI 0.91 to 0.96, P < 0.0001) and age (HR 1.06, 95% CI 1.00 to 1.12, P=0.03) were independent predictors of new-onset AF. The optimal cut-off value of total LA emptying fraction to predict new-onset AF prediction was 50.8% according to ROC curve analysis (area under curve 0.83, sensitivity 95.4%, specificity 69.2%, P < 0.0001). According to Kaplan-Meier analysis of survival, patients with total LA emptying fraction under 50.8% had a worse prognosis (HR=0.49, 95% CI 0.39 to 0.57, P < 0.0001).

Conclusions: In this series of patients with Chagas disease, a low total LA emptying fraction, determined by RT3DE, was an independent predictor of new-onset AF. This new echocardiographic index may add prognostic power to traditional parameters to predict new-onset AF in Chagas disease.
High prevalence of subclinical right ventricle cardiomyopathy among patients infected with human immunodeficiency virus on highly active antiretroviral therapy

Background. The development of highly active antiretroviral therapy (HAART) has entailed a significant decrease in AIDS-related complications and mortality. However, cardiovascular disease has become the main cause of mortality among HIV+ patients on HAART. Most of the published has focused on LV pathology but there is scarce data about the existence of right ventricle (RV) abnormalities. Because of its known relation to pulmonary hypertension (PH) and hepatitis virus co-infection (HCV) hypothesized that there might be a significant prevalence of subclinical RV abnormalities in ambulatory HIV patients.

Methods. We conducted an analytic, observational, cross-sectional study in a tertiary hospital (Spain). We included HIV infected patients under routine follow-up in the specialized Internal Medicine clinic of our institution. All of them provided written informed consent, and underwent a comprehensive transthoracic echocardiogram at the Imaging Unit of the Cardiology department.

Results. A total of 100 HIV infected patients were included. Sixty-two showed some cardiac abnormality. RV heart disease was more than twice as much common than LV disease (48 vs. 30 patients). Biventricular abnormalities were found in 15 patients. The most common abnormal finding was RV hypertrophy (RVH, 26 patients), although only 3 patients showed signs of PH. Abnormal RV fractional area change was observed in 17% while only 2% showed impaired LV ejection fraction (Figure). Patients with RVH were more prevalent among those with positive viral load, history of intravenous drug use and HCV co-infection (Table).

Conclusion. In HIV-infected patients on HAART, subclinical RV abnormalities were common and even more prevalent than LV disease. RVH seems to be related not only to the presence of PH but also to positive viral load, history of IDU or HCV co-infection.

96 Safety of metformin use in hospitalized acute heart failure patients with diabetes mellitus

Background. Diabetes mellitus is a common comorbidity in heart failure patients. Metformin is the drug of choice in diabetic patients; however, in contrast to chronic stable heart failure patients, there exists concern about lactic acidosis associated with metformin use in acute heart failure requiring hospital admission.

Methods. In Korea acute heart failure registry, a total of 5,820 patients with confirmed diagnosis of acute heart failure patients were consecutively enrolled at 10 university hospitals. In this analysis we included only patients with diabetes mellitus. The primary outcome was the need for mechanical ventilation or heart transplantation. Secondary outcomes included admission to intensive care unit, the use of mechanical circulatory support, mechanical ventilation, and renal replacement therapy.

Results. Overall, 1,998 patients (35.5%) had diabetes mellitus. At hospital admission the prescription rate of anti-diabetic medication was 46.4%, 35.3%, 35.2%, 1.8%, 8.3%, and 11.8% for insulin, sulfonylurea, metformin, thiazolidinediones, acarbose, and DPP-4 inhibitor, respectively.

Patients with metformin use had lower all cause in-hospital death or urgent heart transplantation than those without metformin use (2.1% vs. 7.4%, P < 0.003). The rate of ICU admission, cardipulmonary resuscitation, intravenous inotropes and vasopressor use did not differ between the patients with and without metformin use. Interestingly, the use of mechanical ventilation and renal replacement therapy, a potential outcome variable for lactic acidosis, was lower in patients with metformin use. After adjustment for significant covariates, metformin use was associated with reduced risk for in-hospital death and heart transplantation (OR, 0.37; 95% CI, 0.17-0.82).

Conclusions. Metformin use at admission for acute heart failure was not associated with an excess risk of in-hospital death or heart transplantation, suggesting that its use may be safe in heart failure patients.

97 Morbidity and mortality of chronic heart failure (CHF) patients with central sleep apnoea (CSA) treated by adaptive servo-ventilation (ASV): Interim results of FACE cohort study

Background: Central Sleep Apnea (CSA) is associated with a worse prognosis of CHF. However, SERVE-HF randomized control trial showed an increase of mortality risk in CHF with Reduced (CHF-REF) Left Ventricular Ejection Fraction (LVEF) with predominant CSA treated with ASV therapy.

Methods: The multicentre cohort study FACE is collecting long-term real world clinical data of CHF-REF or CHF with Preserved LVEF (CHF-PEF) with CSA and eligible for ASV therapy. The primary outcome is time for all-cause death or unplanned hospitalization for worsening HF. Secondary outcomes are time for all-cause death or unplanned hospitalization, all-cause death or unplanned hospitalization or unplanned hospitalization for worsening HF. Event-free survival will be estimated by Kaplan-Meier method and compared using log-rank test. Interim 1-2 year follow up (FU) data are presented here.

Results: 361 CHF pts with CSA were included in the ITT analysis. Median FU for analysis was 11 months. Baseline characteristics were: age 70.7±11.0 y, 88% male, body mass index 28.1±5.1 kg/m2. LVEF was reduced or preserved in 65% and 35% of patients, respectively. 71% had predominantly CSA, and 29% had coexisting CSA and obstructive apnoea (CSA-OSA). Mean AHI was 33±30/h.

On behalf of: FACE Investigators

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score was 7.6 ± 5.2 (75% had no excessive sleepiness). Major comorbidities were arterial hypertension (72%), dyslipidemia (60%), moderate to severe Chronic Kidney Disease (54%), atrial fibrillation (42%), diabetes (37%), obesity (34%), cerebrovascular event (25%) or Chronic Obstructive Pulmonary disease (12%). Drug treatment included β-blockers (77%), ACE inhibitors or angiotensin II receptor blockers (81%), diuretics (72%), and aldosterone antagonists (28%); non-drug therapy was a cardiac resynchronization device (12%) or implantable cardioverter defibrillator (17%). 66% of patients were compliant to ASV therapy (≥3h/night). Globally, adjusted multivariate analysis did not confirm any benefit or deleterious effect of ASV. However, CHF-REF with predominant CSA seemed to have poorer prognosis under ASV therapy compared to untreated patients. Conversely, other CHF populations (CHF-PEF or CHF with CSA-OSA) treated with ASV may have better survival.

**Conclusion**: CHF patients eligible for ASV therapy have severe CSA and multiple cardiac and metabolic comorbidities. These results are consistent with those of SERVE-HF trial. Furthermore, the FACE cohort study may be a useful tool to better understand the impact of ASV therapy in other CHF populations with CSA, especially in CHF-PEF or CHF with CSA-OSA. Long-term FU is expected for additional analysis of the FACE study.
NAD+ and xanthohumol (XN)-fortified beer (Control + XN, MCT + XN). After 25 days of MCT, animals were submitted to hemodynamic evaluation, followed by sample collection of cardiac and pulmonary samples for histology and molecular biology.

Results: After 4 weeks of MCT, MCT + ETOH group presented a significant increase in the pulmonary arteries medial thickness (38%, p < 0.0001 vs. Control + ETOH). This remodelling was prevented in the MCT + XN groups through a decrease in the expression of proteins responsible for proliferation such as ERK1/2 (50%, p < 0.01 vs. MCT + ETOH) and for cell viability such as AKT (58%, p < 0.05 vs. MCT + ETOH). Additionally, the intake of XN-fortified beer resulted in the inhibition of the anti-apoptotic protein BCL-XL (64%, p < 0.05 vs. MCT + ETOH). At cardiac level, MCT + ETOH rats presented an elevation of RV systolic pressure (128%, p < 0.01 vs. Control + ETOH). This increase was correlated with a rise in RV mass (r = 0.71, p < 0.05), fibrosis (r = 0.87, p < 0.05) and cardiomyocyte cross sectional area (r = 0.24, p < 0.05). Moreover, the cardiac remodeling observed in the MCT + ETOH animals was also associated with an increase in the VEGF-R2 expression (147%, p < 0.05 vs. MCT + ETOH). The ingestion of XN-fortified beer resulted in a significant attenuation of all these alterations in the MCT + XN group (p < 0.05 vs. MCT + ETOH). Lastly, the cardiopulmonary improvements observed in the MCT + XN animals contributed to the increase in the VO2max (30%, p < 0.05 vs. MCT + ETOH), exercise tolerance (73%, p < 0.05 vs. MCT + ETOH) and survival rate (40%, p < 0.05 vs. MCT + ETOH) of these animals.

Conclusion: This study demonstrates that regular consumption of polyphenol-enriched beer can interfere with proliferation and apoptosis signaling pathways associated with PAH, contributing to ameliorate some features in experimental PAH.

Diabetes may cause endothelial dysfunction and remodeling of cardiac structures and function, independent to atherosclerosis and hypertension. Considering the increased risk of heart failure in diabetic cardiomyopathy, investigation of endothelial function and remodeling is important. Pre-clinical studies have shown association of endothelin-1 (ET-1) with cardiac fibrosis, and we have reported the involvement of endothelial cells-derived ET-1 in mediating cardiac fibrosis through endothelial-to-mesenchymal transition (EndMT). However, little is known about mechanism of cardiac accumulation of triglycerides (cardiac steatosis/fatty heart). This present study combined experimental and clinical works to investigate the role of ET-1 in development of fatty heart in diabetes animal model and patients. For animal study, we used mice with conditional knockout of ET-1 in vascular endothelial cells (VEETKO mice) and develop streptozotocin-induced diabetes model. VEETKO mice have less accumulation of triglycerides (TG) in myocardium as compared to its wild-type littermates, as shown by quantification of lipid droplets from electron microscopy and myocardial TG content by radiomunoassay. The mechanism is under investigation, with oxidative stress and glucose transporter enzyme regulation being focused. In addition, 41 diabetes and non diabetes subject with no history of myocardial infarct were recruited. PlasmaET-1 level were measured with radiomunoassay, diastolic function by doppler echocardiography and myocardial TG content by MRI spectroscopy.

Plasma ET-1 level is higher in diabetes group (1.48 ± 0.50 vs. 1.08 ± 0.22 pg/ml, p < 0.05). All diabetes subjects develop diastolic dysfunction with higher grade as compared to non diabetes. Subject with severe diastolic dysfunction has higher ET-1 as compared to normal one (1.78 ± 0.50 vs. 1.09 ± 0.19 pg/ml). Diabetes subject with high plasma ET-1 level had higher myocardial TG content reflecting cardiac steato sis (0.77 ± 0.04 vs. 0.60 ± 0.03). In conclusion, our animal study revealed prevention of cardiac steatosis in mice with lack of ET-1 and higher plasma ET-1 level is associated with accumulation of TG in diabetic human.
A fit and well 54-year-old man presented acutely with an anterior ST elevation myocardial infarction. Primary percutaneous coronary intervention to the culprit LAD was attempted (Figure A) but recanalisation was uneventful. Cardiac MRI revealed an EF of 10%, transmural infarction with 12 non-viable segments, and anterior wall and septal microvascular obstruction. Catheter study showed PA pressure 4mmHg, PA systolic/diastolic/mean pressure 34/15/23, PA wedge and anterior wall and septal microvascular obstruction. Catheter study showed LAD was attempted (Figure A) but revascularisation was unsuccessful. Cardiac closure was performed.

Problems: 1) Persistent high troponins and ventricular arrhythmias may well have been manifestations of an unexpected coexistent GCM. 2) The use of a percutaneous RVAD avoided re-sternotomy and facilitated control of ventricular arrhythmias. Conclusion: Stroke, ventricular arrhythmias and RV failure post LVAD are clinically challenging. The histology of the ventricular core from LVAD implant should be examined routinely.

Possible differential diagnosis: In this scenario (HIV patient with poor nutritional status) two main possibilities need to be differentiated: HIV-related cardiomyopathy and malnutrition cardiomyopathy. The first nutrition-focused blood analysis showed low levels of total proteins (5.6 g/dL, normal values 6.4-8.3), serum albumin concentration (3.0 g/dL, normal values 3.5-5.0 g/dL), phosphorus (1.3 mg/dL, normal values 2.7-4.5 mg/dL), cholesterol (HDL 31 mg/dL, LDL 60 mg/dL), retinol binding protein (2.58 mg/dL, normal values 3.0-6.0 mg/dL), pre-albumin (10.9 mg/dL, normal values 20-40 mg/dL), vitamin A (22.2 µg/dL, normal values 30-60µg/dL) and L-carnitine (6.6µM, normal values 33-50 µM). Hemoglobin and platelet levels were within normal limits. Severe lymphopenia was present (470/µL), with 9.8% CD4 cells.
Oral nutritional supplements were initiated following current malnutrition guidelines. Diuretic intravenous treatment was continued for 4 days, and after congestive symptoms decreased oral enalapril and bisoprolol were initiated. The patient's clinical situation improved quickly and he was discharged 16 days after admission in a good nutritional status, with all previously reported parameters within normal limits and a body mass index of 21. A cardiac magnetic resonance was performed in his last day of hospitalization, showing a normal-sized left ventricle without alterations in contractility and an LV EF of 52%, mild functional mitral regurgitation and no late-gadolinium enhancement. At discharge, he was included in an occupational integration programme and followed by social services, and his clinical situation one year later is good, without signs and symptoms of heart failure and controlled HIV status.

Conclusion: This case illustrates an infrequent and reversible cause of heart failure (malnutrition-related cardiomyopathy) that might be underdiagnosed in clinical practice (especially in patients with chronic comorbidities) and emphasizes the importance of a multidisciplinary management of heart failure.

178 Recurrence of hypertrophic cardiomyopathy in a 25-year-old woman post heart transplant
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This is a 25-year-old woman who was diagnosed at the age of 13 with autosomal dominant hypertrophic cardiomyopathy (HCM). She underwent an uncomplicated heart transplant 10 years ago. No genetic testing was done at the time of diagnosis but she had a strongly positive family history. The pathology of her native heart transplant 10 years ago showed no evidence of rejection. Repeat biopsies showed no evidence of rejection.

She was treated for acute cellular rejection with Alemtuzumab and Prednisone. In November 2016 given her family history of sudden cardiac death. In December, four years post transplant, she was diagnosed with biventricular hypertrophy, and coronary artery disease. Undiagnosed in the TTN gene for a sequence variant that has not previously been described in the primary literature. All biopsies and imaging to date have been inconclusive for the differential diagnoses elaborated upon above. Tacrolimus-induced apical variant of primary cardiac amyloidosis (ATTR) is the most frequent form of familial systemic amyloidosis. It remains a challenging diagnosis due to great phenotypic variability ranging between the most common and well known neurological involvement to strictly cardiac presentation.

We report the case of a 70-year-old patient with late-onset familial amyloid neuropathy (diagnosed late at 66y with V30M mutation). We was the index case in his family and presented with peripheral polyneuropathy. His previous history was also remarkable for pacemaker implantation in 2010 due to 2 degree AV block and syncope, stage 2 (by MDRO) chronic kidney disease and class II NYHA heart failure with no previous decompensations.

He was transferred from his local hospital to our cardiology ward due to decompensated heart failure and acute on chronic kidney injury. In the two months preceding hospital admission, he developed generalized edema unresponsive to diuretics, respiratory insufficiency. EKG was in ventricular pacemaker rhythm. The analysis of the peritoneal fluid showed an unusual high value for trilgycerides (444 mg/dL) meeting criteria for chylous ascites. Transthoracic echocardiogram revealed severe biventricular hypertrophy (LV mass index 244g/m2) with moderate impairment of systolic function (E/e': 22) and pericardial thickening with small effusion.

Given the discrepancy between the relatively acute onset of HF symptoms and the grade of myocardial hypertrophy combined with a surprising finding of chylous ascites we sought to rule out any other contributing causes for the clinical picture. Serum immunoelectrophoresis revealed a polyclonal band corresponding to a immunoglobulin G of uncertain significance. Tc-DPD scintigraphy showed significantly enhanced DPD uptake (visual score 3) in the myocardium, compatible with transthyretin amyloid deposition. Extensive laboratory work up and a thoracic-abdominal-pelvic computed tomography ruled out neoplastic, obstructive or lymphatic causes for chylous ascites. After reviewing the literature for similar cases, we assumed the diagnosis of chylous ascites due to right heart failure and associated portal hypertension.

The patient slowly improved clinically and was discharged after 3 weeks although fluid management was challenging. Due to the preferential depletion of intravascular volume by loop diuretics, moderate increases in their dose lead to various episodes of symptomatic hypotension. Balance was achieved by careful dosing of furosemide, metolazone and spironolactone combined with scheduled paracentesis combined and fluid intake restrictions.

This case is remarkable because of three distinct important messages:

The late onset and the exuberant cardiac infiltration is quite uncommon for patients with Portuguese type V30M mutation who usually have mainly a neurological phenotype.

Heart failure is a rare cause of chylous ascites and its usually an exclusion diagnosis. Severe impaired cardiac compliance creates challenges to achieve optimal diuretic dosing that permits sufficient removal of third space fluid without major intravascular depletion.

180 An 85-year-old man with progressive dyspnea after eating fish
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An 85-year-old male patient presented to emergency room with a complaint of progressive dyspnea started 2 days ago. He complained of at little bit of abdominal pain after eating fish but otherwise his medical history was unremarkable. He was on diuretics for heart failure. Given the discrepancy between the relatively acute onset of HF symptoms and the grade of myocardial hypertrophy combined with a surprising finding of chylous ascites we sought to rule out any other contributing causes for the clinical picture.

Serum immunoelectrophoresis revealed a polyclonal band corresponding to a immunoglobulin G of uncertain significance. Tc-DPD scintigraphy showed significantly enhanced DPD uptake (visual score 3) in the myocardium, compatible with transthyretin amyloid deposition. Extensive laboratory work up and a thoracic-abdominal-pelvic computed tomography ruled out neoplastic, obstructive or lymphatic causes for chylous ascites. After reviewing the literature for similar cases, we assumed the diagnosis of chylous ascites due to right heart failure and associated portal hypertension.

The patient slowly improved clinically and was discharged after 3 weeks although fluid management was challenging. Due to the preferential depletion of intravascular volume by loop diuretics, moderate increases in their dose lead to various episodes of symptomatic hypotension. Balance was achieved by careful dosing of furosemide, metolazone and spironolactone combined with scheduled paracentesis combined and fluid intake restrictions.

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discomfort also. On chest auscultation, inspiratory crackles were noted on both lung field suggesting pulmonary edema. His electrocardiogram showed mild left ventricular hypertrophy and widespread T-wave inversions in precordial leads. His chest x-ray revealed a haziness in both lung field suggesting pulmonary congestion. In the laboratory findings, leukocytosis (11,100 /mm3), mildly elevated liver function tests, elevated serum creatinine (1.4 mg/dL) and hyperkalemia (6.0 mEq/L) were noted. However, cardiac troponin was not elevated on admission. His echocardiogram showed decreased basal wall motion and relatively preserved mid to apical contraction with a left ventricular ejection fraction of 28%. A coronary angiogram was performed to rule out acute coronary syndrome and showed patency on the left and the right coronary arteries. A ventriculogram also displayed good mid to apical left ventricular wall motion with an akinesia in the basal wall. The management of heart failure was performed with diuretics and an angiotensin-converting enzyme inhibitor. The peak cardiac troponin-I level was increased up to 10.8 ng/ml. By the way, we looked at the chest x-ray again and discovered some kind of inverted-J-shaped material in the midline within the trachea. It was obviously silhouette of a fish hook. The fish that he ate 2 days ago must have been caught with the hook by a fisherman. The final diagnosis was made as a stress-induced cardiomyopathy associated with a foreign body in the esophagus and surgical removal of a 2cm-sized fish hook from his esophagus was performed to prevent mediastinitis with rupture. The procedure was successful and the cardiac troponin-I level started to decrease after the surgery. On hospital day 14 just before discharge, his ECG showed normal sinus rhythm and T-wave inversion in multiple precordial leads has been resolved. Follow-up echocardiography showed no regional wall motion abnormality and the ejection fraction of 68%. He was discharged without any further problem. Stress-induced cardiomyopathy is usually caused by emotional or physical stress. However, the actual causes are unknown in up to 30% of cases. In the present case, we discovered a fish hook a little bit late because the old man strangely did not complain of throat or chest pain at first. Physicians should not overlook chest x-ray and food history in acute heart failure without any coronary lesion.

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Making the case for complex cardiogenic shock: from profile to recovery
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Introduction: Cardiogenic shock remains a complex and heterogeneous clinical disorder associated with high mortality challenging cardiovascular programs across the world. We present a profiled case of cardiogenic shock in which staged interventional and pharmacological therapies to treat complex coronary and stenotic aortic disease where performed with the aid of two separate temporary mechanical circulatory support devices. Description: 71 year old gentleman (BMI 26) with hypertension, dyslipidemia, CAD s/c CABG 2006 (LIMA-LAD, SVG-OM1 and SVG-R PDA), severe calcific aortic stenosis, HFrEF NYHA II ACC D due to ischemic cardiomyopathy presented with de novo ACS related acute heart failure syndrome with pulmonary edema clinical profile associated with new onset atrial fibrillation with rapid ventricular response/aberrant conduction which required mechanical ventilation followed by PAC insertion which showed: RA 20 mmHg, PA 80/50 mmHg, PCWP 30 w/V waves 40 mmHg and CI by Fick 2.0. ECHO estimated AWA 0.8 cm2, LVEF 20% akinesis of anterolateral/apical/inferior wall with moderate functional MR and reduced right heart function. Intra-aortic balloon pump was placed with angiography revealing patent LIMA-LAD and SVG-R PDA but 100% occluded SVG-OM1 graft with severe LM disease (80%) and mid LAD (80%) and critical ostial LCX (90%) this latter vessel supplying territory of the previously occluded vein graft to OM1. The IABP + dobutamine under PAC guided therapy was then transitioned to Impella CP in which BAV and PCI with balloon angioplasty of LAD and rotational atherectomy with DES of LCX. The patient had a favorable clinical response and Impella CP was weaned and removed following our standard daily echo/hemodynamic protocol in 72 hrs and was extubated off inotropes 3 days after. He was discharged on low dose diuretics with no residual and organ function damage. Patient returned from home 6 weeks after and underwent successful TAVR with #26 Edward-Sapiens bioprosthesis and has remained 1-2 months after with adequate clinical, echocardiographic and hemodynamic data in addition to best practices in transitions from acute MCS to durable solutions that are focused on myocardial recovery rather than LVAD or HTx.
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Acute heart failure exacerbation of idiopathic cardiomyopathy in the setting of electrical storm secondary to ventricular tachycardia: Total artificial heart or left ventricle assist device?

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Introduction and Background: Acute Heart Failure (AHF) may have multiple etiologies. Ventricular Tachycardia (VT) electrical storm is a life threatening condition that can cause AHF. In patients with VT electrical storm and reduced Left Ventricular Ejection Fraction (LVEF), who are refractory to medical management, salvage therapies with mechanical heart assist devices as a bridge to Orthotopic Heart Transplantation (OHT) may be useful.

Case report description: A 64-year-old male presented with AHF secondary to VT electrical storm. He had a history of idiopathic dilated cardiomyopathy with reduced LVEF (16%) and had a dual-chamber Intracardiac Defibrillator (ICD) for secondary prevention of sudden cardiac death. After admission, he failed medical management with Amiodarone, Lidocaine and Sotalol, requiring multiple electrical cardioversions despite dose optimization. Subsequently, endocardial and epicardial VT ablations were attempted followed by stellate ganglion block, without rhythm control. Unfortunately, he had worsening LVEF, evident signs of low cardiac output despite inotropes and multiple cardiac arrests in the context of recurrent episodes of sustained VT.

Conclusion and implications for clinical practice: This case exemplifies the importance of a multidisciplinary heart team decision on AHF management. Clinicians should carefully evaluate the benefits of TAH over LVAD as an alternative therapy for those patients with biventricular AHF in the setting of refractory VT and end-stage heart failure. These patients often present with right ventricular dysfunction, making TAH a suitable option. Further studies are needed to define specific indications for TAH implantation on clinical practice.

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Two for the price of one: Improvement in left ventricular systolic function in a patient with end stage renal disease following successful kidney transplantation.

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Introduction: Left ventricular systolic dysfunction (LVSD) is prevalent amongst patients with end stage renal disease (ESRD) on dialysis and can disadvantage patients considered for renal transplantation. The best treatment strategies for these patients remain unclear and poorly understood.

Case: A 37-year-old female with a background of ESRD on haemodialysis secondary to renovascular disease presented to our department for routine assessment prior to renal transplantation. A transthoracic echocardiogram (TTE) revealed a dilated left ventricular (LV) cavity size with LV internal dimensions of 5.56cm in diastole and 4.86cm in systole. Her ejection fraction (EF) by Simpsons method was 25-30% indicating severe LV dysfunction. Following discussion in the cardio-renal MDT, she underwent exercise stress echocardiography to assess her LV response to exercise and to exclude underlying ischaemia. She had a reasonable effort tolerance achieving stage 3 of the Bruce protocol. Post stress echocardiography demonstrated contractile reserve with an improvement in LV function and no ischaemia. Coronary angiography confirmed the absence of significant coronary artery disease. She subsequently underwent an uncomplicated live donor related renal transplant.

Two months later she reported an improvement in her exercise tolerance to NYHA class I. Her post-transplant TTE showed normalisation of her LVSD with an estimated EF of 55% and an improvement in LV cavity dimensions to 4.22cm in diastole and 2.84cm in systole. Problems: Improvement in LVSD in ESRD patients post renal transplant has been described but the reason for this phenomenon is not
Conclusions: We have successfully demonstrated that renal transplantation can be safely performed in selected patients with LVSD and results in the improvement of EF, LV systolic dimensions and symptoms of heart failure. These patients, tradition- 
ally considered high risk for surgery, may benefit from early renal transplantation and demonstrate reversibility of their LV dysfunction.

Questions, problems or possible differential diagnosis: What is the most probable diagnosis of this patient? What would be the acute initial management? What would be the best option for the long-term management?

Answers and discussion: Final diagnosis was tuberculous constrictive pericarditis in an HIV positive patient. Tuberculosis is the main cause of pericarditis and pericardial effusion in patients living in endemic countries and in patients with HIV infection it responds for more than 90% of cases. The mortality after pericardial tuberculosis can be as high a 40% six months after diagnosis. Acute management was based on support intervention and symptomatic relief.

Introduction. Zika virus infection (ZIKV), is a mosquito-borne disease that has become a global health hazard. There are no reports of cardiovascular manifestations, heart failure (HF) or arrhythmias associated with ZIKV disease. Case report: A 51 year-old man from Venezuela, previously asymptomatic and with a history of well-controlled arterial hypertension and type 2 diabetes mellitus that in a recent medical evaluation had a normal electrocardiogram (ECG) and echocardiogram (TTE) with a left ventricular ejection fraction (EF) of 68%. On May 2016, he developed low-grade fever, polyarthralgia, widespread pruritic maculopapular rash, conjunctivitis, and myalgia. These clinical manifestations were resolved in 2 days. Five days after the onset of this acute episode, however, he was admitted to the hospital with rapid progressive dyspnea, rated according to the New York Heart Association (NYHA) as class III. The ECG, five days after onset, showed a new left-bundle branch block and on the TTE a severely reduced EF of 16%. A coronary angiogram was performed which was normal. A holter recording showed frequent atrial and ventricular premature beats. A cardiac MRI (CMRI) exhibited severe impaired left ventricular systolic function (EF 16%), hypeintense inferior wall signal on T2-weighted and lateral subepicardial enhancement in late gadolinium sequence. ZIKV-induced myocarditis was diagnosed based on the following criteria: i) ZIKV RNA was detected in serum with the use of reverse-transcriptase polymerase chain reaction (RT-PCR) and Zika virus-specific IgM antibody; ii) Potential simultaneous infection including Dengue, Chikungunya, HIV, and other virus or parasitic infections such as Chagas were ruled out; iii) Clinical, TTE, ECG and CMRI evidence of myocarditis was detected; iv) Normal coronary arteries on angiogram. The patient was initially treated with intravenous furosemide and oral digoxin for a period of one month, along with enalapril, carvedilol and eplerenone and his condition improved to NYHA Class II-III and then, after discontinuing enalapril and administering cabucurtib and mitomycin-C, the patient was discharged with follow-up.

Conclusions and implications for clinical practice: Tuberculosis and HIV infection are still a dangerous combination affecting patients living in developing countries. Pericardial involvement during M. tuberculosis infection can be disastrous during acute episodes generating the necessity of invasive procedures or extensive work-up increasing risk of complications. The decision-making process is not easy and must be individualized to each patient because medical therapy and surgical interventions also have the potential risks.

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The very best from clinical cases - 1

up to 200 mg twice daily, improved further to NYHA Class I. Discussion. Zika virus infection is usually mild with non-specific symptoms. Cardiovascular complications might be underdiagnosed in clinical practice. Therefore the importance of cardiovascular screening in suspected cases. Further research is needed to determine the pathophysiology of Zika myocarditis and would help to develop a pharmacological target and treatments for countering progression of the disease.

**Conclusion:** This is the first report of cardiac involvement with congestive heart failure in a patient with Zika. This case is unique since the patient developed rapidly progressive left ventricular dysfunction and new ECG changes, previously known to have normal cardiac function. Future research is needed to determine the incidence of cardiovascular involvement of Zika virus infection.

<table>
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<tr>
<th>Zika myocarditis</th>
<th>NYHA</th>
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<tr>
<td>Pre_Zika</td>
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<td>Onset</td>
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<td>16</td>
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<td>Follow-up</td>
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Poster Session 1

ACUTE HEART FAILURE

P213

Towards non-invasive assessment of central venous pressure variations using real time and quantitative liver stiffness estimation

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Objective: The main purpose of this study was to assess the correlation between the liver stiffness (LS) estimated by shear wave elastography (SWE) and the central venous pressure (CVP) during hemodynamic variations in a cohort of children with heart disease.

Background: SWE has been shown and used as a non-invasive, quantitative and reproducible approach to assess LS. LS has been reported to be associated with fibrosis but there is also a potential dependence of LS with the CVP.

Methods: 103 children (6.8±5.5 years) referred to our institution for diagnostic or interventional right heart catheterization (RHC) were prospectively enrolled. CVP and LS were measured simultaneously at baseline and after 15 ml/kg of volume loading. Inferior vena cava (IVC) diameter and pulsed-Doppler profile of hepatic veins were also evaluated. Plasma level of NT-pro-BNP was assayed during the interventional right heart catheterization (RHC).

Results: At baseline RHC, the mean CVP was 7.4±2.9 mm Hg (range 3–16) and the mean LS was 9.0±5.8 kPa [4–46.1]. After volume loading, the mean CVP increased significantly to 10±3.3 mm Hg [3–18] (p < 0.01) and the mean LS increased significantly to 14.4±9.1 kPa [4.3–72] (p < 10−4). LS strongly correlated with CVP pre-loading (r=0.86, p < 10−4) and post-loading (r=0.87, p < 10−4). Optimal cut-off value of LS for detection of CVP > 10 mmHg was 10.8 kPa (Se=89.3%, Sp=66.5%), with an area under the curve of 0.846 (95% CI 0.780 to 0.871; p < 0.01). Beyond this correlation, LS is sufficient to provide an indirect and reliable measurement of quantitative CVP variations (p < 10−4, multivariate model). IVC diameter, pulsed-Doppler profile of hepatic veins and NT-pro-BNP were less robust than LS to estimate CVP.

Conclusions: Here, we show that LS measurement using SWE is a reliable surrogate of quantitative estimation of the CVP. It can also be used to measure CVP changes in real time. LS could potentially be a useful non-invasive tool for evaluation and follow-up of acute and chronic right heart failure.

Relation between liver stiffness and CVP

P214

Heart failure with mid-range ejection fraction: who are these patients?

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Introduction: Classification in heart failure (HF) is based on the left ventricular ejection fraction (LVEF). The most recent European guidelines created a new group of patients with a LVEF - 40–49% (mid-range LVEF). However, few data are available regarding these patients (P).

Objectives: To evaluate P with mid-range LVEF in demographic, clinical, treatment and prognostic terms.

Methods: Retrospective and single-center study involving 263 P consecutively admitted into a cardiac intensive care unit during 6 years. Three groups were created according to the LVEF: reduced LVEF (G1: LVEF < 40%, N=182), mid-range LVEF (G2: LVEF 40-49%, N=34) and preserved LVEF (G3: FEVE≥50%, N=47). Demographic, laboratory, echocardiographic, therapeutic and prognostic data were compared. Clinical follow-up (5 years) was performed targeting for readmission with AHF and mortality.

Results: The population mean age was 70±13 years old with a majority of male patients (76%). Readmission for HF occurred in 40% of the cases. In-hospital mortality was 15% and during the follow-up 42%.

During admission the groups presented similar clinical and analytical characteristics: congestive HF (G1 100% vs G2 91% vs G3 100%), NT-proBNP values (G1 17590±23014 pg/mL vs G2 29137±57308 pg/mL vs G3 13895±16887 pg/mL) and creatinine (G1 151±81 µg/dL vs G2 168±137 µg/dL vs G3 157±148 µg/dL). The etiology was ischemic in 28% of the P in G1, 41% in G2 and 22% in G3. Regarding treatment, no statistically significant differences were found in terms of intravenous diuretics were given in the majority (G1 72% vs G2 62% vs G3 63%); noradrenaline/biobutamine (G1 24% vs G2 14% vs G3 16%) and noninvasive ventilation (G1 52% vs G2 41% vs G3 56%).

When comparing the P of G1 and G2 we found that they had similar in-hospital mortality (93% vs 7.4%, p = 0.204) however P of G1 had higher mortality during follow-up (92% vs 8.0%, p = 0.009) and a higher rate of readmission for HF (88% vs 12%, p = 0.002).

When comparing the P of G2 and G3, we found that P with mid-range LVEF had higher in-hospital mortality (85% vs 15%, p = 0.034) and during follow-up (77% vs 23%, p = 0.009), however, readmission rates for HF were similar (52% vs 48%, P = 0.502).

At discharge, there were no statistically significant differences among groups in terms of angiotensin-converting enzyme inhibitors, beta-blockers and diuretics treatment.

Conclusions: In our population, we concluded that P with mid-range LVEF presented a similar clinical profile to P with reduced and preserved LVEF. However, they present a higher in-hospital mortality and during follow-up as compared to P with preserved FEVE and similar in-hospital mortality as compared to P with reduced FEVE.

P215

HFmrEF in elderly patients: the pathogenetic role of ischemia. Real world data from the ATHENA registry.

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Introduction: Heart failure with mid-range ejection fraction (HFmrEF) is a recently proposed classification of heart failure in the context of the updated guidelines from 2016 [1]. It is characterized by a mid-range ejection fraction (LVEF 35–49%) and a reduced cardiac output. The role of ischemia in the pathogenesis of HFmrEF is still unclear [2].

Methods: The ATHENA registry is a prospective observational study that enrolled a real-world population of patients with HFmrEF in their first hospitalization in 2016. The study enrolled 1473 patients aged ≥ 65 years with a median age of 79 years. The primary outcome was a composite of all-cause mortality and readmission for heart failure or angina within 1 year of hospital discharge.

Results: Among the 1473 patients enrolled, 1259 patients (85.6%) had coronary artery disease (CAD), with a median delay of 18 months from the last documented myocardial infarction. The median LVEF was 39% (IQR 31–47%). At discharge, 56.7% of patients were on beta-blockers, 59.4% on angiotensin-converting enzyme inhibitors, and 69.9% on diuretics.

Conclusions: In our study, patients with HFmrEF had a high prevalence of ischemic heart disease, with a median delay of 18 months from the last documented myocardial infarction. The use of ischemic therapies was low at discharge. These findings suggest that further research is needed to better understand the role of ischemia in the pathogenesis of HFmrEF and to improve the treatment of these patients.
Background: Heart failure (HF) classification based on the presence of preserved or reduced left ventricular systolic function, which identifies two main categories of patients, those with HFrEF and those with HFrEF, has become important from an epidemiological, clinical, therapeutic and prognostic point of view. Recently, the European Society of Cardiology has recognized the presence of a “gray area” of patients with ejection fraction (EF) between 40 and 49% defined as “mid-range” (HFrEF). Purpose: To verify the characteristics of HFrEF patients with HFrEF from an etiopathogenetic point of view in a real world setting of elderly patients hospitalised for acute HF.

Methods: data derived from the ATHENA prospective observational study which included elderly patients (≥ 65 years) admitted with diagnosis of AHF (worsening or de novo) to the Emergency department (ED) of a tertiary University teaching-hospital in the period 01.12.2014-01.12.2015. The present analysis included patients with complete echocardiographic data.

Results: 246 patients were included in the present study: patients with HFrEF were 19.5%, 30.5% had HFrEF and 50.0% had HFrEF. Patients with HFrEF and HFrEF shared similar demographic characteristics: higher mean age 83.8, 84.5 and 79.9 years, p = 0.001; higher prevalence of females 41.7%, 67.5% and 32.0% for HFrEF, HFrEF and HFrEF respectively, p < 0.001. Ischemia seemed to be a common denominator for HFrEF and HFrEF patients. History of coronary artery disease (CAD) was more frequent in patients with HFrEF (41.7%) and HFrEF (36.0%) than patients with HFrEF (19.5%), p = 0.004, as well as the prevalence of previous percutaneous coronary intervention that was 27.1%, 25.3% and 11.5% for HFrEF, HFrEF and HFrEF respectively, p = 0.014. Furthermore, ischemic etiology of HF was typically present in patients with HFrEF (47.9%) and HFrEF (40.0%), differently from those with HFrEF in which it was present only in the 28.5% of cases, p < 0.001. The prevalence of atrial fibrillation in patients with HFrEF, the most frequent precipitating cause of acute HF (11.6%) was 27.1%, 25.3% and 11.5% for HFrEF, HFrEF and HFrEF respectively, p = 0.014. Furthermore, ischemic etiology of HF was typically present in patients with HFrEF (19.5%), p = 0.004.

Conclusions: These data suggest that ischemia plays an important role in the pathogenesis of HFrEF. We could therefore hypothesize that patients with HFrEF have a heterogeneous group consisting of a subgroup of patients with HFrEF that, following an acute event, could have experienced a reduction of ejection fraction (EF) and of a subgroup of patients with HFrEF that, due to the positive effect of therapeutic strategies, could have improved at least part of the left ventricular EF; this group has also been recently classified as HFrEF (Heart Failure with Recovered Ejection Fraction).

On behalf of: ATHENA study group

Conclusion: These data suggest that ischemia plays an important role in the pathogenesis of HFrEF. We could therefore hypothesize that patients with HFrEF have a heterogeneous group consisting of a subgroup of patients with HFrEF that, following an acute event, could have experienced a reduction of ejection fraction (EF) and of a subgroup of patients with HFrEF that, due to the positive effect of therapeutic strategies, could have improved at least part of the left ventricular EF; this group has also been recently classified as HFrEF (Heart Failure with Recovered Ejection Fraction).
Methods: We analysed 851 patients admitted consecutively in our coronary care unit with a diagnosis of ST segment elevation myocardial infarction in a five-year period. Patients with previous atrial fibrillation (n=36) or in cardiogenic shock (n=30) were excluded. CHA2DS2-VASc score was calculated for each patient. The cohort was divided in three groups according to the value obtained: CHA2DS2-VASc 0-1 (n=243, 31%); CHA2DS2-VASc 2-3 (n=334, 42.5%); and CHA2DS2-VASc ≥4 (n=208, 25.5%). For each group we compared clinical and laboratory features, treatment and adverse events. Primary endpoint was the occurrence of acute heart failure after a STEMI.

Results: Patients from CHA2DS2-VASc ≥4 group were older (76.9 vs 64.1 ± 9 vs 65.9 years; p < 0.001). Conventional risk factors were more represented in the higher CHA2DS2-VASc score groups; diabetes (91.0% vs 31.1% vs 7.4%; p < 0.001), hypertension (90.9% vs 75.7% vs 39.7%; p < 0.001) and dyslipidemia (59.6% vs 59.9% vs 42.6%; p < 0.001); except for smoking (8.2% vs 33.2% vs 56.8%; p < 0.001). On admission patients with CHA2DS2-VASc ≥4 had more often anaemia (40.1% vs 20.1% vs 12.3%; p < 0.001), renal insufficiency (eGFR < 60 ml/min) (54.6% vs 19.5% vs 3.7%; p < 0.001) and three vessels disease (21.2% vs 17.5% vs 9.1%; p < 0.005). Left ventricular dysfunction was more prevalent (59.1% vs 39.8% vs 34.6%; p < 0.001) in that group. During hospital stay, patients with CHA2DS2-VASc ≥4 developed more frequently heart failure (52.4% vs 24.9% vs 16.8%; p < 0.001); new-onset atrial fibrillation (21.9% vs 11.1% vs 4.1%; p < 0.001); ischemic stroke (2.9% vs 0% vs 0.4%; p = 0.002) and respiratory tract infection (11.1% vs 8.3% vs 5.3%; p < 0.001). In-hospital (8.7% vs 2.4% vs 0.4%; p < 0.001) and 6-month overall mortality (16.7% vs 6.4% vs 2.5%; p < 0.001) were higher in patients with higher CHA2DS2-VASc score. In multivariate analysis and after adjusting for different baseline characteristic CHA2DS2-VASc score revealed to be a strong independent predictor of development of heart failure (0.041). Patients with CHA2DS2-VASc ≥4 were associated with higher risk of development of heart failure (OR 2.88, 95% CI (1.27 - 6.54), p = 0.001).

Conclusion: CHA2DS2-VASc score revealed to be a strong predictor of acute heart failure among STEMI patients.

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Endocan - Novel biomarker in patients with acute heart failure?

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On behalf of: AHF study group

Background: Endocan is known as an endothelial cell-specific molecule 1 (ESM-1), exhibiting anti-inflammatory properties. It is a proteoglycan with a chondroitin/sulfated dermatan sulfate chain. Its elevated level is connected with endothelial activation, inflammation and carcinogenesis. According to the manufacturer, the normal range is 0.3-3ng/mL. To our knowledge, endocan has not been previously investigated in acute heart failure (AHF) patients’ sera.

Purpose: The aim of this study was to investigate the impact of sex, age, ejection fraction (EF), NYHA classification, CRP and blood pressure (BP) on endocan values in AHF pts.

Methods: The study was performed as a prospective, non-interventional, single-center observational study from November 2013 to February 2015 in the University Hospital Centre Sisters of Charity, Zagreb, Croatia. There were 80 pts with AHF included. Complete analysis was performed for 75 pts since five of them had high endocan values (≥20ng/ml), which were considered unmeasurable. For analysis, ELISA kit was used to detect and quantify human Endocan/ESM-1 in serum. Pts were grouped according to demographic and laboratory parameters, with cut-off values of 5ng/ml, for CRP ≤40%, 41-49%, and ≥50 for EF, and 140/90mmHg for BP. Pts were classified and treated according to ESC guidelines. The study was conform to the principles of the Declaration of Helsinki of the World Medical Association. Differences between the groups were determined by the non-parametric Mann-Whitney U and Kruskal-Wallis text. Results will be shown as medium and minimum, maximum.

The analyses were conducted using R version 3.3.1.

Results: The median endocan concentration was 4.8ng/ml (1.3-15.2). Endocan was not significantly different between the sexes (4.6ng/ml (1.3-15.2) for men, 4.4ng/ml (1.5-14.7) for women; p = 0.848). Pts ≥75 years of age had a median value of 3.2ng/ml (1.6-14.7) and pts ≤75 had 5.2ng/ml (3.2-15.2) (p = 0.054). The median endocan value in NYHA classification groups 2 or 3 was 4ng/ml (1.3-15.2) and 4.4ng/ml (1.5-14.7) in group 4 (p = 0.630). In pts with normal CRP (5), median endocan was 4.3ng/ml (1.6-14.7) and with elevated CRP (>5) was 5.2ng/ml (3.2-15.2) (p = 0.610). According to EF, the median endocan value for pts with EF >60% was 4.8ng/ml (1.5-14.7), with an EF 41-49% was 4.4ng/ml (1.6-14.7) (p = 0.595).

Conclusion: To our knowledge this was the first research of endocan in AHF pts. According to the results of this study on 75 pts, endocan was higher in our AHF pts compared to previously measured values in healthy volunteer, but did not differ significantly between groups according to sex, age, EF, NYHA classification, CRP and BP.

P220
Impact of an advanced heart failure program on the characteristics and care of patients admitted with worsening heart failure in a developing country

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Background: Heart failure (HF) is a leading cause of global morbidity and mortality. Management of HF patients requires comprehensive multidisciplinary clinical care, best provided through the establishment of advanced HF programs. Such programs have become increasingly important in developing countries, where healthcare systems face educational and socioeconomic challenges. Our aim is to highlight the impact of advanced HF program establishment on the characteristics and care of acutely decompensated heart failure (ADHF) patients.

Methods: We conducted a retrospective chart review to identify patients admitted with ADHF before and after the establishment of an advanced HF program. One-hundred and forty ADHF admissions within the 24 months period prior to the establishment of the program (Group 1) were compared with 64 ADHF admissions that took place 6 months after program establishment (Group 2). Demographic, clinical, hemodynamic, and laboratory characteristics were evaluated at the time of admission and hospital discharge.

Results: At hospital admission, patients in group 1 tended to be more symptomatic, had higher mean arterial pressure (MAP) and higher heart rate (HR) than patients in group 2 (Figure, panel A). At discharge, patients in group 2 had lost more weight and had lower MAPP. Duration of hospital admission was not significantly different between the two groups (Figure, panel B). HF medications were used more in group 2, both at hospital admission and at discharge (Figure, panels A and B).

Conclusion: After the establishment of an advanced HF program, patients admitted with ADHF were more optimally managed before and during their admission, with more evidence-based therapies and better hemodynamics. Although the duration of hospital stay was the same, more effective diuresis took place when patients were followed by the HF program. Longer follow up is needed to assess differences in readmission rate.

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The PARASAIL study Patient reported outcomes from the Canadian real world experience of sacubitril/valsartan in patients with heart failure and reduced ejection fraction

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Background/Introduction: Following the completion of the PARADIGM-HF trial, there is an opportunity to further explore the drug knowledge in a broader patient population through real world experience. PARASAIL, a Canadian prospective, multicenter, open-label, study aims at characterizing the effectiveness and safety of Sacubitril/Valsalta in 300 Canadian patients with heart failure with reduced ejection fraction (HFrEF) followed for 12 months.

Methods: The exploratory objectives from this study focus on validated quality of life questionnaires recorded by patients (Minnesota living with HF questionnaire (MLHFQ), EQ-5D questionnaire and patient global assessment (PGA) who have been converted to Sac/Val at 12 and 24 weeks. Participants who were considered to be eligible were adult HFrEF outpatients with an estimated global assessment of ≤70% NYHA class II or III and on stable doses of ACEi or ARB recruited in 32 centers across Canada. The suggested starting dose of Sac/Val was 24 mg/26 mg bid replacing ACEi or ARB. Up titration to 49 mg/51 mg bid than to 97 mg/103 mg bid can occur every 2-4 weeks as per clinical judgement. Symptomatic hypotension and/or SBP below 100 mmHg, estimated GFR below 60 mL/min/1.73m2, angioedema or necessity to use ACEi or ARB concomitantly, were amongst the exclusion criteria. The results presented here are those from the initial 54 patients who completed 24 weeks of treatment.

Results: Mean patient age was 66 years old. 82% male, 89% Caucasian, and BMI of 31.3 kg/m2; mostly NYHA class II (91%), with baseline blood pressure of 123/73 mmHg. Baseline standard HF therapy was commonly used in most patients: 63% on ACEi or 26% ARB before Sac/Val initiation, 89% on beta-blockers, 46 % on MRA. Baseline mean LVEF was 30 ± 13% and mean NYHA class was 1.8 ± 0.8. Baseline standard HF therapy was commonly used in most patients: 63% on ACEi or 26% ARB before Sac/Val initiation, 89% on beta-blockers, 46 % on MRA and 52% on diuretics. Drug initiation and titration started at the 24/26 mg dose of Sac/Val for most patients (87%) and up titration to maximum dose of Sac/Val was achieved for the majority (70%) at 12 weeks. For both PGA and MLHFQ, there were improvement in the QoL: 45% of patients experienced an improvement of their scores (slightly, moderately and markedly) with PGA at week 4 and 56% at week 12, and there was a significant improvement in the MLHFQ at both weeks 4 and 12 with 18% and 26% decrease in the score compared to baseline respectively (P<0.0035 and P<0.0020 respectively). For the EQ-5D questionnaire, there were no changes in the VAS score at week 4 and week 12, and no changes in the 5 individual domains either. The treatment was safe and well tolerated and no patient discontinued it within the initial 12 weeks of follow-up.

Conclusion: The PARASAIL trial is designed to evaluate real-life effectiveness and safety of Sac/Val in HFrEF patients. Initial results of QoL questionnaires detected early signs of improvement in 2 of the 3 validated questionnaires. While placebo effect cannot be ruled out, further analysis of the total cohort of the patients will provide more insights about this possibility.

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Long term safety of inotropes and/or vasopressors in acute heart failure: results from ESC-HF-LT registry

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On behalf of: on behalf of ESC-HF-LT registry investigators

Introduction: Increasing short term safety concerns have been reported concerning the use of inotropes and/or vasopressors in the initial management of acute heart failure (AHF). However, data on long-term safety of these agents is scarce. We therefore sought to assess safety, especially long-term mortality, of intravenous inotropes and/or vasopressors in AHF by a post-hoc analysis of a large AHF registry.

Methods: The European Society of Cardiology Heart Failure Long-Term Registry (ESC-HF-LT) was a multicenter prospective observational registry conducted in 21 countries between 2011 and 2013. Median follow-up duration was 381 [363; 457] days. For present analysis we selected patients (pts) with unscheduled hospitalizations for AHF, for whom intravenous (IV) therapy was needed (n = 9690), including 833 (12.5%) pts who received more inotropes and/or vasopressors. A further analysis of 1212 pts was derived using propensity score matching (606 pts in each treatment group) in which 36 baseline variables were balanced as assessed by standardized mean differences. Primary endpoint was long-term all-cause mortality. Secondary endpoints were in-hospital mortality, all-cause post-discharge mortality and post-discharge rehospitalization.

Results: Long-term all-cause mortality was greater in pts receiving IV inotrope and/or vasopressor compared to those who did not, both in the whole (43.7 % vs. 23.2 %) and the matched cohorts (39.8 % vs. 29.4 %). Adjusted hazard ratio (HR) for the association between the use of IV inotrope and/or vasopressor and long-term all-cause mortality was 1.720 [1.498 – 1.975] in the whole cohort and 1.434 [1.128-1.823] in the matched cohort. Adjusted HR for associations between the use of IV inotrope and/or vasopressor and in-hospital mortality were 3.138 [2.432-4.048] in the whole and 1.873 [1.151 – 3.048] in the matched cohorts. Adjusted HR for long-term all-cause mortality in patients discharged alive were 1.249 [1.069-1.474] in the whole and 1.078 [0.769-1.512] in the matched cohorts. No association was found between the use of IV inotrope and/or vasopressor and post-discharge rehospitalization, neither in the whole nor in the matched cohorts (HR 1.101 [0.924-1.311] and 1.117 [0.788-1.582] respectively).

Conclusions: The use of inotropes and/or vasopressors in AHF was associated with increased long-term risk of all-cause death.

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The bleeding risk in thrombolysed patients with intermediary-high risk pulmonary embolism

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Background: The intermediary-high risk pulmonary embolism (PE) is associated with an early mortality risk which shows the need for upgrading medical therapy. The main purpose in using thrombolytics in patients with intermediary-high risk PE is to obtain an improvement in the clinical status and the mortality risk, without increasing the bleeding risk.

Purpose: The purpose of this study is to assess the bleeding risk in patients with intermediary-high risk PE thrombolysed with t-PA compared to patients treated with unfractionated heparin (UFH). The main purpose is to identify the group of patients which has the lowest bleeding risk with thrombolytic therapy, in order to reduce the main side effect.

Material and methods: We included 65 patients with intermediary-high risk PE. The inclusion criteria were: 1. First symptomatic acute PE (in the last 2 weeks). The exclusion criteria were: 1. Age > 80 y.o.; 2. Severe anemic syndrome (Hb < 8 g/dl); 3. Pre-existing pulmonary hypertension; 4. Dilative cardiomyopathy with severe LV dysfunction (EF < 30%); 5. Aortic or mitral valvulopathies which may produce pulmonary hypertension. The subjects were divided in two groups: 1. study group - received t-PA (10mg bolus and 90 mg in 2 hours) and UFH; 2. control group - received UFH alone. In the control group were included patients with contraindications for thrombolysis, with BMI > 30.
or BMI < 18.5, or with end stage renal failure, as these factors were associated with an increased thrombotic bleeding risk. The patients were assessed regarding the bleeding risk by major and minor bleeding events and the severity of the bleeding event was calculated by the HB decrease compared to inclusion status. There were no differences regarding the sex distribution in the two groups but there was a significant difference between the medium age (58.48 +/− 12.3 y.o. in control group vs 63.32 +/− 17.4 y.o. in study group (p = 0.05)). This difference can be explained by the inclusion and exclusion criteria.

Results: Regarding the major bleedings there was only one major bleeding in the study group (intracerebral hematoma) and no major bleedings in the control group. Meanwhile the minor bleeding rate was 1.7 in the study group vs 1.86 in control group (p = 0.075).

The medium HB value on admission in the study group was 13.3 +/− 1.1 g/dl vs 12.91 +/− 1.24 g/dl in the control group, with no statistical difference. Comparing the HB value between the two groups in the fifth day we noticed a decrease of 6.58% in the study group vs 3.87% in control group (p=0.04).

Conclusion: These data prove the safety use of thrombolytics in selected patients with intermediary-high risk PE, those leading to an optimal risk/benefit ratio which may identify the best patient profile for receiving this therapy.

P245

Clinical profile of heart failure admissions in a tertiary hospital. Implications for multidisciplinary management

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Introduction. Population aging has produced notable changes in heart failure admissions.

Purpose: Our aim was to analyse the characteristics, comorbidity, management, and outcomes of these patients in three departments.

Methods: Prospective registry during 45 days. All patients admitted for heart failure in Internal Medicine, Cardiology and Geriatrics were included.

Results: From 235 patients, 124 patients (52.7%) were admitted in Internal Medicine, 83 (35.3%) in Cardiology, and 28 (11.9%) in Geriatrics. Mean age was 77.0 ± 20.2 years (Cardiology 71.5 ± 13.5; Internal Medicine 79.2 ± 21.1; Geriatrics 89.9 ± 5.5 p < 0.001). Preserved ejection fraction was found in 121 patients (61.5%) and this rate was higher in Internal Medicine (62.5%) and Geriatrics (70.0%) than in Cardiology (31.3%), p < 0.0001. Comorbidity was frequent, especially atrial fibrillation (126; 53.6%) renal disease (89; 37.8%), and chronic obstructive pulmonary disease (85; 27.6%). Infections were the most common decompenating trigger in Internal Medicine (56; 27.6%) and this rate was higher in Internal Medicine (62.5%) and Geriatrics (70.0%) than in Cardiology (31.3%), p < 0.0001. Treatment administered is resumed in the

Conclusion: Patients admitted for decompensated heart failure are elderly and present frequent comorbidity. There are major differences between services with respect to age and clinical profile.

P225

Current use and impact on 30-day mortality of pulmonary artery catheter in cardiogenic shock patients: results from the CardShock study

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On behalf of: CardShock Investigators

Background: Cardiogenic shock (CS) is the most life-threatening manifestation of heart failure (HF). Its complexity and high mortality, would justify the need for invasive monitoring with a pulmonary artery catheter (PAC) that may allow the clinician to establish an accurate diagnosis at all times and to guide treatment. Randomized clinical trials have failed to demonstrate clinical benefit of PAC use in critically ill patients, but CS patients were grossly underrepresented.

Purpose: This study aims to describe the real-world use of PAC in a contemporary cohort of patients with CS and to evaluate its prognostic impact on 30-day mortality.

Methods: This is a sub-study of the previously published CardShock study an observational, prospective, multicenter cohort of patients with CS. The use of PAC was within the discretion of the physician in charge.

Results: The CardShock study included 219 patients; PAC was used in 82 patients (37.4%). The management was more aggressive in those with PAC (table). Overall 30-day mortality was 38.6%, with no differences between PAC and non-PAC patients (figure). PAC use did not affect mortality (OR: 1.24 (95% CI 0.60-2.56) p = 0.56), in a multivariate analysis adjusted by a propensity score (including the history of prior myocardial infarction, inotropic use at admission, etiology of shock, mechanical ventilation, and assist device use).

Conclusions: This study revealed that PAC is used in 1/3 of CS patients. They are characterized by a prior poorer prognosis and by more aggressive management. PAC use was not associated with 30-day mortality.

Characteristics of the study population

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>PAC group (82 patients, 37.4%)</th>
<th>Non-PAC group (137 patients, 62.6%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP at admission, mean (SD)</td>
<td>79.61 (1.75)</td>
<td>76.47 (1.05)</td>
<td>0.10</td>
</tr>
<tr>
<td>Inotrope use at admission, n (%)</td>
<td>41 (60.00)</td>
<td>36 (26.28)</td>
<td>0.000</td>
</tr>
<tr>
<td>Confusion at admission, n (%)</td>
<td>63 (77.78)</td>
<td>85 (62.96)</td>
<td>0.02</td>
</tr>
<tr>
<td>Baseline LVEF, mean (SD)</td>
<td>31.43 (1.73)</td>
<td>33.94 (2.32)</td>
<td>0.22</td>
</tr>
<tr>
<td>iABP, n (%)</td>
<td>56 (76.71)</td>
<td>57 (46.34)</td>
<td>0.000</td>
</tr>
<tr>
<td>ECMO and LVAD, n (%)</td>
<td>6 (7.41)</td>
<td>5 (3.73)</td>
<td>0.23</td>
</tr>
<tr>
<td>Mechanical ventilation, n (%)</td>
<td>73 (89.02)</td>
<td>64(47.06)</td>
<td>0.000</td>
</tr>
<tr>
<td>30-day mortality, n (%)</td>
<td>35 (42.68)</td>
<td>49 (35.77)</td>
<td>0.31</td>
</tr>
</tbody>
</table>

PAC: pulmonary artery catheter; SD: standard deviation; SBP: systolic blood pressure; HR: heart rate; ACS: acute coronary syndrome; LVEF: left ventricular ejection fraction; iABP: intra-aortic balloon pump; ECMO: extracorporeal membrane oxygenation; LVAD: left ventricular assist device; CRR: continuous renal replacement. Inotrope use refers to dobutamine, adrenaline, levosimendan or milrinone use.

Kaplan-Meier survival estimates

Kaplan-Meier curves for 30-day survival

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**P226**

**Intravenous beta-blocker therapy in in-stent elevation myocardial infarction**

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**Background:** Beta-blockade is recommended in all stable patients with ST-elevation myocardial infarction (STEMI) within 24 hours. However, the role of intravenous (IV) beta-blockade is less clear in the modern era of reperfusion therapy.

**Aims:** To investigate the impact of intravenous (IV) beta-blockade therapy on short-term mortality and risk of development of cardiogenic shock in patients with STEMI.

**Methods:** We used data from the nationwide Swedish Web-system for Enhance-ment of Evidence-based care in Heart disease Evaluated According to Recommended Therapies (SWEDEHEART) registry for patients in Västra Götaland County. All patients with STEMI undergoing PCI between 2005 and 2014 were included. The primary endpoint was mortality within 30 days and the secondary end-points was in-hospital cardiogenic shock. We used multilevel modeling based on complete-case mixed-effects logistic regression to adjust for clustering of observations in a hierarchical database and for differences in patient characteristics.

**Results:** In total, 5,869 patients were included in the study of which 1,131 (19.3%) were treated with IV beta-blockade. At 30 days, there were 688 (11.7%) deaths and 426 (7.3%) cases of cardiogenic shock. IV beta-blockade was not associated with higher risk of death (OR 1.01, 95% CI 0.80-1.28, P=0.91) nor with higher risk of in-hospital cardiogenic shock (OR 1.18, 95% CI 0.90-1.56).

**Conclusion:** In our study, the use of IV beta-blockade in patients with STEMI was not associated with higher risk of short-term mortality and in-hospital cardiogenic shock.

**P227**

**Relationship between improvements in long term outcomes and baseline systolic blood pressure in acute heart failure patients treated with TRV027: an exploratory subgroup analysis of BLAST-AHF**

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**Background:** TRV027 is a novel ‘biased’ ligand of the angiotensin II type 1 receptor (AT1R). In a phase 2b acute heart failure trial (BLAST-AHF), TRV027 did not affect a composite clinical outcome at 30 days.

**Methods:** Post-hoc analyses from BLAST-AHF (n = 618) were performed to examine the effects of TRV027 according to baseline systolic blood pressure (SBP) on changes in: post-baseline SBP, renal function, and 180-day outcomes. Patients were treated with one of four TRV027 dosing regimens, 1, 5, or 25 mg/hr, or matching placebo for up to 96 hours. Interactions between baseline SBP and the selected endpoints were identified using subpopulation treatment effect pattern (STEEP) analysis, grouping patients by SBP tertile: < 127 mmHg, ≥ 127 mmHg and < 140 mmHg, and ≥ 140 mmHg.

**Results:** TRV027 did not affect SBP in patients with lower baseline SBP but was associated with a trend towards SBP increase in patients in the highest two SBP tertiles. TRV027 induced a trend towards increased creatinine over the first 3 days in patients with lower baseline SBP, in patients in the higher two SBP tertiles, TRV027, specifically the 1 mg/hr dose, tended to reduce creatinine at days 5 and 30. Beneficial effects on 180-day outcomes, especially all-cause mortality and cardiovascular (CV) death or readmission, were observed in patients with higher baseline SBP (≥ 127 mmHg) in the TRV027 1mg/hr dose group (all-cause mortality HR 0.39, 95% CI 0.14 - 1.06, p = 0.056; CV death or HF/RHF rehospitalization HR 0.53, p = 0.048), while more adverse outcomes were observed in patients with baseline SBP in the lower tertile.

**Conclusions:** In this post-hoc analysis from the BLAST-AHF trial, patients with baseline SBP ≥ 127 mmHg treated with TRV027 experienced improved 180-day outcomes.

**P228**

**Feasibility of integrating multiple remote monitoring technologies as a single heart failure decision support tool**

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**Background:** Acute heart failure (AHF) is the leading cause of hospitalizations in patients aged 65 and older, and one of the leading diagnoses associated with 30-day readmissions. Preventing hospital admissions and reducing short-term readmissions is a critically important unmet need for patients, caregivers, and hospitals due to its high morbidity and cost. Non-invasive remote monitoring provides capabilities that enable patient self-care management, thereby leading to a greater patient engagement, empowerment, satisfaction and efficiencies.

**Purpose:** The purpose was to evaluate the feasibility of merging two disparate remote monitoring and management systems into an enhanced singular decision support tool that enabled timely and impactful interventions by a mature heart failure (HF) disease management program. The rate of hospital readmissions or ED visits 30 days post discharge was evaluated.

**Methods:** This is a prospective, interventional, nonrandomized study of AHF patients. Patients hospitalized for AHF were identified. Patients discharged to home were supplied with cutaneous wearable sensors and connected to a telehealth system. Patients discharged to a skilled nursing facility were provided with sensors and connected to a separate mobile monitoring application. Patients were monitored by these technologies for 30 days post discharge. Clinicians were alerted using variables from the remote monitoring systems to evaluate and guide further assessment and intervention.

**Results:** A total of 31 patients were enrolled during the 13 month study period. The mean age of participants was 78.5 years, 56% being 80 years old or older. 42% percent were male and 58% female. Of the participants, seven withdrew within 30 days. The readmission rate of patients that did not withdraw from the program was 20.8%. Thirteen patients had atrial fibrillation detected remotely.

**Conclusion:** The combination of these two disparate systems were successfully integrated within an established HF management program to provide decision support for HF interventions. The readmission rate of 20.8% suggests improved outcomes; however requires further investigation.

**P229**

**Tolvaptan reduces readmission rates in acute heart failure patients with hypervolemic hyponatremia**

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**Background:** A significant portion of health care dollars is spent in the hospitalization and management of acute heart failure (AHF) patients (pts). Tolvaptan, an oral vasopressin receptor antagonist, is approved for treatment of pts with AHF and hypervolemic hyponatremia. In the EVEREST trial, no difference was observed in mortality or readmissions in pts admitted with AHF (not necessarily with hyponatremia) treated with tolvaptan vs placebo. We used tolvaptan to assist in the management of pts admitted with AHF with hyponatremia (defined as sodium < 135 mmoL/L).

**Methods:** We reviewed charts of admitted pts at 5 community hospitals owned by Mercy Health in Cincinnati, Ohio between 2012 and 2016. Charts of our treatment group were reviewed for pts who had received tolvaptan for treatment of hyponatremia and AHF. A control group included pts with AHF and hyponatremia that did not receive tolvaptan. Charts were reviewed at admission and discharge for sodium (Na) levels, BUN, creatinine, weight loss, length of stay, cost per case, number of readmissions within 6 mos., and death.

**Results:** Our pertinent findings are listed in the table below. For the calculated cost per pt: # of readmits is multiplied by Cost/admission.

**Conclusion:** In clinical practice, pts with hypovolemic hyponatremia and AHF treated with tolvaptan demonstrated a greater improvement of sodium levels and a reduction in the number of readmissions in the next 6 mos. Furthermore, the 6 month calculated cost per patient is significantly lower for the patients treated with tolvaptan. Although the LOS and cost/case did not reach statistical significance in the pts treated with tolvaptan, the cost of readmissions alone is important in reducing health care costs. Thus, tolvaptan can be a cost effective therapy when used in the management of hyponatremic AHF pts.

<table>
<thead>
<tr>
<th>Tolvaptan vs Control</th>
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<tbody>
<tr>
<td>Tolvaptan (n = 172)</td>
</tr>
<tr>
<td>Control (n = 71)</td>
</tr>
<tr>
<td>p value</td>
</tr>
<tr>
<td>Change in Sodium (mmol/L)</td>
</tr>
<tr>
<td># of Readmits in 6 months</td>
</tr>
<tr>
<td>Length of Stay (days)</td>
</tr>
<tr>
<td>Cost/Admission (U.S. dollars)</td>
</tr>
<tr>
<td>Calculated cost per pt in 6 months (U.S. dollars)</td>
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</tbody>
</table>
P230

Clinical experience with spironolactone in patients with heart failure nyha iii-iv functional class and midrange ejection fraction
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1Medical University Pleven, Pleven, Bulgaria

Objective: Clinical evaluation of the effect and safety of the addition of spironolactone to standard diuretic therapy in patients with heart failure III-IV NYHA functional class compared with that of the spironolactone.

Material and methods: A total of 78 patients with symptoms of decompensated heart failure III-IV functional class NYHA, where treated at University Hospital "G. Staraisky". Pleven, Bulgaria, between 1.01.2015-31.06.2015. The patients included were with left ventricular ejection fraction (LVEF) 40 to 49% - HF with midrange EF" in the absence of renal failure with creatinine clearance <30 ml/min 1.73 m2. The treatment was initiated with high-dose loop diuretic furosemide 120 mg per 24 hours. Co-medication with spironolactone was used in 42 patients (Group1) and with spironolactone in 36 (Group 2). The included patients were treated and closely monitored in the intensive care unit of the clinic of cardiology.

The treatment effect was assessed by clinical improvement of the patient expressed in mastering the congestion, reduction of subjective complaints, weight and diuretic response. The potassium levels were monitored during hospitalization in both groups.

Statistical methods: Chi-square test, Student test, IBM SPSS 21 were used for statistical analysis.

Results: The groups did not differ significantly by gender, age and severity of HF by NYHA. Diuretic response> 3000ml / 24h. Was considered as good. Good diuretic response was demonstrated in 24 patients (78%) from the spironolactone group vs. 23(55%) in the spironolactone group (Chi Squared = 4.537, p=0.03317 <0.05).

Hypokalemia (K < 3.5) was observed in 29 patients (89%) treated with spironolactone vs. 11 patients (31%), treated with spironolactone. (Chi Squared = 11,496, p=0.000697 <0.05).

Conclusion: The efficiency regarding additive diuretic effect of spironolactone to standard therapy with a loop diuretic in the study group is greater than that of spironolactone in patients with decompensated heart failure III-IV NYHA class and moderately reduced ejection fraction. Greater safety of spironolactone use is demonstrated in reduction the risk of potentially dangerous hypokalemia.

P231

Short course oral digoxin treatment in acute heart failure: a case control study
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1University of Monastir, monastir, Tunisia

Heart failure (HF) is a major worldwide health problem and one of the most important causes of hospitalization and readmission in older adults. Digoxin is one of the oldest and least expensive modulator for the management of HF. We conducted a matched case control study including 42 patients consulting the emergency department (ED) for acute HF (AHF), treated with short course digoxin, and 162 matched in the intensive care unit of the clinic of cardiology.

The treatment was initiated with high-dose loop diuretic furosemide 120 mg per 24 hours. Co-medication with spironolactone was used in 42 patients (Group1) and with spironolactone in 36 (Group 2). The included patients were treated and closely monitored in the intensive care unit of the clinic of cardiology.

The treatment effect was assessed by clinical improvement of the patient expressed in mastering the congestion, reduction of subjective complaints, weight and diuretic response. The potassium levels were monitored during hospitalization in both groups.

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Hypokalemia (K < 3.5) was observed in 29 patients (89%) treated with spironolactone vs. 11 patients (31%), treated with spironolactone. (Chi Squared = 11,496, p=0.000697 <0.05).

Conclusion: The efficiency regarding additive diuretic effect of spironolactone to standard therapy with a loop diuretic in the study group is greater than that of spironolactone in patients with decompensated heart failure III-IV NYHA class and moderately reduced ejection fraction. Greater safety of spironolactone use is demonstrated in reduction the risk of potentially dangerous hypokalemia.

P232

HFpEF, HFrEF and HFmrEF: which is the treatment of choice at discharge?
Real world data from the ATHENA registry.
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1Careggi University Hospital (AUOC), Department of medicine and geriatrics, Florence, Italy
2Careggi University Hospital (AUOC), Department of emergency and internal medicine, Florence, Italy

Background: Heart failure (HF) is a highly prevalent condition particularly in the elderly. Prognosis has improved in HFrEF due to the availability of evidence based treatments. Currently, no treatments have proven efficacy in HFmrEF patients and also in HFrEF, the new category of HF, recently introduced by the Heart Failure Association of the European Society of Cardiology. 

Methods: data derived from the ATHENA retrospective observational study which included elderly patients (> 65 years) admitted with diagnosis of AHF to a tertiary University teaching-hospital in the period 12.2014-01.2015.

Results: study population was composed by 246 patients: 19.5% with HFrEF, 30.5% with HFmrEF and 50.0% with HFpEF. Mean age of three group of patients was respectively 83.5, 84.9 and 79.9 years, p = 0.001. Pharmacological treatments at discharge in the three HF groups are showed in the attached table. BBs and MRAs were the only two classes of drugs that had a statistically different prescription rate across the three HF groups: patients with HFrEF received BBs in similar percentage to patients with HFmrEF, MRAs prescription rate in HFpEF was intermediate compared to the other two groups. Furthermore, the average number of drugs taken by patients at the time of discharge was 11.8 with no differences across the groups.

Conclusion: present, in the absence of specific randomized clinical trials, patients with HFmrEF are treated similarly to those with HFrEF. Also, a high percentage of patients with HFpEF receive treatments that only have been to improve prognosis in HFrEF patients. Randomised clinical trials evidences are needed to appropriately treat HFmrEF patients.

On behalf of: ATHENA study group

Background: Heart failure (HF) is a highly prevalent condition particularly in the elderly. Prognosis has improved in HFrEF due to the availability of evidence based treatments. Currently, no treatments have proven efficacy in HFmrEF patients and also in HFrEF, the new category of HF, recently introduced by the Heart Failure Association of the European Society of Cardiology.

Purpose: to evaluate treatments at discharge in a real world setting of elderly patients after an episode of acute HF in the three different groups of HF: HFrEF, HFmrEF and HFpEF.

Methods: data derived from the ATHENA retrospective observational study which included elderly patients (> 65 years) admitted with diagnosis of AHF to a tertiary University teaching-hospital in the period 12.2014-01.2015.

Results: study population was composed by 246 patients: 19.5% with HFrEF, 30.5% with HFmrEF and 50.0% with HFpEF. Mean age of three group of patients was respectively 83.5, 84.9 and 79.9 years, p = 0.001. Pharmacological treatments at discharge in the three HF groups are showed in the attached table. BBs and MRAs were the only two classes of drugs that had a statistically different prescription rate across the three HF groups: patients with HFrEF received BBs in similar percentage to patients with HFmrEF, MRAs prescription rate in HFpEF was intermediate compared to the other two groups. Furthermore, the average number of drugs taken by patients at the time of discharge was 11.8 with no differences across the groups.

Conclusion: present, in the absence of specific randomized clinical trials, patients with HFmrEF are treated similarly to those with HFrEF. Also, a high percentage of patients with HFpEF receive treatments that only have been to improve prognosis in HFrEF patients. Randomised clinical trials evidences are needed to appropriately treat HFmrEF patients.
and HFmrEF were associated with increased risk for all-cause rehospitalisation and re-hospitalisation for cardiac reasons; for all-cause rehospitalisation: 1.9 (1.4-2.6; p = 0.001) and 1.4 (1.0-2.0; p = 0.030); for cardiac rehospitalisation: 4.4 (2.6-7.4; p < 0.001) and 2.5 (1.4-4.3; p = 0.001), respectively.

Conclusions: In patients leaving the hospital after an episode of cardiac decompensation with the phenotype of HFrEF, LVEF remains very dynamic. Six months later, prevalence of HFmrEF and HFpEF is about 30% each in survivors. LVEF recovery is a very important feature in these patients as both HFmrEF and HFpEF indicate worse prognosis compared to HFrEF.

P234 Prediction of in-hospital mortality in acute heart failure: comparing risk scores

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Introduction: Risk stratification of patients with Heart Failure (HF) could improve clinical outcome and allocation of resources. Multiple risk scores (RS) have been created for the prediction of in-hospital mortality, such as OPTIMIZE-HF (1) by Abraham, the Peterson et al study GWTG-HF (2) and the work formulated by O’Connor PROTECT (3).

Purpose and Methods: A retrospective study was performed on patients admitted for HF. Clinical, analytical, and echocardiographic parameters were evaluated. Calculation of the OPTIMIZE-HF, GWTG-HF and PROTECT RS were determined and compared. The risk score better at predicting in-hospital mortality was determined.

Results: A total sample of 952 patients were evaluated, 50.8% male, with a mean age of 77 ± 10 years old. Regarding in-hospital mortality, the ROC curve detailed in the image was ascertainment.

The following table shows the mean values of each RS in alive vs deceased patients and the AUC of the ROC curve and the corresponding statistical significance.

Conclusion: In this population, only the GWTG-HF RS performed moderately well at predicting in-hospital mortality. Both the PROTECT and OPTIMIZE-HF RS underperformed, although the latter RS achieved better predictive power. Since HF represents such a heterogeneous group, creating risk scores is especially difficult in this population.


P235 Towards a multimarker prognostic strategy in acute heart failure. A role for GDF-15

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Funding Acknowledgements: DOConet (NORTE-01-0145-FEDER-000003), supported by Norte Portugal Regional Operational Programme (NORTE 2020)

Background: Growth differentiation factor (GDF) -15 mirrors inflammation and oxidative stress in cardiovascular diseases. Brain Natriuretic peptide (BNP) is associated with cardiomyocyte stretch in heart failure (HF). We aimed to evaluate the correlation between these biomarkers and to study the it’s prognostic impact acute HF.

Methods: We studied a group of patients prospectively recruited as part of an acute HF registry. Patients admitted with the diagnosis of acute HF were eligible. Patients were treated at the discretion of the attending physician. A venous blood sample was drawn at discharge. Patients were followed up to 2 years and the endpoint was all-cause mortality. A spearman correlation coefficient was used to study correlation between GDF 15 and BNP, age, creatinine, C-reactive protein (CRP) and hemoglobin. Patients with discharge GDF 15 below and above the median value were compared. Cox-regression multivariate models were built to study the association of GDF 15 (continuous and dichotomized according to the mean) and mortality. Patients were further cross-classified according to discharge GDF 15 (mean) and discharge BNP (mean and independent association with mortality was studied. RESULTS: We studied 158 patients. Seventy (50%) male, mean age 75 years, 87 (55.1) had left ventricular ejection fraction < 40%; mean discharge BNP was 1000.2pg/mL and mean discharge GDF 15 was 3013.3ng/mL. During the 2-year follow-up 71 patients (44.9%) died. Patients with higher GDF 15 (>3000ng/mL) were significantly older and had higher BNP, higher creatinine and CRP and lower hemoglobin. No differences were observed concerning sex, etiology of HF and left ventricular function. GDF 15 correlated positively with age (Rho=0.27), BNP (Rho=0.36), creatinine (Rho=0.51) and CRP (Rho=0.28) and negatively with hemoglobin (Rho=-0.305). BNP and GDF 15 (analyzed as continuous or as categorical variables) associated with 2-year mortality. Patients with discharge BNP>1000pg/mL had an age, gender, creatinine, CRP, hemoglobin- and GDF 15- independent risk of 2-year mortality of 2.10 (95% CI: 1.22-3.61) and the age-, gender-, creatinine, CRP-, hemoglobin- and BNP- adjusted risk for GDF 15≥3000ng/mL was 1.70 (96% CI:1.01-2.87). Patients discharged with both BNP and GDF 15 above the mean had a multivariate adjusted HR of 2-year death of 3.64 (1.80-7.34) p < 0.001 when compared with the reference category (both BNP and GDF 15 below the mean). Patients with only one of the variables above the mean had an HR of 2-year mortality of 1.65 (95% CI: 2.94-5.92), p = 0.039 CONCLUSIONS: Higher GDF15 associated with worse prognosis in acute HF independently of BNP. When both biomarkers GDF 15 and BNP were elevated at discharge, the 2-year mortality risk increased over 3-fold. Biomarkers related to different pathophysiological pathways can provide incremental prognostic information in acute HF. We reinforce the concept of a multimarker approach in the prognostic assessment of acute HF.

P236 Risk scoring system prediction for clinical outcomes in Korean patients with acute decompensated heart failure: KorAHF score

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On behalf of: KorAHF registry

Funding Acknowledgements: Korea Centers for Disease Control and Prevention

Background: Assessment of risk at time of admission could be a useful tool for guiding management of acute decompensated heart failure (ADHF). The aim of this study was to develop a novel and simple assessment tools for better hospital discharge risk stratification.

Methods: A total of 5,625 cohort patients enrolled in Korean acute heart failure registry (KorAHF). Clinically relevant variables were collected in all the patients (Table 1).
The entire study population had complete 1-year follow-up data. Multivariate analysis by step-wise Cox regression models tested variables that were significant at a p value < 0.2 in univariate analysis.

**Results:** During 1-year follow-up, all-cause death occurred in 970 out of 5,625 patients (17.2%) in the development cohorts. By multivariate Cox regression analysis, the 11 independent factors that increased the risk of 1-year mortality were described in Table 1. The score was calculated by sum of one point for each variable. A new risk score (KorAHF score) for ADHF showed a strong graded relation to 1-year mortality (2.4% to 63.2%; Figure 1).

**Conclusion:** The KorAHF score for Korean patients with ADHF is a simple and relevant risk scoring system in prediction of 1-year all-cause mortality. Validation of the risk scoring system in a larger cohort would be needed.

### Variables in the risk score system

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta Coefficient</th>
<th>P value</th>
<th>Multivariate Hazard Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&gt;75 years)</td>
<td>0.642</td>
<td>&lt; 0.0001</td>
<td>1.90 (1.66-2.17)</td>
</tr>
<tr>
<td>NYHA FC IV</td>
<td>0.183</td>
<td>0.006</td>
<td>1.20 (1.06-1.37)</td>
</tr>
<tr>
<td>SBP &lt; 100 mmHg</td>
<td>0.397</td>
<td>&lt; 0.0001</td>
<td>1.49 (1.26-1.76)</td>
</tr>
<tr>
<td>GFR &lt; 60 ml/min</td>
<td>0.350</td>
<td>&lt; 0.0001</td>
<td>1.42 (1.23-1.63)</td>
</tr>
<tr>
<td>LVEF &lt; 30%</td>
<td>0.185</td>
<td>0.008</td>
<td>1.20 (1.05-1.36)</td>
</tr>
<tr>
<td>Na &lt; 135 mEq/L</td>
<td>0.396</td>
<td>&lt; 0.0001</td>
<td>1.47 (1.29-1.68)</td>
</tr>
<tr>
<td>Hemoglobin &lt; 10 g/dL</td>
<td>0.373</td>
<td>&lt; 0.0001</td>
<td>1.45 (1.25-1.69)</td>
</tr>
<tr>
<td>Nutritional risk index</td>
<td>0.539</td>
<td>&lt; 0.0001</td>
<td>1.71 (1.50-1.97)</td>
</tr>
<tr>
<td>Uric acid &gt; 7.5 mg/dL</td>
<td>0.138</td>
<td>0.048</td>
<td>1.15 (1.00-1.32)</td>
</tr>
<tr>
<td>NT-proBNP &gt; 1000 pg/ml or NT-proBNP &gt; 3500 pg/ml</td>
<td>0.398</td>
<td>&lt; 0.0001</td>
<td>1.49 (1.30-1.71)</td>
</tr>
<tr>
<td>No use of RAAS or Beta-blocker</td>
<td>0.328</td>
<td>&lt; 0.0001</td>
<td>1.39 (1.21-1.59)</td>
</tr>
</tbody>
</table>

**KorAHF Risk Score**

**High Risk:** Score 0-2
**Medium Risk:** Score 3-6
**Low Risk:** Score 7-10

**ACUTE HEART FAILURE Registry:** From March 2011 to February 2014. Preconditioning factors were identified at admission and included acute coronary syndrome (ACS)/ischemia, severe hypertension, atrial or ventricular tachyarrhythmia, brad- yarrhythmia, infection, pulmonary embolism, renal failure, anemia, or bleeding, med- ications which can aggravate HF, noncompliance, excessive alcohol or illicit drug use, endocrine abnormalities, recent addition of negative inotropic drugs. In-hospital mortality and 1-year mortality were assessed.

**Results:** Mean age was 68.5±14.5 and 2,993 patients (53.2%) were male. Among the 5,625 patients who were registered at KorAHF Registry, 4,874 patients (86.7%) had 1 or more preconditioning factors identified, with acute coronary syndrome/sclerosis (62.3%), atrial or ventricular tachyarrhythmia (20.5%), and infec- tion (19.6%) being most frequent. Acute coronary syndrome/sclerosis was most common preconditioning factor in HFpEF whereas atrial or ventricular tachyarrhythmia was most common in HFrEF. Acute coronary syndrome/sclerosis (8.2% vs 3.5%, P<0.001) and renal failure (7.6% vs 4.6%, P=0.018) were associated with higher in-hospital mortality, and infection (19.4% vs 11.8%, P=0.038), renal failure (29.5% vs 16.3%, P<0.001) and anemia or bleeding (26.8% vs 17.0%, P<0.001) were associated with higher 1-year mortality. But in multivariate analysis adjustment for 14 risk variables, only acute coronary syndrome/sclerosis was independently associated with higher in-hospital mortality (odds ratio 2.00, 95% CI 1.44-2.78, P<0.001) and anemia or bleeding was independently associated with higher 1-year mortality independently (hazard ratio 1.45, 95% CI 1.26-2.58, P<0.001), whereas renal failure and medications which can aggravate HF were associated with higher 1-year mortality (hazard ratio 1.38, 95% CI 1.24-2.03, P=0.046) and hazard ratio 1.62, 95% CI 1.04-2.03, P=0.012). In HFpEF patients, infection is associated with higher in-hospital mortality (odds ratio 2.11, 95% CI 1.03-4.33, P=0.041) whereas no pre- cipitating factor can predict 1-year mortality.

**Conclusion:** Precipitating factors are frequently identified in patients hospitalized for HF and are associated with clinical outcomes independent of other predictive vari- ables. Increased attention to these factors, many of which are avoidable, is important in optimizing the management of HF.

**P238**

**Prognostic role of severe renal impairment in patients with HFpEF or HFrEF hospitalised for acute heart failure: data from the IN-HF Outcome Italian Registry**

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**On behalf of:** IN-HF Outcome Investigators

**Funding Acknowledgements:** The study was partially supported by an unrestricted grant by Novartis, Abbott, and Medtronic, Italy

**Background:** Renal insufficiency (RI) frequently coexists with heart failure (HF) and worsens outcomes by adding a negative prognostic effect per se and by limiting the use of HFrEF life-saving treatments such as ACE-inhibitors (ACE-I) and mineralocorticoid receptor antagonists (MRAs). Prognostic impact of RI in patients with HFrEF is less defined.

**Aims:** To evaluate the prognostic role of RI in patients with HFrEF or HFrEF hospitalised for acute HF.

**Methods:** We analysed patients hospitalised for acute heart failure (AHF) included in the IN-HF Outcome Italian registry with available data regarding left ventricu- lar ejection fraction (LVEF) and estimated glomerular filtration rate (eGFR) data on admission. We than compared the prognostic role of severe RI (< 30 ml/min/1.73m2) in patients with HFrEF (LVEF < 45%) and in patients with HFrEF (LVEF>45%).

**Results:** The study population was composed by 1643 patients: 1131 patients had HFrEF and among these patients the prevalence of severe RI was 13.2%. Compared to those with more preserved renal function, HFrEF patients with severe RI were older (75±10 vs 70±12 years, p<0.0001), with a higher prevalence of females (40.9% vs 30.4%, p<0.01) and had a higher prevalence of ischemic aetiology of HF (64.2% vs 47.2%, p<0.001). Analysing treatments in the week prior to admission, HFrEF patients with severe RI received a lower prescription rate of ACE-I or angiotensin receptor blockers (46.3% vs 59.2%, p<0.001) and of dabigatran (7.4% vs 15.4%, p<0.008), while prescription rates of betablockers and MRAs were similar. HFrEF patients with severe RI had higher in-hospital and one-year all-cause mortality (see Figure). Patients with HFrEF were 513 and 11.2% of these had severe RI. Compared to those with more preserved RI, HFrEF patients with...
severe RI had a similar percentage of females (55.2% vs 56.7%, p = 0.84) and similar age (77 ± 9 vs 74 ± 10 years, p = 0.03) and a higher prevalence of ischemic etiology of HF (39.7% vs 29.2%, p = 0.03). The in-hospital and 1-year mortality rates of HFpEF patients with or without severe RI are reported in Figure. CONCLUSIONS. In patients with AHF, severe RI is significantly associated with a worse in-hospital and one-year all-cause mortality not only in patients with HFrEF but also in those with HFpEF.

P239
Clinical characteristics and outcome of acute heart failure patients with mid-range ejection fraction
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Background: Heart failure (HF) with mid-range ejection fraction (HFmrEF) is a new entity defined by the recent ESC heart failure guidelines.

Methods: In a retrospective, single center study we included patients hospitalized for AHF at our Institute. Left ventricular ejection fraction (LVEF) was assessed with echocardiography during the hospitalization in all patients. For the purposes of this analysis patients were divided according LVEF in HFrEF (LVEF ≤ 40%), HFmrEF (LVEF 40-49%), and HFpEF (LVEF ≥ 50%). Primary outcomes were cardiovascular (CV) death and CV death and HF hospitalization at day 180.

Results: A total of 948 patients were included in this analysis, 625 (65.9%) HFrEF, 117 (12.4%) HFmrEF, and 206 (21.7%) HFpEF. HFmrEF patients showed intermediate characteristics between HFrEF and HFpEF as regards age, sex, cardiac and extracardiac comorbidities. At baseline systolic blood pressure differed significantly in the three groups (HFrEF 135 ± 31 mmHg vs HFmrEF 138 ± 31 mmHg; p < 0.001) as well as values of Nt-proBNP (6665 [IQR 4369-13753] ng/mL vs 4826 [IQR 2847-6915] ng/mL; p < 0.001). Treatment with ACEi/ARBs and beta blockers was highly implemented in both HFrEF and HFmrEF patients at discharge (HFrEF 69.8% baseline to 77.6% discharge vs HFmrEF 67.5% baseline to 74.4% discharge for ACEi/ARB; HFmrEF 65.1% baseline to 83.5% discharge vs HFmrEF 62.4% baseline to 82.1% discharge, for beta blockers). At Cox regression analysis, the risk of CV mortality to day 180 did not differ across groups (HFrEF HR 1.180, 95% CI 0.919-1.515; p = 0.166 vs HFmrEF HR 0.955, 95% CI 0.643-1.379; p = 0.286). Similarly the risk of CV death and HF hospitalization was comparable between groups (HFrEF HR 1.185, 95% CI 0.724-1.937; p = 0.48 vs HFmrEF HR 0.956, 95% CI 0.579-1.579; p = 0.198) (Figure 1a and b).

Conclusion: AHF patients with mid-range LVEF seem to show intermediate clinical characteristics and similar outcomes of patients with HFrEF and HFpEF. This study confirms the limited prognostic power of LVEF in predicting post discharge events in AHF setting.

P240
Contemporary assessment of lung ultrasound, bnp and echocardiography predicts outcome in patients with acute heart failure independently to systolic dysfunction
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Background: Pulmonary and systemic congestion at hospital discharge predict an adverse prognosis in patients with heart failure. Lung ultrasound (LUS) may be a simple, accurate, fast and economic tool to assess pulmonary congestion by imaging ‘comets’ or B-lines.

Purpose: 1) To investigate the relationships of B-lines to B-type natriuretic peptide (BNP), left ventricular ejection fraction (LVEF) and LV filling pressure at admission. 2) To evaluate their relationship to prognosis at six months and the added value of repeat measurements before discharge. 3) To explore potential differences in patients with HFpEF and HFrEF.

Methods: Patients admitted for worsening heart failure were assessed within 12h of admission. B-lines and BNP values were also evaluated at discharge. The primary composite outcome was re-hospitalization for heart failure or death at 6 months. Continuous variables are shown as median and inter-quartile range (IQR). Categorical variables are shown in percentage (%) or count.

Results: Of 162 patients enrolled, 95 had HFrEF and 67 had HFpEF; median age was 80 [77-85] years and 85 [72-95] were women. The median number of B-lines at admission was 31 [27-36] and median plasma BNP was 1007 [768-1540]ng/L. Patients with HFrEF were slightly older, more likely to be men and less likely to have a history of hypertension. At admission, B-lines correlated with BNP (r=0.43; p<0.001), clinical congestion (r=0.25; p=0.001) and PAP (r=0.42; p<0.001). Failure to reduce

Figure 1
B-lines during hospitalization was strongly associated with worse outcome (AUC 0.91 [0.85-0.96] p < 0.001); a B-line reduction of <40% from admission to discharge had a sensitivity 80%, specificity 70% and correctly predicted outcome at 180 days in 76% of cases (p = 0.001). In univariate Cox regression analysis, the number of B-lines at discharge (HR 1.12 [1.09-1.15; p = 0.02]) and change in B-lines during admission (HR 0.95 [0.94-0.96]; p < 0.001) were related to poor outcome. Multivariable analysis confirmed the association with change in B-lines. 

Conclusions: LUS appears a useful method to assess the severity and monitor the resolution of lung congestion. Measurement of lung congestion at discharge provides prognostic information for patients with either HFpEF or HFrEF.

P241 Genetic determinants of heart failure prognosis
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1University Hospital of Santiago de Compostela, Cardiology, Santiago de Compostela, Spain; 2Fundación Pública Galega de Medicina Xenómica, SERRGAS, Santiago de Compostela, Spain; 3Instituto de Investigación Sanitaria de Santiago, Santiago de Compostela, Spain, 4Hospital de Santiago, Santiago de Compostela, Spain; 5University Clinical Hospital of Santiago de Compostela, Department of Cardiology, Santiago de Compostela, Spain

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Objective: Heart failure (HF) is a complex cardiometabolic disorder resulting from the combination of genetic and environmental factors. Recent advances in genomics offer a smart option for predicting future risk of disease early in life and prognosis. The objective of this study was to examine the prognostic value of a series of single nucleotide polymorphisms (SNP) previously related with metabolic disorders and obesity.

Methods: A selection of 199 SNP found to be related with obesity, BMI, circulating lipids, and cerebral ischaemic stroke were genotyped in 227 patients with HF diagnosis following the current European guidelines of clinical practice. Anthropometric and clinical variables were collected for each patient and a follow-up period was established for registry of death and re-hospitalization by HF as the primary endpoint. An additional genetic model was assumed, and the genotypes were analysed by Cox regression to study the association with HF prognosis.

Results: A total of 63 events (defined by the combination of death and re-hospitalization for HF) were registered. From the total of SNP, rs2107595, rs737337 was related with BMI values, being the protective variant more present in 25% of cases (< 35 kg/m2) and obesity type I (< 30 kg/m2). Age and diabetes mellitus were also bad prognostic variables whereas higher total cholesterol was related with better prognosis, as expected in HF patients. Only rs6882076, and rs737337 variants were independently associated with HF prognosis during a follow-up period of 438 (263-1077) days [median (IQR)]. Results were further adjusted for baseline characteristics (age, sex, body mass index (BMI), diabetes mellitus, hypertension, hyperlipidaemia, and blood lipid concentrations). The association between elevated uric acid levels and cardiovascu-
lar diseases has been known for almost half a century. Although the relationship between uric acid and chronic heart failure has also been demonstrated, the clinical and prognostic role in acute settings remains controversial and still poorly exam-
ined. Therefore, this study aims to evaluate the significance of uric acid in acute heart failure (AHF) and verify any different impact in heart failure with reduced ejection fraction (HRHF) compared to heart failure with preserved ejection fraction (HFpEF).

Methods: This was a retrospective analysis which included consecutively 324 subjects, screened from Interventional Diur HF Trial (NCT01441424) from January 2011 to February 2016. Patients were eligible if they were admitted with a primary diagnosis of AHF. Enrolled subjects were categorized based on ejection frac-
tion (EF): HLF HF (EF <50%), HFF HF (EF=50%). Blinded physicians assigned a standardized congestion score at the time of enrollment. We defined as hyperuricaemia as serum uric acid (UA) ≥ 7 mg/dL in men and ≥ 6 mg/dL in women. Patients were followed for six months after discharge with clinical visits or telephone contacts. The primary outcome was the composite of death or rehospitalization for AHF.

Results: 173 HLF HF and 151 HFF HF patients were followed and hyperuricaemia was found in 160 subjects with greater proportions in HFF HF compared to HLF HF.

Background: The association between elevated uric acid levels and cardiovascu-
lar diseases has been known for almost half a century. Although the relationship between uric acid and chronic heart failure has also been demonstrated, the clinical and prognostic role in acute settings remains controversial and still poorly exam-
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Results: 173 HLF HF and 151 HFF HF patients were followed and hyperuricaemia was found in 160 subjects with greater proportions in HFF HF compared to HLF HF.
(77% vs 43%; p = 0.01). It was significantly more prevalent in women (74% vs 60%; p = 0.008), those with diabetes (39% vs 19%; p < 0.001), hypertension (86% vs 43%; p < 0.001) and atrial fibrillation (48% vs 34%; p = 0.01). In HFrEF patients, univariate analysis showed that hyperuricemia (HR 1.48 (1.02-2.15); p = 0.04) and congestion score ≥ 2 (HR 2.83 (1.32-5.28); p < 0.001) were related to the primary outcome; after adjustment, multivariable analysis demonstrated that only congestion score ≥ 2 (HR 2.08 (1.06-4.10); p = 0.03) was independently associated with the primary outcome. On the contrary, in HFrEF patients, the only significant predictor of poor prognosis was hyperuricemia (HR 2.38 (1.32-4.28); p < 0.001) and multivariable analysis showed that hyperuricemia (HR 2.38 (1.32-4.28); p = 0.004) was independently associated with the increased risk of death or hospitalization.

Conclusions: In Acute Heart Failure hyperuricemia is common among those with HFrEF and HFrEF. In the HFrEF subgroup, hyperuricemia was independently associated with an increased risk of death or hospitalization.

**P244**

Acid-base balance disorders are associated with increased 1-month and 3-month mortality in patients with acute heart failure

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On behalf of: Of the GREAT network

**Funding Acknowledgements:** The work was supported by the Research Council of Lithuania, grant No. MIP-049/2015

**Background/Introduction:** Arterial blood gas (ABG) analysis is one of the main tests for decision-making in patients with severe dyspnea. However, the significance of ABG analysis on the prognosis for the acute heart failure (AHF) patients remains unclear.

**Purpose:** The study evaluated whether acid-base balance disorders at the time of admission are associated with 1- and 3-month rehospitalisation and mortality rates of AHF patients.

**Methods:** A prospective observational cohort study enrolled consecutive patients with acute dyspnea from March, 2015 to August, 2016. The inclusion criterion was a suspected acute coronary syndrome. Data of 144 study patients with adjudicated diagnosis of AHF, available ABG and biochemical blood analyses at admission and completed 3-months follow up were included in the analysis. Outcomes were evaluated with Kaplan-Meier curves and Cox proportional hazard model to estimate survival rates, hazard ratios (HR) and 95% confidence intervals (CI). Data were analyzed using SPSS v23 statistical package.

**Results:** 71 (49.3%) patients were male and 73 (50.7%) female. Acid-base balance disorders were found in 90 (62.5%) patients: 25 (17.3%) patients had acidosis (15 [10.4%] metabolic, 10 [6.9%]respiratory), 58 patients (40.3%) had alkalis (7 [4.9%] metabolic, 51 [35.4%] respiratory). 7 (4.9%) patients had a mixed A-B disorder. Both respiratory and metabolic acidosis (HR=4.85, 95% CI: 1.42; 15.25, P=0.011) and mixed A-B disorders (HR=5.52, 95% CI: 1.55; 19.57, P=0.008) also displayed a significant effect on 1- and 3-month rehospitalisation rates. The cumulative 90-day survival was 85% for patients with A-B disorders and 93% for individuals with normal A-B balance (p = 0.155). Patients with on-admission A-B disorders had a higher count of leukocytes (mean 9140/mm3 vs. 7360/mm3, p = 0.049), increased CRP (mean 29.95 mg/L vs. 12.35 mg/L, p = 0.028), glucose (mean 7.55 mmol/L vs. 6.32 mmol/L, p = 0.04), uric acid (mean 11.61 mmol/L vs. 7.86 mmol/L, p = 0.022) as well as high sensitivity (hs) troponin I serum concentration (mean 70.65 ng/mL vs. 45.31 ng/mL, p = 0.024) compared to patients without A-B balance disorders. No significant difference was observed in admission serum BNP concentration (mean 1554.45 pg/mL vs. 829.73 pg/mL, p = 0.056) in patients with and without A-B balance disorders.

**Conclusions:** On-admission acid-base balance disorders demonstrate a significant impact on 1- and 3-month mortality rates of patients with AHF. Patients with acid-base balance disorders have a distinct biochemical profile in terms of inflammatory and necrosis biomarkers. These patients require careful monitoring during first three months after the discharge.

**P245**

Short-term outcomes in heart failure patients with chronic obstructive pulmonary disease in the community

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**Aims:** Heart failure (HF) and chronic obstructive pulmonary disease (COPD) are common co-morbidities. The combination presents diagnostic challenges and has been linked with worse prognosis in patients admitted to hospital. There is hardly any prognostic data in patients with both co-morbidities in the community.

**Methods: And Results:** We evaluated 783 patients (27.2%) with left ventricular systolic dysfunction under the care of a regional nurse-led community heart failure team between June 2007 – June 2010. 101 patients (12.9%) also had a diagnosis of COPD. 94% of patients were on loop diuretics; 83% on ACE Inhibitors, 74% on beta-blockers; 9.6% were on bronchodilators and 42% on aldosterone antagonists. Mean age of the patients was 77.9 + 5.7 years; 42% were females and mean NYHA class was 2.1 + 0.6. Mean follow-up was 28.2 + 2.9 months. Beta-blocker utilization was markedly lower in patients receiving bronchodilators compared to those without (overall 24.4% vs 81%; P, 0.0001). 24 month survival was 93% in patients with HF alone and 89% in those with both co-morbidities (P<NS). The presence of COPD was associated with increased HF hospitalizations (HR 1.56 (1.4-2.1); P, 0.0001) and major adverse cardiovascular events [1.23 (1.03 - 1.75); P, 0.001].

**Conclusions:** COPD is a common co-morbidity in ambulatory HF patients in the community and is a powerful predictor of worsening HF. It does not however appear to affect short-term mortality in ambulatory HF patients.
Conclusions: Patients with HFmrEF represent a significant portion of patients with HFpEF. However, this difference becomes non-statistically significant at 12 months and 19.6% respectively, p with respect to HFmrEF (10.7%) and HFpEF (8.0%), p

Purpose: We studied 1669 patients hospitalised for AHF and with EF assessed during hospitalization: patients with HfMRIef were 19.0%, 58.4% had HfPEF and 22.6% HfSEf. HfMRIef had intermediate demographic characteristics: mean age was 73 ± 10 vs 70 ± 12 years in HfPEF and 75 ± 10 in HfSEf (p < 0,001), prevalence of females in HfMRIef was 43.9% compared to 30.3% and 60.0% in HfPEF and HfSEf respectively (p < 0,001). Ischemic etiology was more frequent in HfMRIef (48.9%) and HfPEF (47.6%) than in HfSEf patients (20.7%). p < 0.001, which had a higher rate of hypertensive etiology. Compared to those with HfMRIef and HfPEF, patients HfSEf had a higher prevalence of diabetes (48.0% vs 38.8% and 39.5%, p = 0,01), dyslipidaemia (26.2% vs 24.0% and 16.7%, p = 0,001) and chronic kidney disease (20% vs 11.9% and 10.7%, p = 0,003). At hospital discharge mortality rate was significantly higher (p < 0.001) in HfMRIef (147 ± 34 mmHg) vs HfPEF (143 ± 33 mmHg) and HfSEf (127 ± 30 mmHg) patients. Acute pulmonary edema was observed in 25% of patients compared to HfPEF (34.5%) and HfSEf (33.2%), p = 0,001. No differences were found in the use of IV diuretics, while use of inotropes (dopamine, dobutamine, levosimendan) was higher in HfPEF (25.6%) with hypertensive etiology (17.0%) and HfSEf (8.0%), p < 0.001. In hospital mortality was higher in HfMRIef patients (7.3%) compared to HfPEF (4.1%) and HfSEf (2.9%), p = 0.003, but this difference was not significant at 1 year (24.6%, 23.7% and 19.1% respectively, p = 0.16).

Conclusions: Patients with HfMRIef represent a significant portion of patients with HF and appear to have intermediate clinical characteristics. In-hospital mortality rate was lower than that observed in HfPEF and higher than that found in HfSEf. However, this difference becomes non-statistically significant at 12 months follow-up.

P247 Evaluation of prognostic indicators of in-hospital evolution and re-hospitalization of patients admitted to the coronary unit with acute heart failure

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Background: The term “acute heart failure” refers to the beginning of heart failure signs and symptoms, or a sudden and unexpected worsening of them. Being a life-threatening clinical condition, it demands urgent evaluation and treatment, which often results in most of the patients having to be admitted to critical care units. In a recent research carried out in Argentina among a group of patients experiencing this situation, one year follow-up was performed. Logistic regression analysis was used to assess Kaplan-Meier was 24 months, with no gender difference. All parameters influencing mortality at an impact on survival. Improving the quality of life as measured by the six minutes’ walk test and the questionnaire was significantly improved in patients remained alive. Finally, the evaluation of drug prescriptions trends, according to new international guidelines, is quite reassuring in that the new molecules that allowed a significant reduction in morbidity and mortality in heart failure are widely prescribed in our patients.

P248 Predictors of one year mortality in chronic systolic heart failure newly diagnosed

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Introduction and problematic: Heart failure is a common pathology, with a heavy morbidity and mortality. Its prevalence in the world varies between 1 and 2% of the adult population and reaches 10% after 70 years. It represents the ultimate evolution of many cardiovascular diseases, especially ischemic and hypertensive. Heart failure is associated with high morbidity and mortality. A lot of progress where new techniques have emerged and made possible functional improvement and, especially a better survival, to certain category of patients. Therefore, the prognostic evaluation becomes a crucial role in the management of heart failure, to guide treatment decisions based on individual risk.

Objective: Identifying and measuring predictors of one-year mortality in newly diagnosed chronic systolic heart failure

Methods: We conducted a longitudinal prospective analytical bi-centric study, with one year follow-up.

Results: 298 patients were enrolled with a mean age of 54.9 ± 1.8 years, a sex ratio of 1.9. The prevalence of diabetes mellitus was 39.1%, hypertension 30.1%. Coronary artery disease was present in 55.5%, dilated cardiomyopathy in 30.1% and toxic cardiomyopathy in 1.9%. The mortality rate was 12.7% (11.7% in men vs 14.2% in women, p not significant) and re-admission rate was 17.6% (23.1% for men vs 6.6% in women, p = 0.004). Most clinical, echocardiographic, biological and functional parameters cited in the literature have demonstrated prognostic predictive value with different rates of sensitivity and specificity. In multivariate analysis, pulmonary vascular resistance (new highly sensitive and specific parameter, RR 47, βNP, TNF-α, DP, etc., the distance travelled in six-minutes’ walk test and serum sodium level were predictors of mortality in heart failure. The median survival by Kaplan-Meier was 24 months, with no gender difference. All parameters influencing mortality had an impact on survival. Improving the quality of life as measured by the six minutes’ walk test and the questionnaire was significantly improved in patients remained alive. Finally, the evaluation of drug prescriptions trends, according to new international guidelines, is quite reassuring in that the new molecules that allowed a significant reduction in morbidity and mortality in heart failure are widely prescribed in our patients.

P249 Incidence, risk predictors and prognosis of left ventricular systolic dysfunction after acute coronary syndrome

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Introduction: Left ventricular systolic dysfunction (LVDs) is a strong marker of worse prognosis in acute coronary syndromes (ACS) and information is lacking about independent predictors of LVDs after ACS. Thus, it is relevant to search for those determinants in order to better manage ACS patients, prevent heart failure (HF) development and improve prognosis.

Purpose: To identify predictors of LVDs after ACS and to evaluate how it influences prognosis.

Methods: Retrospective analysis of 327 patients with ACS consecutively admitted for coronaryarhraphy in a non-tertiary hospital between January 2014 and December 2015. All patients underwent a routine invasive strategy and were evaluated by echocardiography, with left ventricular ejection fraction (LVEF) measure, before hospital discharge. Patients were divided into 2 groups according to their LVEF: A - LVEF ≥ 40% (n = 287, 87.8%); B - LVEF < 40% (n = 40, 12.2%) which defines LVDs. A one year follow-up was performed. Logistic regression analysis was used to assess independent predictors of LVDs after ACS.

Results: Overall, 414 cases (65.1%) presented with ACS without ST elevation, the mean age was 66.6 ± 13.2 years, with 97 (29.7%) being female. Patients presenting with ST elevation ACS (p = 0.033), heart rate >100 bpm (p = 0.033), and signs of heart failure (Killip-Kimball ≥ 2) at admission (p = 0.001), and those with prior history of HF (p = 0.003) or taking oral anticoagulants (p = 0.038) were significantly prone to show LVDs. Similarly, these patients showed higher levels of myocardial markers of necrosis (p = 0.004) and natriuretic peptides (BNP) over hospitalization (p = 0.001). They underwent coronaryography by femoral artery access more often (p = 0.016), with higher rates of coronary bypass surgery referral (p = 0.004). One year mortality was also higher in group B (p = 0.008). Logistic regression showed strong association between Killip-Kimball ≥ 2 at admission (15.0% vs 37.5%; OR 2.6; IC95% 1.2-5.6, p = 0.016), maximum BNP levels ≥ 200 pg/mL (9.9% vs 89.2%; OR 3.9; IC95% 1.3-11.8) and LVDs.

Conclusion: Based on this unicentric data survey, LSVD after SCA, which had an incidence of 12.2%, can be predicted by assessment of HF signs at admission...
Despite advances in specific treatments, heart failure is still recognized as one of the major public health concerns such as poor clinical outcomes. Among such HF patient population, several studies showed that HF patients with hypoalbuminemia have poorer clinical outcomes compared those without. However, in patients with acute decompensated HF (ADHF), conflicting results were reported regarding the relationship between serum albumin level and clinical outcomes. Indeed, it remains controversial whether hypoalbuminemia on admission is associated with increased mortality in ADHF patients. However, we aimed to investigate the relationship between hypoalbuminemia on admission and long-term mortality in hospitalized patients following ADHF. We targeted a cohort of 1684 consecutive patients who admitted to the cardiac intensive-care unit from 2007 to 2011. Among them, patients with ADHF were divided into 2 groups according to the presence or absence of hypoalbuminemia on admission. There were 152 deaths (27.5%) during a median follow-up of 1.9 years. Kaplan-Meier survival plots in patients with and without hypoalbuminemia are shown in Figure 1. Hypoalbuminemia on admission defined as a serum albumin <3.4 g/dl. Relationship between admission albumin level and mortality was analyzed by univariable and multivariable Cox proportional analyses. Multivariable analysis included variables which showed <0.1 in univariable analyses. Results: Out of the 551 patients, 311 (56%) were classified as hypoalbuminemia. Kaplan-Meier survival plots in patients with and without hypoalbuminemia are shown in the Figure. Hypoalbuminemia on admission tended to be associated with increased mortality in univariable Cox proportional hazard regression analysis (hazard ratio [HR], 1.32; P=0.098). In the multivariable Cox proportional hazard regression analysis, there was no relationship between hypoalbuminemia on admission and mortality (HR, 1.01; P=0.959). Even when we treated serum albumin levels as a continuous variable, no association between hypoalbuminemia on admission and long-term mortality was observed. Conclusion: Either hypoalbuminemia or serum albumin levels on admission was not associated with long-term mortality in patients with ADHF. These data suggest that hypoalbuminemia or serum albumin levels on admission may not be a predictor for worse long-term clinical outcomes in patients with ADHF in our patient population. Considering results of previous studies, hypoalbuminemia or serum albumin level at discharge and changes in albumin levels from admission to discharge may play some roles in relationship between albumin status in HF patients and long-term clinical outcomes.
An echocardiography was performed on admission. The IHM was analyzed according to echo parameters (LVEF, EDV, LAD, TAPSE, PAWT, DTE wave, E/E' ratio and echolucency). Results: The parameters have significantly correlated with IHM in our group: LVEF = 0.006, the cut off value of 54mm at ROC analysis with 90% sensitivity, 60, 95%CI 0.58 - 0.78, under the curve area 0.69, p = 0.0029) TAPSE (p = 0.0002, cut off value 17mm, sens 100, spec 48.8, 95%CI 0.66 - 0.85, area 0.56, p < 0.0001), PAWT = 0.0001, cut off value 102 ms, sens 100, spec 65.71, 95%CI 0.68 - 0.86, p = 0.0001, area 0.78, DTE(p) = 0.003, cut off value 196 ms, sens 81, 82, spec 60, 95%CI 0.61 - 0.79, area 0.70, p = 0.0002), E/E' ratio(p) = 0.009. The significance differs according to etiology. Statistically significant remain: for valvular dysfunction (p = 0.001), for ischemic TAPSE and PAWT (p = 0.01), for hyper tension - TAPSE (p = 0.001), PAWT (p = 0.008, DTE(p) = 0.008) and E/E' (p = 0.01).

Conclusions: A series of echocardiographic parameters, essentially obtained in the first hours of admission have proven a positive predictive and independent value in our analysis for IHM. Their prognostic value changes when assessed according to echolucency, a result that gives echocardiography an important role in evaluating non ACS AHF patients.

### P253

**Echocardiography in acute heart failure: an incremental value for patient prognosis**

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**Introduction:** Echocardiography is currently indicated in some, but not at all patients with suspected acute heart failure (AHF), mainly to identify cardiac abnormalities and refine the diagnosis of the hospitalization trigger. We intended to identify the most predictive echocardiography variables of outcome at AHF admission.

**Methods:** We studied a prospective cohort study of 182 patients (72 ± 14 years, 55.5% men, 31% ischemic HF), admitted for AHF between 2010 and 2013, from the ICALOR database. Each patient had benefit of a complete echocardiography at bedside within first days after admission. Clinical and biological data, with BNP value, at admission were also collected. The end point was readmission for HF, all-cause mortality after discharge.

**Results:** During a mean follow-up of 9 months after discharge: 41 patients died (22.5%) and 71 (39%) were readmitted for AHF. In univariable analysis, a RV pressure (p = 0.0003), for ischemic TAPSE and PAWT (p = 0.01), for hypertension whereas mitral regurgitation (HR=3.33,(1.37-8.06), p = 0.02) were independent predictors of readmission. The logistic discrimination of these parameters was very significant: C statistic differenced between: 0.69 for hypertension, 0.78 for mitral regurgitation, 0.86 for RV pressure, 0.89 for TAPSE and PAWT.

**Conclusion:** Our results suggest that echocardiography, mainly through mechanical and biohumoral severity of HF and may influence the success of CPR and determination of the outcome of CPR by first detected electrical rhythm (FDER), in patients hospitalized for AHF.

### P254

**Is arrival on the weekend associated with increased short term mortality of patients with acute dyspnea?**

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**On behalf of: GREAT network**

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**Introduction:** Arrival to the emergency department during the weekends might be associated with poorer care and subsequent longer hospitalisation and worse outcomes. So far few data have been published on the frequency and impact of the weekend on hospitalisation trigger. We intended to identify the most predictive echocardiography variables of outcome at AHF admission.

**Method:** We studied a prospective cohort study of 182 patients (72 ± 14 years, 55.5% men, 31% ischemic HF), admitted for AHF between 2010 and 2013, from the ICALOR database. Each patient had benefit of a complete echocardiography at bedside within first days after admission. Clinical and biological data, with BNP value, at admission were also collected. The end point was readmission for HF, all-cause mortality after discharge.

**Results:** During a mean follow-up of 9 months after discharge: 41 patients died (22.5%) and 71 (39%) were readmitted for AHF. In univariable analysis, a RV pressure (p = 0.0003), for ischemic TAPSE and PAWT (p = 0.01), for hypertension whereas mitral regurgitation (HR=3.33,(1.37-8.06), p = 0.02) were independent predictors of readmission. The logistic discrimination of these parameters was very significant: C statistic differenced between: 0.69 for hypertension, 0.78 for mitral regurgitation, 0.86 for RV pressure, 0.89 for TAPSE and PAWT.

**Conclusion:** Our results suggest that echocardiography, mainly through mechanical and biohumoral severity of HF and may influence the success of CPR and determination of the outcome of CPR by first detected electrical rhythm (FDER), in patients hospitalized for AHF.
On behalf of: on behalf of SLOVASeZ Investigators

**Background:** HF Guidelines 2016 proposed new classification of heart failure based on ejection fraction – HFrEF, HFmrEF and HFpEF.

**Aim:** of the study was to evaluate and compare the three groups of patients according LVEF admitted due to acute heart failure. **Methods:** Data from nationwide multicenter AHF surveys (SLOVASeZ 1 and II) with 1452 consecutive patients enrolled in 14 hospitals throughout Slovakia were analyzed. Ejection fraction was measured during indexed hospitalization in 71.4% of patients and these patients were included to the further evaluation. Mean age of the patients was 72.2 ± 11.7 years, 52% of them were men. Majority of patients were admitted with decompensated heart failure (71.3%), AHF de novo was diagnosed in 28.6% of patients. We identified 41.6% patients with HFrEF, 22.2% patients with HFmrEF and 36.2% patients with HFpEF. Nineteen characteristics of these patients were selected to the statistical analysis. Patients with HFmrEF were younger (mean 67.3 vs. 73.9 years, p = 0.02), with higher proportion of men (69.7% vs. 36.6%, p = 0.001). Women were represented more often in HFrEF. Patients with HFpEF were admitted mostly for decompensated chronic heart failure (74.1%, p = 0.001). Coronary heart disease was considered as primary etiology in all group of patients, but the most present in HFrEF (72.3%, p = 0.001), followed by HFmrEF (58.6%) and HFpEF (49.7%). Systolic blood pressure at admission was lower in HFrEF (p = 0.01) compared to other groups, with no difference in heart rate between groups. We also did not find difference in the sodium and creatinine levels between groups. Hypotension was considered as the most frequent comorbidity in HFmrEF and HFpEF compared to HFrEF (p = 0.001). Atrial fibrillation (p = 0.01) and anemia (p = 0.05) were more often in HFpEF. There was no difference in the incidence of diabetes mellitus and chronic kidney disease between groups. There was strong trend to higher in-hospital laboratory parameters, but did not reach statistical significance.

**Conclusions:** The most significant differences were between HFpEF and HFpEF. Patients with HFmrEF are very close to those with HFrEF but have more CHD as dominant HF etiology.

**P257**

**Presenting emergency department hemodynamic phenotypes of acute heart failure patients**

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**Purpose:** There is little known about the baseline hemodynamic (HD) profiles (beyond pulse/blood pressure) of patients presenting to the Emergency department (ED) with acute heart failure (AHF). Assessing these baseline parameters could help differentiate underlying HD phenotypes which could be used to develop specific phenotypic specific approaches to patient care.

**Methods:** Patients with suspected AHF were enrolled in the PREMIUM (Prognostic Hemodynamic Profiling in the Acutely Ill Emergency Department Patient) multi-national registry and continuous HD monitoring was initiated on ED presentation. AHF clusters using the CI and SVRI was an increase in hospital discharges for HF, which affects the population of Murcia. People aged 19 years and more were considered as the study population. Inclusion criteria were: age ≥ 19 years; hospitalization due to AHF; and continuous HD monitoring technology in this cohort of ED AHF patients. Further studies are needed to determine whether phenotypic specific therapies based on these clusters can improve outcomes.

**Results:** A total of 127 patients had confirmed AHF. The final model, using mean normalized patient baseline HD values was able to differentiate these individuals into 3 distinct phenotypes. Cluster 1: normal cardiac index (CI) and systemic vascular resistance index (SVRI); cluster 2: very low CI and markedly increased SVRI; and cluster 3: low CI and an elevated SVRI. These clusters were not differentiated using clinically available ED information.

**Conclusions:** These distinct clusters were defined using novel noninvasive presenting HD monitoring technology in this cohort of ED AHF patients. Further studies are needed to determine whether phenotypic specific therapies based on these clusters can improve outcomes.

**P258**

**Trends of heart failure hospitalization during the period of 2003-2013.**

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**Background:** Heart failure represents a burden to the health-care system and it is one of the most important public health problem. Population-based studies in other countries report a reduction in recent years, but in Spain we lack data about the profile and temporal evolution in a well-defined population framework.

**Purpose:** To evaluate temporal trends in heart failure hospitalization in the Region of Murcia in the period comprised between 2003 and 2013.

**Methods:** Study based on the minimum basic hospital discharge data from all hospitals in the Region of Murcia between 2003-2013. We obtained the healthcare episodes by individual health card. For each year, were studied: crude and standardized attendance by age/sex, ratio of feminization, length of stay, mortality, demographic and clinical variables. Results: 27,158 episodes were obtained in the period. The hospital discharges increased by 76.7%, from 1.28 ± 2.26 (crude) and 1.06 ± 1.77 (standardized). People ≥ 75 years doubled their attendance, up 19.9% in 75-84 years and 32.5% ≥ 85 years, while in < 74 years did not change. Arrhythmias, ischemic heart disease and valvular heart disease were the most prevalent causative disorders. The ratio of feminization was 1.34, but after standardization was matched and did not change. Length of stay was 9.4 days and in-hospital mortality was 9.2%, both of them were unchanged. Conclusions: Between 2003-2013 there is an increase in hospital discharges for HF, which affects the population > 74 years, independent of population increasing. They are necessary strategies targeting this population.
The incidence of AHF, requiring intensive therapy is significantly increased. Vasopressors (norepineprine) had to be administered in 3 (12.5%) patients. All alcohol abused patients suffered from severe AHF. In 5 (20.8%) of cases patients developed cardiogenic shock and 5 (20.8%) patients suffered from lung edema. Atherosclerosis was found with no signs of obstructive coronary lesions. In 12 (50%) patients, takotsubo cardiomyopathy caused acute heart failure (AHF). 3 (12.5%) patients developed cardiogenic shock and 5 (20.8%) patients suffered from lung edema. All alcohol abused patients suffered from severe AHF. In 5 (20.8%) of cases dobutamine administration was required, with mean duration of dobutamine infusion 7.2 days. Vasopressors (norepinephrine) had to be administered in 3 (12.5%) cases. LVOT obstruction developed in 1 case during dobutamine treatment. Mortality rate was not significantly higher, than from STEMI in our department. 2 (8.1%) vs 31 (8.4%)

Conclusions: The incidence of AHF requiring intensive therapy is significantly high. Treatment with dobutamine seems to be safe. It seems like alcohol abused patients have worse prognosis when suffering from stress cardiomyopathy. Treatment approaches are to be further investigated.

P261
ExtraHf survey: the european survey on implementation of exercise training in heart failure patients: regional differences in training modalities

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On behalf of: Committee on Exercise Physiology & Training of the Heart Failure Association of the ESC

Background: In heart failure (HF), exercise training programmes (ETP) are well-recognized intervention to improve symptoms, but still poorly implemented. The Heart Failure Association promoted a survey to investigate whether and how cardiac centres in Europe are using ETP in their HF patients. Aim of this study is to investigate the presence of geographical difference in ETP availabilities, and modalities of implementation.

Methods: The study was designed as a web-based survey of cardiac units in countries affiliated to the ESC. The data collected were subsequently divided in five areas, according to the UNO division of the countries involved: Northern, Southern, Eastern and Western Europe, and extra-EU.

Results: 173 centers replied to the survey, in charge of 78,514 patients: Northern 52 centers (15,040 patients), Southern 48 centers (11,474 patients), Western Europe 34 centers (11,769 patients), Eastern Europe 34 centers (12,746 patients), ESC countries extra-EU 14 centers (11,830 patients).

Overall aerobic continuous exercise was the most common modality of training programme in all regions, (98-92%) with the exception of the northern region where this modality was implemented in only 42% of the cases, and in contrast interval low-intensity training was mostly used (85%) of the cases).

High intensity exercise training was implemented in around 25% of the cases, but in eastern and extra European countries this modality was employed in less than 10% of the cases. Bicycle training was used in most cases (>70%) except in the extra European countries where treadmill modality was mostly employed (60%). Other modality of aerobic endurance training with other cardio fitness facilities (e.g. elliptical trainer) was implemented in around 10% with the exception of the northern region where this modality was implemented in 30% of the cases.

Conclusions: Differences in training modality implementation are evident among different European regions. Further studies should investigate ETP outcomes based on different modality of training implementation in order to identify the most effective program.

P262
Severe acute heart failure complicating ST-elevation myocardial infarction.

Results from the BIHOATEZZ-Gipuzkoa registry

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On behalf of: BIHOATEZZ-Gipuzkoa

Introduction: Acute heart failure (AHF) complicating ST-segment elevation myocardial infarction (STEMI) is recognized as an ominous complication and studies assess the prognosis of AHF according to its timing. Purpose: We aimed to evaluate incidence and impact of severe AHF in a multicenter STEMI network patients (BIHOATEZZ) treated by primary percutaneous coronary intervention (pPCI) and also evaluate if the timing meets the recommended delays.

Methods: 254 patients included during 2015 in a prospective multicenter registry were analyzed. Patients with severe AHF (Killip II-IV) were compared to those with Killip I-II-in-hospital and 30 days mortality were the primary endpoints. Results: Age, gender and anterior wall infarction did not differ between the two groups. 12 patients (4.8%) presented with severe AHF. It was associated with increased in-hospital mortality rate (66.7% vs 4.6%, p < 0.005) and 30 days mortality rate (66.7% vs 4.6%, p < 0.005). The strongest predictor of in-hospital and 30 days mortality rate is heart rate (66.7% vs 4.6%, p < 0.005)
Clinical profile and in-hospital outcomes according ejection fraction in patients admitted with acute decompensated heart failure

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Background: The current evidence suggests that patients (pts) with heart failure (HF) and preserved systolic function (PSF) differ from those with left ventricular systolic dysfunction (LVSD) in their clinical characteristics and outcomes, but there is still a controversy about phenotypes and prognosis in both populations.

Aim: To evaluate baseline characteristics, treatments and in-hospital outcomes of pts admitted for acute decompensated heart failure (ADHF) according to ventricular ejection fraction.

Methods: 225 consecutive pts admitted with ADHF between October-2015 and October-2016 were selected; Patients' characteristic and blood exam results were compared with chi² and fisher exact tests. p < 0.05 was considered statistically significant.

Results: Of the total cohort, 120 (53.8%) pts had LVSD and 103 (46.2%) had PSF; pts with LVSD were more likely to be younger (74 ± 12 vs 77.5 ± 10, p = 0.0021), male (74% vs 53%, p = 0.001) and had a significantly higher incidence of coronary disease (47% vs 17%, p < 0.0001) than those with PSF; valvular disease was more prevalent in PSF (55% vs 22%, p < 0.0001). At admission, the absence of a precipitating factor was more frequent in LVSD (44% vs 28%, p = 0.01) while uncontrolled hypertension was more prevalent in pts with PSF (22% vs 13%, p = 0.05), LVSD pts had more prevalence of low cardiac output (17% vs 2%, p = 0.001), with higher creatinine values (1.34 IQR25-75: 1.18-1.85 vs 129 IQR25-75: 1.01-1.52 mg/dl, p=0.0000) than those with PSF. During hospitalization, LVSD pts had more renal function impairment than PSF (1.7 IQR 1.34-22 vs 1.45 IQR 1.21-1.82, p = 0.003) and required more complex therapies (18% vs 2%, p = 0.01). There were no significant differences in length of stay (7 IQR25-75: 4-12 vs 8 IQR 25-75: 4-12 days, p = NS) but in-hospital death or heart transplantation were more frequent in LVSD pts (14% vs 3%, p = 0.003). At discharge, LVSD pts were on of beta-blockers: 63%, ACEI: 84% and aldosterone receptor antagonists: 43%; low cardiac output was associated to non-use of beta-blockers (p = 0.0001) and renal impairment with non-use of aldosterone receptor antagonists (p = 0.02).

Conclusions: In this population, LVSD was associated with a more severe clinical profile at admission, a higher use of complex therapies and worse in-hospital outcomes. Nevertheless, there were no differences in length of stay, this may be related with no measurable factors in pts with SPF like fragility or complications related to invasive procedures. At discharge, LVSD pts, despite being a greater risk population, received lower rates of pharmacological treatment according to clinical practice guidelines.
anterior myocardial infarction (AMI). Systolic dysfunction has been a risk factor for developing LV apical thrombus in AMI patients. However, the importance of diastolic dysfunction in the development of LV apical thrombus has been poorly proved in these patients.

**Purpose:** We performed to evaluate whether diastolic dysfunction can influence the development of LV apical thrombus.

**Methods:** We retrospectively analyzed all consecutive anterior AMI patients with available echocardiographic images within 1 month from January 2005 to April 2016. After gathering clinical characteristics from their medical records, systolic and diastolic functions were analyzed from the digitally stored images.

**Results:** We included total 1140 patients (813 males, 64 ± 12 years old) with anterior AMI, and 540 were diagnosed as STEMI. The incidence of LV apical thrombus was 3.2% (37/1140), and they had larger LV systolic dimension (40 ± 9 vs 34 ± 8mm, p < 0.01), larger LV diastolic volume (71 ± 35 vs 105 ± 98mm, p < 0.01), larger LV systolic volume (105 ± 38 vs 89 ± 32mm, p < 0.01), and lower LVEF (34 ± 16 vs 48 ± 11mm, p < 0.01). Also, LV apical thrombus group showed higher mitral E velocity over mitral annular E' velocity ratio, an indicator of LV end-diastolic pressure, (17.0 ± 8.5 vs 12.3 ± 6.6, p < 0.01).

After propensity score matching with age, gender, and LVEF, we selected total 56 patients without LV apical thrombus as a reference group. In the LV apical thrombus group, pseudonormal (35.1 vs 19.6%, p < 0.01) and restrictive filling pattern (27.0 vs 17.2%, p < 0.01), and lower LVEF (34 ± 16 vs 32 ± 8mm, p < 0.01) were more prevalent (p < 0.01). The presence of more than grade 2 diastolic dysfunction was significantly associated with the presence of LV apical thrombus (OR=2.53, 95% CI=1.28–5.01, p < 0.01). Conclusions: Along with LV systolic function, LV diastolic function was also related with the presence of LV apical thrombus in patients with anterior AMI.

**P266**

**Infective endocarditis complicated by heart failure: Prognosis and predictive factors of mortality**

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Background: Although the progress of antibiotic prophylactic field, infective endocarditis remains a frequent pathology. Heart failure represents his main complication.

The aim of the study: was to determine the various characteristics of patients suffering from heart failure complicated by infective endocarditis and to define its impact on the mortality.

Patients and methods: From the infective endocarditis register of our service comparing 241 patients and responding to criteria of the University which collected retrospective data, we included patients with heart failure on admission; namely dyspnea greater or equal to NYHA stage II. A total of 85 patients were enrolled in the heart failure (65.2% of register).

Results: Heart failure complicating infective endocarditis of native valve had occurred in 66 cases (77.6%). The microbiological investigation was positive in 43.5% of cases with a predominance of staphylococcus. The using of surgery was necessary in 65.8% of cases. Hemodynamic instability was the main indication.

The total mortality in our registry was 19.5%, but higher in the group with heart failure (28.2% vs 14.7%, p < 0.006). In the multivariate analysis we found, as predictive factors for mortality of infective endocarditis complicated by heart failure group, the significant influence of anemia (OR= 5.2 ; IC 95% [1.6-24]; p = 0.02), infection by staphylococcus aureus (OR= 5.7 ; IC 95% [3.8-29.8]; p = 0.03) and surgery delay (OR=3.1 ; IC 95% [1.1-14.7] p=0.01).

Conclusion: Heart failure is the most frequent complication of infectious endocarditis, and its first cause of death.

**CHRONIC HEART FAILURE**

**P267**

**Semiotics of coronary vessels in patients with chronic heart failure of ischemic etiology with type 2 diabetes**

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Introduction (goals / objectives): Objective: To study the semiotics of angiographic coronary arteries in chronic heart disease with low ejection fraction in patients with type 2 diabetes.

Materials and Methods: The study involved 60 patients with a diagnosis of chronic heart failure of ischemic etiology (CHF) between the ages of 40 to 80 years, including 39 men and 21 women, mean LVEF by Simpson 37.2 ± 4.6%. The patients were divided into 2 groups: 1 c. - 30 people who have had diabetes type 2 diabetes compared. And 2 c. - 30 patients without diabetes type 2. The average duration of diabetes type 2 in one group was 6.2 ± 2.4 (5 to 8) years, while the duration after 6.2 ± 2.4 (5 to 8) years.

In the 2nd c., ie, in individuals without type 2 diabetes, the average duration amounted to CHF 2, 6 ± 1.8 (1.5 to 3) years.

Results: According to the CAG it found that the most common atherosclerotic lesions were located in the basin of the left anterior descending branch (LAD), amounting to - 23 (88%) cases. The second highest frequency of occurrence proved the right coronary artery (RCA) - 12 (20%) patients. Frequency of atherosclerotic lesions of the circumflex artery (CA) and the obtuse marginal branch of CA was 11 (18.3%) and 5 (8.3%) cases, respectively. Atherosclerotic lesion in the posterior interventricular branch of the basin (ZMZH) was observed in 3 (5%) patients. In the intermediate zone of the artery (PA), posterior-lateral branch (ZB) and the left coronary artery (LCA) - 2 (3.3%) cases.

By the number of affected arteries revealed the following: 1 vessel disease was observed in 17 (26.3%) patients; of these patients 1g. 7 (11.6%). Patients 2g. 10 (16.6%) . 3Stenoses - 25 cases in 21 (35%) patients. 1g. 5 (10%) patients, 2c. 15 (25%) ; and 3h- and more vascular porozenicih- 22 (36.6%) patients; 1 of them c. 17 (28.3%) patients, 2c. 5 (8.3%) patients.

Conclusion: CHF patients with reduced LVEF with concomitant type 2 diabetes characterized by 2s and multivessel disease compared with patients with the absence of type 2 diabetes.

**P268**

**The membrane-modifying effect of hyperbaric oxygen therapy in chronic heart failure**

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Chronic heart failure (CHF) which complicates the course of cardiovascular diseases is accompanied by severe hypoxia, organ ischemia and platelet hemostatic disorders. The use of hyperbaric oxygen therapy for their correction is pathogenetically justified.

**Purpose of the study:** To study the effect of hyperbaric oxygenation on platelet membrane with different functional activity in patients with chronic heart failure of ischemic etiology.

Materials and methods: The study involved 24 patients with CHF I-III functional class (FC) of ischemic etiology. The average age of the patients was 52.91 ± 11.54 years, mostly men (70%).

All patients for 5 days were on standard CHF medical therapy and were administered hyperbaric oxygen therapy (pressure chamber 303MK, Russia) with a duration of 30 min per session at 1.2 ATA.

Platelet aggregation was evaluated with an aggregometer “Biola 230LT” (Russia), evaluating the elastic properties of platelet membranes was done using a scanning probe of an atomic force microscope - Solver P47-PRD (NM-MDT, Russia) in contact mode. To determine the platelet membrane elasticity, Young’s modulus was used based on the Hertz model.

Results: Prior to hyperbaric oxygen therapy (HBOT) in patients with CHF, disruption of platelet aggregation in the form hyper-aggregation was found in 33.3%, hypo-aggregation - 25% and normal aggregation in 41.7%

Platelet membrane elasticity was 0.84 ± 0.19, 0.74 ± 0.22, 0.71 ± 0.20 MPa respectively.

After 5 sessions of HBOT we found/revealed opposite changes the elastic properties of the membrane, depending on the functional activity of platelets increased platelet membrane elasticity was observed during platelet hyper-aggregation in comparison to the normal and hypo-aggregation.

The use of HBOT in these patients was accompanied by a decrease in elastic modulus with 0.84 ± 0.19 to 0.42 ± 0.16 (p = 0.04), which indicates an increase in the elasticity of the membrane and decrease the degree of platelet aggregation activity.

Conclusion: Hyperbaric oxygen therapy in patients with CHF FC I-III is accompanied by membrane-modifying effect in the form of increasing the elasticity of the membrane with platelet hyperactivity.

**P269**

**Assessment of the lipidic exchange at patients with chronic heart failure depending on the functional condition of kidneys**

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Purpose: To study indicators of the body weight index (BMI) and condition of lipidic metabolism in patients with chronic heart failure (CHF) taking into account functional condition of kidneys.
of patients had the raised BWI (obesity and preobesity).

Conclusion: It is possible that some of the cytokines that were studied here are only regulated in HF due to specific etiologies such as ischemic HF. Also, cytokines other than the ones that were investigated may play a role in causing severe inflammation and fibrosis seen in CD. Studies in future, therefore, should focus on identifying further inflammatory biomarkers that could be used as tools for early prediction and prognosis of CD. Identifying patients at an early stage of the disease may help in providing effective treatment and prevent the development of HF and thus early death.

P271
Role of obstructive sleep apnea syndrome in development of left ventricular diastolic dysfunction
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Background: The purpose of this study was to determine the role of obstructive sleep apnea syndrome (OSAS) as a risk factor for the development of left ventricular diastolic dysfunction in middle-aged OSAS men.

Methods: We examined 38 newly diagnosed middle-aged OSAS men without conditions, affecting left ventricular diastolic function. All subjects underwent sleep study, 24-hour ambulatory blood pressure monitoring (ABPM), and an echocardiogram. Inclusion criteria for OSAS patients were: apnea-hypopnea index (AHI) ≥ 10 h−1 and excessive daytime sleepiness. In OSAS patients, relationships between sleep parameters, diastolic echocardiographic parameters and blood pressure recordings were also analyzed.

Results: An abnormal left ventricular filling pattern was present in 23 (60.5%) of the 38 OSAS patients. Impaired relaxation was by far the most common abnormal pattern in this group (18 (47.4%) patients), whereas a pseudonormal pattern was present only in 5 (12.8%) patients with OSAS. We analyzed separately OSAS patients with normal filling pattern and those with impaired relaxation of left ventricle. Patients with impaired relaxation had higher AHIs than those with normal pattern. LV mass, and LV mass index were also higher in OSAS patients with impaired relaxation. The study showed a significant correlation between AHI and E/A ratio (r = 0.39, P < 0.01), DT (=0.33, P < 0.05), and IVRT (r = 0.39, P < 0.05). In the model of logistic regression diastolic dysfunction was predicted only by AHI and patients age.

Conclusions: In middle-aged men OSAS can affect left ventricular diastolic function independently of other possible factors. It may be an early response to cardiac overload caused by OSAS.

P272
What is the incidence of elevated pulmonary artery pressure amongst patients presenting to the incident heart failure clinic?
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Purpose: Pulmonary hypertension (PH), defined as a systolic pulmonary artery pressure above 40mmHg is associated with increased morbidity and mortality. We investigated the frequency of pulmonary hypertension as derived by transthoracic echocardiography (TTE) amongst patients referred to our incident heart failure (HF) clinic.

Methods: Patients suspected of having new onset HF are referred to the incident HF clinic if their NTproBNP is >400 ng/l. The clinic serves a city populated by 550,000 inhabitants. All patients undergo detailed echocardiography and are assessed by a HF consultant cardiologist. We collected data on the patients seen between April 2012 and December 2016.

Results: A total of 3393 patients were seen in this period. 779 patients (20%) had an estimated systolic pulmonary artery pressure over 40mmHg. Of this cohort, PH was the only problem identified on TTE in 188 patients (24%) of those with PH. PH was found in association with HF with preserved left ventricular ejection fraction (HFpEF) in 282 patients (36% of those with PH). PH was diagnosed in association with HF with reduced left ventricular ejection fraction (HFrEF) in 263 patients (34% of those with PH) and finally PH was detected in those with associated valvular disease in 46 patients (6%). Table 1.

Conclusions: Pulmonary hypertension is present in 1 in 5 of the patients presenting to the diagnostic HF clinic. In 76% of these patients it is found in combination with other types of heart failure, but in 24% it is the only abnormality detected on echocardiography.
P273 Pulmonary and cardiac characteristics of heart failure patients comparing three groups based on left-ventricular ejection fraction

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Funding Acknowledgements: GlaxoSmithKline Pharma

Background: Patients with heart failure (HF) are vulnerable to chronic obstructive pulmonary disease (COPD) and gas exchange disturbances. Vis versa patients with COPD might experience structural changes in the right heart depending on the development of pulmonary hypertension. The frequency of cardiopulmonary abnormalities is not yet investigated sufficiently in HF patients divided in the recently defined three groups based on left-ventricular ejection fraction (LVEF); i.e. HF with reduced (HFrEF), HF with mid-range (HFrEF) and HF with preserved LVEF (HFpEF). Moreover, the influence of lung function abnormalities on the right heart is insufficiently understood.

Purpose: Therefore, the present study investigated the frequency of lung and right ventricular (RV) functions in the three HF groups. Furthermore, relations of HF and COPD were explored.

Methods: Overall, 186 consecutive stable HF patients seen in our outpatient clinic were divided into HFrEF (n = 70), HFrEF (n = 55), and HFpEF (n = 61). Airflow limitation and gas exchange disturbance were measured by spirometry (forced exhaled volume in the first second/forced vital capacity (FEV1/FVC) (%) and DLCO (diffusion capacity of the lungs for carbon monoxide). Standard echocardiography was performed to measure RV structure (RV diameter) and function (tricuspid annular plane systolic excursion/pulmonary artery systolic pressure (TAPSE/PASP)). Correlations were used to assess possible relations between COPD and measures of the RV.

Results: None of the investigated pulmonary parameters differed significantly between the three groups (all p > 0.5); FEV1/FVC was 72 ± 12, 70 ± 15, and 74 ± 10% in patients with HFrEF, HFrEF, and HFpEF (P = 0.12) and DLCO was 5.7 ± 1.6, 5.7 ± 1.8, and 5.6 ± 1.6 mmOL/min/ML respectively (P = 0.9). RV structure and function did not differ (TAPSE/PASP 0.58, 0.60 and 0.57, respectively (P = 0.84). There was only a weak correlation of DLCO (r = 0.34, p < 0.001), and even less of RV EF (r = 0.24, p = 0.03) with RV function.

Conclusion: In this outpatient clinic population pulmonary function abnormalities were comparable in the three HF groups as was RV functional impairment. Thus, identifying lung function abnormalities in stable HF is important irrespective as to LVEF. The influence of pulmonary function abnormalities on the RV seems to be limited and not clinically meaningful.

P274 Comparing mildly-reduced with preserved ejection fraction heart failure patients: two flips of the same coin?

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Introduction: Patients with preserved ejection fraction Heart Failure (HFpEF) are a heterogeneous group whose clinical trials have been negative so far. Heterogeneity of this population has been attributed to this systematic failure and efforts have been made to try to identify different subgroups inside this population. The most recent European Heart Failure guidelines subdivide the previously called preserved ejection fraction group into mildly reduced (HFrEF) with 40-49% and preserved (PEF) with >50% ejection fraction. Our aim was to characterize a group of patients admitted with heart failure decompensation and left ventricular ejection fraction (LVEF) >40% in terms of clinical, laboratory and echocardiographic characteristics.

Methods: A cohort of patients admitted for HF decompensation between June 2015 and June 2016 on a tertiary HF center was analysed. Electronic medical records and echocardiograms were sourced for data introduction. HF was defined as current ESC criteria guidelines. Patients with HF diagnosis and EF >40% were included. Exclusion criteria included history of previously reduced EF, moderate valvular heart disease, constrictive pericarditis, congenital heart disease and previous cardiac transplantation.

Results: 717 patients were admitted during the study period, from what 303 fulfilled inclusion criteria. After exclusion criteria, 225 were enrolled and 211 had complete echocardiographic data for analysis. 69 (30.7%) patients had HFrEF. There were no differences between groups in terms of age (p = 0.57), gender (p = 0.45) or biomarkers. Coronary artery disease (CAD) and prior coronary revascularization was more frequent in HFrEF (p = 0.004, p = 0.009 respectively). CAD was correlated with lower LVEF (OR 2.46 [3.64-5.51], CI 95% 1.15). Remaining comorbidities were equally present on both groups. End-diastolic and end-systolic left ventricular volumes, left ventricular end-diastolic diameter were significantly higher in HFrEF patients (p < 0.001), Left ventricular mass showed a trend to be higher in HFrEF (p = 0.052). Relative-wall-thickness was significantly higher in PEF patients (p < 0.001). TAPSE and tricuspid annular S′ showed a trend to lower values in HFrEF patients (p = 0.07).

Conclusions: In this cohort of patients lower EF tends to be more associated with CAD and LV dilatation which is consistent with a transition group between truly preserved EF and reduced EF. Further prospective studies should confirm these results and may eventually analyse CAD separately among populations with HFrEF.

P275 The role of sympathetic co-transmitter galanin on autonomic control in heart failure: An active player or a bystander in sympathovagal crosstalk

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Background: Autonomic imbalance in favor of sympathetic nervous system is an important clinical feature of heart failure (HF). Sympathetic co-transmitters neuropeptide Y(NPY) and galanin, located in the adjacent vesicles to the main transmitter norepinephrine, attenuate the vagal tonus after burst sympathetic activity by a mechanism called ‘sympathovagal crosstalk’. On the basis of preliminary data from animal studies suggesting increased levels of galanin in HF models and improvement in cardiac function subsequent to treatment with galanin antagonists, we examined the levels of galanin and NPY, the two main co-transmitters of sympathovagal crosstalk in chronic heart failure patients.

Purpose: We evaluated whether the levels of galanin correlated with the levels of NPY, the humoral activity expressed by Pro BNP and coperipin concentrations; and myocardial performance estimated by echocardiography in patients with HF. To our knowledge, this is the first study to document plasma concentrations of galanin in chronic HF patients.

Methods: The study population consisted of 57 patients with chronic systolic HF and 30 control subjects. Of HF patients, 68.4%(39) had ischemic and 31.6%(28) had dilated cardiomyopathy. All subjects underwent detailed transthoracic echocardiography, had their demographic characteristics recorded and blood collected for proBNP, coperipin, galanin and NPY analysis.

Results: (The ProBNP, coperipin and NPY were significantly elevated in HF group,212.8 ± 1104.5 vs 212.6 ± 96.4 pg/mL, p < 0.0001; 872.3 ± 280.7 vs 840.7 ± 279 pg/mL, p < 0.0001; 139.8 ± 65.5 vs 79.8 ± 35.9 pg/mL, p < 0.0001 respectively). Galanin, on the other hand, was not statistically different between HF or control groups.(212.8 ± 1104.5 vs 35.9 ± 14.0 pg/mL, p = 0.9). The correlation analysis revealed that NPY was correlated with the echocardiographic parameters of HF severity:<0.22, p = 0.03 for EF; r = 0.3, p = 0.05 for left atrial volume index; r = 0.3, p = 0.05 for Tei index of right ventricle; r = 0.23, p = 0.03 for tricuspid annular plane excursion; r = 0.24, p = 0.04 for E/e; and with proBNP:<0.22, p = 0.047); while galanin was correlated only with humoral biomarkers ProBNP and coperipin (<0.39, p < 0.0001 and 0.41, p < 0.0001 respectively). The NPY levels were also strongly associated with beta blocker(ReB) use, in which BB significantly decreased the levels of NPY(1048.8 ± 245.1 with BB to 834.7 ± 275.6 without BB, p = 0.032). The multivariate linear regression analysis revealed that among variables like coperipin, proBNP, BMI, smoking status and beta blocker use, which were proved to be associated with galanin in univariate comparisons, only proBNP was the significant predictor of galanin levels in HF patients.0.034(CI 95% 0.005-0.014, p = 0.001)

Conclusions: Our findings confirmed the direct role of NPY on autonomic balance in HF and suggest that, until further evidence emerges, galanin seems not to be an active player in sympathovagal crosstalk in the failing human heart.

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P276
Reverse remodeling in systolic heart failure: the relevance of aetiology and baseline function
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Background: Reverse remodeling (RR) refers to the complete or partial recovery of left ventricular (LV) geometry and function following guideline-recommended treatment for heart failure (HF). At present, diagnostic criteria for RR do not take into account HF aetiology or baseline function, and standardized criteria are lacking.

Purpose: To assess how aetiology and baseline function impact on RR, and to search for RR criteria with prognostic relevance in a population of patients with systolic HF.

Methods: Patients with stable systolic HF (left ventricular ejection fraction - LVEF <50% at baseline) undergoing two transthoracic (TTE) examinations within 12±4 months, were selected. The follow-up started with the second TTE. The endpoint was cardiovascular death or heart transplantation.

Results: In our population of 927 patients (age 68±12 years, LVEF 34±9%, ischaemic aetiology in 53%, baseline LVEF categories <30%, 30-39% and 40-49% were similarly represented (n=287 [31%], 324 [35%] and 316 [34%], respectively). Over the 33-month interquartile range - IQR 15-59 follow-up, the endpoint occurred in 126 patients (14%). Patients with non-ischaemic aetiology experienced significantly greater variations (%LVEF index (all P<0.001). %LVEF and LVESVi were significantly different across LVEF categories (P<0.01 and 0.028, respectively), with the greatest improvement in patients with LVEF <30%. When stratifying patients according to both aetiology and baseline LVEF category, the greatest recovery in LVESVi and %LVEF was observed in patients with LVEF <30% and non-ischaemic HF, followed by LVEF 30-39% and non-ischaemic HF, while decreasing sharply in patients with LVEF 40-49% and non-ischaemic HF. The improvements in LVESVi and %LVEF were much less prominent in patients with ischaemic aetiology; %LVEF recovery was greater in patients with LVEF <30% (Figure). When searching for RR criteria with prognostic relevance, in patients with non-ischaemic HF the highest area under the curve (AUC) values were obtained for %LVEF, the best cut-points being -11% for LVEF <30% (AUC 0.858), -10% for LVEF 30-39% (AUC 0.832), and -2% for LVEF 40-49% (AUC 0.868). In the ischaemic subgroup, the highest AUC values were obtained for %LVESVi, the best cut-points being +10% for LVEF <30% (AUC 0.956), +8% for LVEF 30-39% (AUC 0.613), and +2% for LVEF 40-49% (AUC 0.615).

Conclusions: In stable systolic HF, the potential for recovery is greater in patients with non-ischaemic aetiology or lower baseline LVEF category. When taking into account both information and patient prognosis, the following criteria for RR were defined: -11%, -10% and -2% %LVESVi (for LVEF <30%, 30-39% and 40-49%, respectively) in patients with non-ischaemic HF; +10%, +8% and +2% %LVEF (for LVEF <30%, 30-39% and 40-49%, respectively) in patients with ischaemic HF.

P277
Do we treat heart failure differently according to gender?
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Introduction: This study aims to determine the differential characteristics between the treatment among men and women with acute heart failure admitted to the Emergency Services 3 hospitals in our network between 2011 and 2013.

Methods: Observational prospective cohort study including 1824 patients presenting to the emergency room of our hospital for acute decompensated heart failure.

Results: The sample included 1824 patients. 48% (886) were male and 51% (938) female.

The use of antialdosteronic treatment was significantly higher in males (19% vs 13% p=0.0007) and it was higher too the use of antiaggregants (36% in males vs 30% in women p=0.0041) probably because of the higher rate of ischemic cardiomyopathy in males (40% vs 25% p<0.0001) and anticoagulant drugs (52% in males vs 45% in women p=0.0021) although the rates of atrial fibrilation were similar in both groups (54% vs 52% p=0.45). Among men the use of betablockers was significantly higher (40% vs 28% p=0.05) and in the other hand, women presented a higher rate of calcium channel blockers (25% in females vs 22% in men p=0.03).

Despite the higher prevalence of heart failure with preserved systolic function among females (62% vs 38% p=0.0001) the use of loop diuretics was similar in both groups (63% in women vs 61% in men p=0.285).

Conclusions: 1. The use of antiaggregants was higher in males probably because of the higher rate of ischemic cardiomyopathy among them. 2. The use of anticoagulants drugs was higher in men although the rates of atrial fibrillation were similar in both groups.

3. Among men the use of betablockers was significantly higher and in the other hand, women presented a higher rate of calcium channel blockers probably because of the higher prevalence of heart failure with preserved ejection fraction in women.

4. Despite the higher prevalence of heart failure with preserved systolic function among females the use of loop diuretics was similar in both groups.

P278
Hemodynamic effects of levosimendan in advanced but stable chronic heart failure
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Background: Levosimendan improves hemodynamics in acute decompensated heart failure (HF). However, it is increasingly used for repetitive or intermittent infusions in advanced but stable chronic HF; without clear indication, selection criteria or effect.

Purpose: To test the hypotheses that (1) levosimendan improves hemodynamics in stable chronic HF and (2) that the response is dependent on baseline clinical and hemodynamic factors.

Methods: Twenty-three patients (median age 56 [49-64] years, 4 [17%] women) with stable New York Heart Association (NYHA) III-IV HF received a single 24-hour levosimendan infusion. Noninvasive hemodynamics (inert gas re-breathing technique), estimated glomerular filtration rate (eGFR) and N-terminal pro-brain natriuretic peptide (NT-proBNP) were assessed before and after infusion.

Results: Levosimendan had the following effects (median change): a significant increase in cardiac output (CO) (+9.8 ± 21.6%, p=0.036) and decrease in NT-proBNP (-28.1 ± 18.3%, p=0.005) and mean arterial pressure (MAP) (-5.9 ± 8.2%, p=0.007) but no change in eGFR (+0.89 ± 14.0%, p=0.959). There were no significant associations between baseline clinical and/or hemodynamic factors and the levosimendan effect on CO.

Conclusions: Levosimendan was associated with improved hemodynamics in patients with stable chronic HF but we could not identify any predictors of the magnitude of hemodynamic response.

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P279
Prevention of left ventricular diastolic dysfunction with long-term CPAP treatment in OSAS patients.
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Background: The purpose of this study was to determine the effect of chronic CPAP application on diastolic left ventricular filling in middle-aged OSAS men with diastolic dysfunction.

Methods: The study included 18 otherwise healthy patients who had confirmed impaired relaxation of left ventricle and moderate to severe obstructive sleep apnea seen at the sleep laboratory at a single clinic. A battery of cardiac assessments, including 2D and 3D echocardiography, was done on them at baseline and after treatment with CPAP for 8 weeks. Complete measurements were available in 17 patients. One patient failed to complete the trial.

Results: There were no differences in blood pressure recordings, heart rate or weight at baseline and after CPAP in OSAS patients. After 8 weeks on effective CPAP, left ventricular filling pattern were not modified, but a significant increase in E/A ratio (0.69 ± 0.17 and 0.90 ± 0.13, P < 0.01) and reduction in DT (296.6 ± 26.3 to 268.6 ± 21.5 ms, P < 0.05) and IVRT (112.3 ± 26.3 ms and 101.2 ± 9.3 ms, P < 0.01) values were induced. Left atrial volume index also improved on both 2D and 3D echo (P < 0.01).

Conclusions: Chronic CPAP application can modify diastolic left ventricular filling and avoids the progression of diastolic abnormalities, and indeed, it might reverse these alterations, at least in the initial stages before severe ventricular structural changes develop. The mechanism for diastolic improvements needs further study but it may be correction in blood pressure, hypoxia, and sympathetic system activity.

P280
Effect of potassium/magnesium enriched salt on functional capacity and quality of life in symptomatic patients with chronic heart failure
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Background: Nowadays the clinical studies highlight the contradicting results regarding sodium restriction impact on outcomes in patients with chronic heart failure (CHF). Plasma magnesium and potassium concentrations are often reduced in patients with chronic heart failure. The purpose of the present study was to evaluate the effect of potassium/magnesium enriched salt consumption on quality of life in symptomatic patients with CHF.

Methods: A total of 64 symptomatic patients aged 66–80 years with CHF and preserved left ventricular ejection fraction were recruited. All patients were randomly assigned to 2 groups first – with moderate (less than 5–6 g/day) salt-restricted diet (n = 32), second group of participants received recommendations to use potassium/magnesium enriched salt containing 30% of potassium and 5% of magnesium in their daily intake no more than 5–6 g/day. All enrolled participants were on stable treatment with 3 more drugs and initially had serum potassium level 3.9–4.7 mmol/L. Six-minute walk distance as physical function assessment, quality of life, and daily activity using Minnesota Living With Heart Failure Questionnaire (MLWHFQ) were measured at baseline and at 8 weeks.

Results: There was a significant difference in change for the six-minute walk distance at 8 weeks in moderate salt-restricted diet group (10.5 m; 95% CI, 2.5 to 26.8 m; p = 0.02) whereas in patients used potassium/magnesium enriched salt a slightly improved dynamic of exercise capacity had been noticed (+ 17.2 m; 95% CI, 3.1 to 37.2 m; p = 0.03) although the intergroup distinction was insignificant (p = 0.07). Moderate sodium salt-restricted interventions were not notably associated with quality of life enhancement. The MLWHFQ overall score decreased on 15% (p = 0.08) mainly due to diminishing of physical subscore (-26%; p = 0.04). In group with potassium/magnesium enriched salt intake the greater changes of quality of life parameters had been revealed. The MLWHFQ overall score reduced on 29% (p = 0.04), physical subscore fell on 36% (p = 0.03), psychosocial/symptomatology subscore decreased on 19% (p = 0.04). Thus, the significant correlation was found between potassium/magnesium enriched salt consumption and physical subscore of MLWHFQ (r = 0.28; p = 0.02).

Conclusions: Dietary interventions concerning moderate sodium restriction either with potassium/magnesium salt enrichment lead to enhancement of exercise capacity in patients with CHF and preserved ejection fraction. Daily use of potassium/magnesium enriched salt could be a promising non-pharmacological treatment option for managing impaired quality of heart failure patient’s life.
diagnosis were more frequently recorded by GPs than by cardiologists; however, an absence of data on ejection fraction was common to both groups.

P292
Comparison of office heart rate and mean 24-hours ambulatory heart rate in chronic heart failure patients
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Objective: Heart rate (HR) control in heart failure patients is commonly based on single office measurements at rest. However, 24-hours ambulatory heart rate measurement may yield a more accurate surrogate parameter of individual HR than single measurements. In a pilot study, we investigated the association between measures of office HR and mean 24-hours ambulatory HR in chronic patients with heart failure.

Methods: Patients with stable chronic heart failure and a left ventricular ejection fraction (EF) < 50 % were prospectively enrolled in the outpatient clinic of a tertiary care hospital. Office HR was measured after 5 minutes rest both in the sitting and in supine position, mean ambulatory HR was determined using a certified ambulatory blood pressure monitoring device (Mobil-O-Graph, I.E.M. GmbH, Stüttgarg, Germany) and was calculated as the mean of all successful HR measurements during 24-hours. HR > 70 beats per minute (bpm) was considered elevated.

Results: We enrolled 28 subjects with mean age of 62.6 ± 10.3 years (35% females) and mean EF of 34.4 ± 9.4 %. Mean sitting HR was 69.5 ± 16.5 bpm and mean supine HR was 71.5 ± 15.3 bpm. Mean 24-hours ambulatory HR was 67.6 ± 10.6 bpm. Ambulatory HR was correlated with sitting HR (Pearson’s r = 0.620, P = 0.001) and supine HR (r = 0.398, P = 0.044) HR was elevated in 9 subjects (33.3%) in sitting position, in 13 subjects (46.4%) in supine position, and in 13 subjects (48.1%) in ambulatory read-outs. Among those with a normal supine HR (<147 bpm), 3 (21.4%) had an elevated ambulatory HR. Vice versa, 3 individuals (23.1%) of those with elevated supine HR revealed a normal ambulatory HR.

Comparing sitting HR with ambulatory HR, 5 (29.4%) had an elevated ambulatory HR, although presenting with a normal sitting HR, while 2 (22.2%) of those with elevated sitting HR had a normal ambulatory HR.

Conclusion: Office HR measurements and ambulatory HR show only moderate correlation in subjects with chronic heart failure. Office HR measurements tend to be higher than ambulatory measurements. Approximately one in five with normal office HR has elevated ambulatory HR, while a similar proportion of subjects with elevated office HR have normal ambulatory HR. After confirmation in larger cohorts, the clinical relevance of this divergence and the usefulness of 24-hours ambulatory HR beyond office HR as target parameter in heart failure treatment should be investigated in future studies.

P293
Suboptimal dosing of common heart failure treatments in newly diagnosed patients with heart failure: a retrospective population-based cohort study in Sweden
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Background: Studies in real-world settings have shown that patients with heart failure (HF) often do not receive medication at doses recommended by the European Society of Cardiology (ESC). By studying dosing patterns of HF treatments in newly diagnosed patients, healthcare professionals can evaluate how well treatment guidelines are being implemented in the real world.

Purpose: To assess treatment dosing in newly diagnosed patients with HF with reduced (HFREF), preserved (HFpEF) and unknown EF according to the ESC 2012 guidelines for HFREF (ESC does not make recommendations for HFrEF). This study assessed the proportion of patients who were prescribed a median maintenance treatment dose (defined as volume of drug dispensed [mg]/duration of dispensation [days]) of ≥50 % and ≥100 % of the recommended target dose of individual treatments within the class.

Methods: Patients with HF were identified via electronic medical records from primary and/or secondary care in Uppsala and Västerbotten, linked via unique identifiers to the National Patient Register and Swedish Prescribed Drug Register. Local echocardiography data identified HFREF (EF < 50%) and HFrEF (EF ≥ 50%). Patients aged ≥ 18 years with ≥2 diagnoses of HF between 01/01/2010 and 31/03/2015 and an ICD-10 diagnostic code of ISO (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I130 or I132 in any position were included. The date of the first diagnosis was the index date. A 10-year look-back period was used to exclude prevalent cases. For each drug class commonly used in HF (angiotensin-converting enzyme inhibitors [ACEis], angiotensin II receptor blocker [ARBs], β-blockers and mineralocorticoid receptor antagonists [MRAs]), this study assessed the proportion of patients who were prescribed a median maintenance treatment dose (defined as volume of drug dispensed [mg]/duration of dispensation [days]) of ≥50 % and ≥100 % of the recommended target dose of individual treatments within the class.

Results: In total, 8702 patients with HF were identified (HFREF, 23.5%; HFrEF, 12.9%; unknown EF, 63.6%; mean age: 76.6; 12.6 years; 46.0% female). More patients with HFREF than those with HFrEF or unknown EF received a common HF treatment (ACEi: HFrEF, 56.3%; HFREF, 43.8%; unknown EF, 44.1%; ARB: HFrEF, 31.6%; HFREF, 27.0%; unknown EF, 26.9%; β-blocker: HFrEF, 80.6%; HFREF, 64.6%; unknown EF; 63.4%; MRA: HFrEF, 48.9%; HFREF, 32.9%, unknown EF, 28.0%). Patients with HFrEF were more likely to be prescribed maintenance treatment doses of ≥50 % of ≥100 % of the recommended dose than those with HFREF and unknown EF (Figure).

Conclusions: Prescription of ESC-recommended doses of HF treatment is low. With the exception of MRAs, most patients receiving treatment were not prescribed ESC-recommended doses, highlighting suboptimal treatment of HF in Sweden. This study did not consider underlying causes of the low doses prescribed, which may be influenced by tolerability.

P284
Management of patients with heart failure with preserved versus reduced ejection fraction: a retrospective population-based cohort study in Sweden
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Background and purpose: Little is known about how patients with heart failure (HF) with preserved (HFpEF), reduced (HFrEF) or unknown ejection fraction (EF) are managed in clinical practice in Sweden. In an effort to gain a better understanding of the management of these patients, we evaluated the different care settings in which they received cardiovascular disease (CVD)-related care in the first year after diagnosis.

Methods: Patients with HF were identified via electronic medical records from primary and/or secondary care in Uppsala and Västerbotten, linked via unique identifiers to the National Patient Register. Local echocardiography data identified HFrEF (EF ≥ 50%) and HFpEF (EF < 50%). Patients aged ≥ 18 years with ≥2 diagnoses of HF between 01/01/2010 and 31/03/2015 and an ICD-10 diagnostic code of ISO (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I110, I130 or I132 in any position were included. The date of the first diagnosis was defined as the index date. Unadjusted proportions of patients treated in primary care (provided in an outpatient, office-based setting) and secondary care (provided in an inpatient or outpatient hospital setting) were assessed in the first year post-index.

Results: In total, 8702 patients with HF were identified. HF phenotype could be defined for 36.4% of patients (HFpEF, 35.4%; [mean age: 74.2; 12.6 years; 46.8% male]; HFrEF, 64.6% [mean age: 79.5; 11.0 years; 50.0% male]). Smaller proportions of patients with known EF than with unknown EF were treated in only a primary care setting (HFpEF, 2.5%; HFrEF, 0.9%; unknown EF, 12.1%). Small proportions of patients were seen in only an outpatient setting (HFpEF, 2.9%; HFrEF, 4.8%; unknown EF, 6.1%), while larger proportions were seen in only an inpatient setting (HFpEF, 12.9%; HFrEF, 50.0%; unknown EF, 54.2%).
RAASi, require further prospective evaluation. Suggesting that patiromer allows continuous management of HK in HFrEF pts on 52 weeks in HFrEF pts with HK and diabetic nephropathy. These post-hoc results, Methods: generally well tolerated, with 17 (65%) pts reporting ≥ 3 mmol/L, systolic/diastolic BP decreased by 17.0 (16.2) 12.3 (12.3) (Figure). The majority of patients receiving an ACEi or ARB at the index date continued to do so for the following 2 years (ACEi, 63.6%; ARB, 60.9%); most of these were receiving doses lower than those recommended by the ESC (70.8% and 88.9%, respectively). A small proportion of patients receiving an ACEi at the index date switched to an ARB over the 2-year period (4.1%) and vice versa (2.6%). Most patients were not receiving the recommended ESC dose before switching (ACEi, 81.8%; ARB, 77.8%). Similarly, most patients who discontinued an ACEi (37.3%) or ARB (39.1%) were not receiving the recommended dose before discontinuation (ACEi, 64.8%; ARB, 87.4%). Conclusions: A large proportion of patients with HF in Sweden do not receive drug combinations recommended by the ESC. Furthermore, few patients are prescribed ESC-recommended doses of HF drugs and few undergo up-titration of treatment before switching. These findings are remarkable for HFpEF, for which guidelines are established. These findings may be partly reflective of the high proportion of elderly patients studied. PP26: Drug treatment patterns in patients newly diagnosed with heart failure: a retrospective population-based cohort study in Sweden G Wikstrom1; K Lindmark2; M Olofsson3; J Stalhammar4; G J Bergman5; M Torbiom6; V Viinintii7; B Bruce Wirta8; B Balazs9; K Bommar2
1 Uppsala University, Institute for Medical Sciences, Uppsala, Sweden; 2 Ulmea University, Heart Centre, Department of Public Health and Clinical Medicine, Ulmea, Sweden; 3 Ulmea University, Research Unit, Medicine, Skeletal Department, Department of Public Health and Clinical Medicine, Ulmea, Sweden; 4 Trelabya University, Department of Public Health and Caring Sciences, Uppsala, Sweden; 5 QuintilesIMS, Solna, Sweden; 6 Novartis Pharma AG, Basel, Switzerland Background and purpose: Limited data are available on longitudinal drug treatment patterns in these patients based on ESC 2012 guidelines, which recommend treatment with angiotensin-converting enzyme inhibitors (ACEis), angiotensin II receptor blockers (ARBs), β-blockers (BBs) and mineralocorticoid receptor antagonists (MRAs) for HFpEF (ESC does not make recommendations for HFrEF or unknown EF). Methods: Patients were identified via electronic medical records from primary and/or secondary care in Västerbotten, linked via unique identifiers to the National Patient Register and Swedish Prescribed Drug Register. Local echocardiography data identified HFrEF (<50%) and HFpEF (≥50%). Patients aged ≥18 years with ≥2 diagnoses of HF between 01/01/2015 and 31/03/2015 and an ICD-10 diagnostic code of IS0 (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I110, I113 or I112 in any position were included. The date of the first diagnosis was defined as the index date. A 10-year look-back period was used to exclude prevalent HF cases. ATC codes were identified from drug prescriptions. Patients with a 4-year look-back and 2 years of follow-up were included. Results: Overall, 4937 patients were included (mean ± SD age, 76.6 ± 12.6 years; 27.7% aged ≥85 years; HFrEF, 24.6%; HFpEF, 12.9%; unknown EF, 62.5%). At the index date, 63.0% of patients were treated with an ACEi or an ARB, 62.3% with a BB and 16.0% with an MRA; 18.5% were not receiving treatment. The most common treatment groups (monotherapy or combinations) were: ACEi + BB (HFrEF, 20.5%; HFpEF, 21.0%; unknown EF, 23.5%); BB monotherapy (HFrEF, 12.1%; HFpEF, 14.0%; unknown EF, 16.5%; HFpEF, 12.3%; unknown EF, 12.3%) (Figure). The majority of patients receiving an ACEi or ARB at the index date continued to do so for the following 2 years (ACEi, 63.6%; ARB, 60.9%); most of these were receiving doses lower than those recommended by the ESC (70.8% and 88.9%, respectively). A small proportion of patients receiving an ACEi at the index date switched to an ARB over the 2-year period (4.1%) and vice versa (2.6%). Most patients were not receiving the recommended ESC dose before switching (ACEi, 81.8%; ARB, 77.8%). Similarly, most patients who discontinued an ACEi (37.3%) or ARB (39.1%) were not receiving the recommended dose before discontinuation (ACEi, 64.8%; ARB, 87.4%). Conclusions: A large proportion of patients with HF in Sweden do not receive drug combinations recommended by the ESC. Furthermore, few patients are prescribed ESC-recommended doses of HF drugs and few undergo up-titration of treatment before switching. These findings are remarkable for HFpEF, for which guidelines are established. These findings may be partly reflective of the high proportion of elderly patients studied.
Background: Dyspnoea is a disabling symptom in patients admitted with heart failure (HF) and respiratory diseases (RD). The main aim of this study is to evaluate its intensity at admission and discharge and the relation with quality of life. We also describe its management, intensity, and evolution in HF and RD.

Methods: We included prospectively all patients admitted with decompensated HF and chronic obstructive pulmonary disease (COPD)/pulmonary fibrosis during 4 months. Surveys quantifying dyspnoea (Numerical Rating Scale 1-10) and quality of life (EuroQol 5d) were administered.

Results: A total of 258 patients were included (190 (73.6%) with HF and 68 (26.4%) with RD (62 COPD and 6 pulmonary fibrosis). Mean age was 74.0 ± 1.2 years, and 157 (60.6%) were men. Dyspnoea before admission was 7.5 ± 0.1. Patients with RD showed greater dyspnoea than those with HF both before admission (8.1 ± 0.2 vs. 7.3 ± 0.2, p = 0.01) and at discharge (3.2 ± 0.3 vs. 2.0 ± 0.2, p = 0.0001). They also presented a higher rate of severe dyspnoea (≥ 7) at discharge (23 [34.3%] vs. 36 [19.2%], p = 0.02). Opioids were used in 36 (15.5%), mean dose 10.3 ± 1.8 mg Morphine Equivalent Daily Dose. HF patients had worse EuroQol 5d punctuation than those with RD, due to mobility problems (118 [62.1%] vs. 284[41.8%], p = 0.004), and lower punctuation in Visual Analogue Scale (57.9 ± 1.6 vs. 65.6 ± 1.0, p= 0.006). Progression of dyspnea and pain during hospital admission by Numerical Rating Scale are resumed in the figure. The independent predictors of severe dyspnoea at hospital discharge are depicted in the table.

Conclusions: About a quarter of patients admitted with HF or RD persist with severe dyspnoea at discharge. Opioids are probably underused. HF patients have less dyspnoea than patients with RD but present worse quality of life.

### Predictors of severe dyspnea

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.1 (1.02-1.2)</td>
<td>0.004</td>
</tr>
<tr>
<td>Female Sex</td>
<td>2.2 (1.2-2.3)</td>
<td>0.005</td>
</tr>
<tr>
<td>Depression</td>
<td>3.9 (2.1-7.2)</td>
<td>0.001</td>
</tr>
<tr>
<td>Non admitted in a intensive care unit</td>
<td>3 (1.1-8.3)</td>
<td>0.05</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>1.2 (1.1-1.4)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

### Independent predictors of severe dyspnea (≥ 5 points) at hospital discharge by logistic regression model. CI: Confidence Interval; OR: Odds Ratio

Progression of dyspnea and pain

P289
The role of IGFBP7, mimecan and osteopontin in the management of heart failure with preserved and reduced ejection fraction.

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On behalf of: TIME-CHF

Background/Objectives: Biomarkers are increasingly used in the management of heart failure (HF), where different pathophysiological pathways are involved. Thus, it is not surprising that the value is not uniform and new biomarkers are sought to better determine the underlying pathophysiology and to predict outcome. Therefore, we investigated three newly discovered biomarkers that were found to be linked with HF in a well described population to determine levels, progression and prognostic value of these biomarkers in comparison to the best established biomarker in HF, i.e. NT-proBNP.

Methods: We performed a retrospective analysis of the TIME-CHF trial, including a total of 632 patients with symptomatic HF (NYHA ≥ II), aged 60 years or older, who either received NT-proBNP or symptom-guided therapy. 462 blood samples were available at baseline (BL) for analysis. Echocardiography was performed at baseline to objectify left ventricular ejection fraction (LVEF), dividing the population in 366 patients with reduced (HFrEF, i.e. ≤45%) and 96 with preserved LVEF (HFpEF, i.e. >45%). Osteopontin (OPN), Mimecan and insulin-like growth factor binding protein 7 (IGFBP7) together with NT-proBNP were measured at baseline and after 1, 3, 6, 12 and 18 months. Follow-up (FU) was up to 5.5 years.

Results: At baseline, NT-proBNP and OPN differed significantly between HFrEF and HFpEF, whereas IGFBP7 and Mimecan did not. In HFrEF patients, IGFBP7 levels showed a non-significant fluctuation between FU visits. OPN levels also showed a fluctuating progression, with a non-significant decrease after the 1-month visit and a non-significant increase after the 12-month visit. No significant differences were found between BL and month 18 for IGFBP7 and OPN. Mimecan levels showed a non-significant increase between each individual FU visit, but with an overall significant increase from BL to month 18. Secondly in HFpEF, IGFBP7 levels however did show significant fluctuations over time, with a significant change between BL and month 18. OPN levels showed a significant decrease between the 1 and 3-month visit, but no significant differences between the other individual visits. Like in HFrEF, no significant differences in OPN and Mimecan were found between BL and the 18-month visit. Mimecan levels did not significantly in HFpEF change during individual FU visits or the 18-month FU. OPN turned out to be the strongest predictor for overall survival without deaths due to cancer in HFrEF, shortly followed by IGFBP7, NT-proBNP and Mimecan. In HFpEF, no of the biomarkers reached statistical significance in predicting overall survival without deaths due to cancer.

Conclusion: The three new biomarkers showed a pattern different to that of NT-proBNP despite comparable prognostic values. This supports a different underlying pathophysiological mechanism and suggests that they may be helpful in addition to NT-proBNP and stratifying new therapeutic targets, which needs to be further investigated in future studies.

P289
Coenzyme Q-10 in treatment of patients with heart failure: Results Russian multicenter double blind placebo controlled study

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Background: Q-10 was showed the ability to reduce mortality in HF patients in several clinical studies; however, the drug is still not in ESC guidelines this why additional information about it effects and safety is needed to find its role in HF treatment.

Aim: To estimate clinical effects and safety of water soluble Q-10 in the form of nasal drops (90 mg/day = equivalent 225 mg/day for liposoluble tablets) in patients with heart failure.

Materials: patients with NYHA I-IV and LVEF < 45% who was on optimal medical therapy. Patients were randomized on Q-10 and placebo group. It was multicenter, randomized (ratio 2:1), placebo-controlled, double-blinded study. The duration of the study was 24 weeks. The primary endpoints were: dynamics of NYHA, and scale for quality of life. Patients were randomized on Q-10 and placebo group. It was multicenter, randomized (ratio 2:1), placebo-controlled, double-blinded study. The duration of the study was 24 weeks. The primary endpoints were: dynamics of NYHA, and scale for quality of life.

Methods: The role of IGFBP7, mimecan and osteopontin in the management of heart failure with preserved and reduced ejection fraction.

Materials: patients with NYHA I-IV and LVEF < 45% who was on optimal medical therapy. Patients were randomized on Q-10 and placebo group. It was multicenter, randomized (ratio 2:1), placebo-controlled, double-blinded study. The duration of the study was 24 weeks. The primary endpoints were: dynamics of NYHA, and scale for quality of life.

Results: 148 patients were enrolled into the study: 101 in the Q10 group and 47 in the placebo group. There was no statistically significant difference in clinical characteristics and therapy of patients in Q10 and placebo groups. Patients in the Q10 group had greater positive dynamics of NYHA during the study (- 0.16 vs. – 0.08, p = 0.002), HOQSCS (– 1.06 vs. – 0.53, p = 0.038) and 6 minute walk distance (34 m vs. 33 m, p = 0.044). Also, there were greater positive dynamics of LVEF in Q10 group (+ 3.1% in Q10 vs. + 1.3% placebo, p = 0.038). Patients in the Q10 group have a reduction of BNP level during the study and there was an increase in BNP levels in placebo group (+ 3.4 pg/ml vs + 34 pg/ml, p = 0.038). Safety analysis showed a similar rate of adverse reaction in Q10 and placebo groups.

Conclusion: Results of our study support, that Q 10 showed clinical, functional, and hemodynamic improvement in clinical relevant CHF. These results can explain mechanisms by which this treatment can improve prognosis in CHF.

P290
Effects of angiotensin receptor blocker at discharge in patients with heart failure with reduced ejection fraction

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Purpose: To investigate the association between treatment with angiotensin receptor blocker (ARB) at discharge and clinical outcomes in patients with HFrEF compared with treatment with angiotensin converting enzyme (ACE) inhibitors or no RAS blockade.

Methods: The Korean Acute Heart Failure registry is a prospective multicenter cohort and included patients who were hospitalized for acute heart failure (AHF) from 10 hospitals between March 2011 and February 2014. We studied 3,005 patients with HFrEF (<40%), representing 53.4% of the total study population. Our Study population was divided into an ARB group (n = 1,190), an ACE inhibitor group (n = 1,090), and a no RAS blockade group (n = 725). Propensity score matching was performed to reduce confounding factors.

Results: All-cause death during follow-up occurred in 346 patients (29.1%) in the ARB group, 315 patients (28.9%) in the ACE inhibitor group, and 305 (42.1%) in the no RAS blockade group. After propensity score matching analysis (ARB vs. ACE inhibitor, 853 pairs), there was no significant difference between the two groups in the rate of all-cause death (hazard ratio [HR] 0.94, 95% confidence interval [CI] 0.79 to 1.12, p = 0.49). The rate of all-cause death was significantly lower in the ARB group than in the no RAS blockade group in the matched population (ARB vs. no RAS blockade, 527 pairs, HR 0.73, 95% CI 0.60 to 0.89, p = 0.002). The ARB group had a significantly lower discontinuation rate within 1 year than the ACE inhibitor group in the overall population (ARB vs. ACE inhibitor, 20.8% vs. 33.6%, p < 0.001) and the propensity-matched population (18.5% vs. 34.0%, p < 0.001).

Conclusions: For the treatment of AHF with reduced EF after hospitalization, ARB at discharge shows a mortality benefit comparable to that of ACE inhibitors. In addition, tolerability of medication was greater for ARB than for ACE inhibitor.
P392 The Impact of Digoxin on Mortality in Patients with Chronic Systolic Heart Failure
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Background / Aim: Prior Studies showed mixed results in association of digoxin use with all-cause mortality (ACM). The aim of this analysis is to identify the impact of digoxin use on ACM in a contemporary heart failure (HF) cohort treated with guideline based care.

Methods: We included 2,298 consecutive patients seen in a HF clinic between 2000 and 2015. Patients were considered to be a digoxin user if he/she received digoxin at any point during the enrollment period in the HF clinic. Patients were matched based on digoxin utility using propensity matching in 2-3:1 fashion. The primary outcome was ACM.

Results: Of 2,298 patients, 325 digoxin users were matched with 750 non-digoxin users. Matched cohort did not have differences among demographics and clinical variables except for worse HF symptomatology and increased prevalence of AF. Overall, the prevalence of the use of guideline suggested therapies was 96%. After adjusting for the propensity score, atrial fibrillation, ejection fraction and New York HF Class (HR 1.74; 95 CI 1.23 to 2.38; P < 0.001).

Conclusions: In this analysis of well treated HF patients, digoxin was associated with increased ACM. Further randomized controlled trials are needed to determine whether digoxin therapy should be used in well treated HF patients. Until then, routine use of digoxin in clinical practice should be discouraged.

P393 Comparison of outcome in systolic heart failure patients using ivabradine, digoxin or neither of them: a real life study
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On behalf of: TREAT-HF Investigators

Background and Purpose: Ivabradine is considered with a class IIa recommendation as a fourth-line therapy to reduce heart failure (HF) hospitalization and cardiovascular death in symptomatic chronic HFrEF patients with LVEF ≤35%. In sinus rhythm and a resting heart rate ≥70 bpm despite receiving maximally tolerated optimal medical therapy. Digoxin has received a class IIb recommendation to reduce the risk of hospitalization for these patients. A real-life comparison between both agents is lacking. The aim of this study was to compare their effects on cardiovascular (CV) mortality and rehospitalization in a cohort of chronic stable HFrEF patients.

Methods: The Turkish research team-HF (TREAT-HF) is a network undertaking multicenter, observational cohort studies in HF. This study is a subgroup analysis of TREAT-HF outpatient cohorts who fulfilled following criteria: (1) symptomatic HFrEF patients, (2) in sinus rhythm, and (3) using either ivabradine or digoxin on top of maximally tolerated medical therapy or (4) patients meeting ivabradine recommendation criteria but not using any of the study drugs. A total of 297 patients with available follow-up data for CV death and recurrent HF hospitalization were included in the study.

Results: A total of 61 (20.5%) patients were using ivabradine, 83 (27.9%) patients were using digoxin, and 153 (51.5%) were not using any of them despite being in sinus rhythm, and having LVEF ≤35% and a resting heart rate ≥70 bpm. During a mean follow-up of 15.6 months, 59 (19.9%) patients developed CV death and 225 (76%) patients had at least one HF rehospitalization. Rate of CV death was similar among patients using ivabradine and digoxin, but higher in patients not using these agents [CV death: 8 (13.1%) in ivabradine, 13 (15.7%) in digoxin and 38 (24.8%) in neither drug users; P = 0.080]. Patients using digoxin had slightly less rehospitalization [61 (73.5%) compared to other groups [ivabradine 47 (77%) and neither drug users [117 (77%)] but the difference between the three groups was not statistically significant (P = 0.816). Mean number of HF rehospitalization was also not different (1.5 ± 1.3 in ivabradine, 1.5 ± 1.3 in digoxin, 1.6 ± 1.4 in neither drug users; P = 0.836). In Kaplan-Meier analysis, ivabradine and digoxin had comparable effects on CV mortality and rate of rehospitalization in chronic HFrEF patients.

P394 NTproBNP in primary care: initial experience.
JL Bonilla Palomas1; AL Gamez Lopez2; M Moreno Conde3; MC Lopez Ibanez4; CJ Razo Ruiz5; M Cruz Ruiz6; E Jimenez Medina7; JM Abad Ortega8; J Leal Helming9; A Villar Razo1
1Hospital San Juan de la Cruz, Ubeda, Spain

Introduction: The plasma concentration of brain natriuretic peptides (BNP) or NTproBNP can be used as an initial diagnostic test in patients with dyspnea or suspected heart failure (HF). Patients with normal BNP/NTproBNP concentrations are unlikely to have HF. In the other hand, elevated BNP/NTproBNP help establish an initial working diagnosis, identifying those who require further cardiac investigation. However, in Spain, the use of natriuretic peptides in primary care is not widespread.

Purpose: To describe the initial experience in our health area (a population of 150,000 inhabitants) of NTproBNP use in primary care as initial diagnostic test in patients with dyspnea or suspected HF.

Methods: From April 2016 NTproBNP is available for the diagnostic evaluation of symptomatic primary care patients, specially with the goal to exclude HF using a cut-off point of 300 ng/L. We evaluated the management of these patients according to the test result.

Results: During 8 months a total of 77 symptomatic primary care patients were evaluated with NTproBNP. NTproBNP was <300 ng/L in 45 patients and ≥300 ng/L in 32 patients. Among patients with NTproBNP<300, only 4 (9%) patients were referred to the cardiologist (No one presented abnormalities in the echocardiography study), 1 patient (2%) was referred to the pulmonologist, and 40 patients (99%) remained in
primary care, as established. Among patients with NT-proBNP >300 ng/L, 15 (47%) patients were referred to the cardiologist and 17 (53%) remained in primary care. The last group of patients presented lower NT-proBNP levels than those who were referred to the cardiologist (median 960 ng/L, interquartile range 434–1399 ng/L vs 2941 ng/L, interquartile range 967–6202 ng/L, respectively, p = 0.01).

Conclusion: In our experience, NT-proBNP use among symptomatic primary care patients is particularly appropriate and useful for exclusion of the diagnosis of HF. In addition, NT-proBNP use in primary care has reduced the demands of cardiac referrals and has propagated that a significant number of patients remain managed in primary care.

P295
Ivabradine reduces rehospitalization in patients with chronic systolic heart failure: single country data from OPTIMIZE-HF program
H Sisakian1; H Hayrapetyan2; L Sahakyan1; H Hararian1; H Patrosoyan3
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Funding Acknowledgements: Servier

P296
An audit exploring the effectiveness in clinical documentation on implementation of an inpatient heart failure proforma
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Background: Heart failure is an increasingly complex condition with the aging population and associated co-morbidities. Documentation in healthcare is of paramount importance for the communication of patient care. However, documentation of heart failure is complex, with multiple parameters requiring regular review on wards that may not have continuity of medical staff.

Methods: Based on national heart failure and ward round clinical guidelines an audit tool was developed to assess the safety and feasibility of the introduction of specific heart failure ward round proformas to standardise medical documentation in this patient group.

Results: 97% of entries included the date, patient’s name, hospital number and the proforma increased documentation. Staff on the ward previously felt that 66.5% of key outcomes were documented “always” or “most of the time”, whereas this increased to 92.7% after implementing the proforma.

Conclusion: This audit demonstrates that the ward round proforma improves and standardises medical documentation in the notes for patients with heart failure.

This is supported by a qualitative improvement in the medical documentation as assessed by a multi-disciplinary team. Further work is needed to determine if this kind of documentation impacts on patient outcomes.

P297
Factors affecting medication adherence trajectories for elderly outpatients with chronic heart failure
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1The Russian National Research Medical University named after N.I. Pirogov, Moscow, Russian Federation

Objectives: To study the factors that determine adherence to treatment of elderly outpatients with chronic heart failure (HF).

Methods: In an open comparative study were included 42 outpatients aged 60 years and older (71.1 ± 9.8 yrs) with chronic heart failure NYHA II–IV class, due to coronary heart disease and/or hypertension. Patients were performed general clinical examination, ECG, EcoCCG, Dual-energy X-ray absorptiometry (DEXA), Mental status was assessed using the Mini-mental State Examination scale (MMSE). Adherence to treatment was assessed by scale of compliance Morisky–Green. Frailty was defined as three or more of the following: unintentional weight loss, low physical activity, frequent falls, chair stand up test >10 sec, disorders of psychological and emotional status. Results: 64.3% of patients were taking ACE inhibitors, 71.4% - beta-blockers, 9.5% - mineralocorticoid receptor antagonists. The group 1 included 25 patients (59.5%) with treatment adherence, the group 2 – 17 patients (40.5%). Patients in the Group 1 were younger (68.6 ± 10 yrs) than patients in the Group 2 (74.8 ± 8.4 yrs), 56% patients of the Group 1 were with the higher education, and in the Group 1 - 64.7% patients were with the higher education. 21 patients (84%) of the Group 1 and 13 patients (76.5%) of the Group 2 were living with the family. 18 (72%) patients of the Group 1 and 8 (47%) of the Group 2 were physically active. 52% patients of the Group 1 and 64.7% patients of the Group 2 had III–IV FC NYHA.

Results: 64.3% of patients were taking ACE inhibitors, 71.4% - beta-blockers, 9.5% - mineralocorticoid receptor antagonists. The group 1 included 25 patients (59.5%) with treatment adherence, the group 2 – 17 patients (40.5%). Patients in the Group 1 were younger (68.6 ± 10 yrs) than patients in the Group 2 (74.8 ± 8.4 yrs), 56% patients of the Group 1 were with the higher education, and in the Group 1 - 64.7% patients were with the higher education. 21 patients (84%) of the Group 1 and 13 patients (76.5%) of the Group 2 were living with the family. 18 (72%) patients of the Group 1 and 8 (47%) of the Group 2 were physically active. 52% patients of the Group 1 and 64.7% patients of the Group 2 had III–IV FC NYHA.

Patients of the Group 1 were taking 4.3 ± 1.5, of the Group 2 - 9.8 ± 1.7 medications. 48% and 41% of patients of two groups respectively were taking 5 or more medications. UEF in patients of the Group 1 were 53.1 ± 13.1 and in patients of the Group 2 - 55.7 ± 13.9. Comorbidities (anemia, diabetes, atrial fibrillation, COPD, osteoporosis on DEXA) were recorded more frequently in the nonadherence group. Frailty was found in 20% patients of Group 1 and in 35.2% patients of Group 2 and correlated with age (p = 0.003, r=0.45) and high HF FC (p = 0.003, r=0.47), that can be considered frailty as a marker of HF severity. MMSE mean score was 26.7 ± 2.4 points in patients group 1 and 25.1 ± 2.4 points – group 2 (p = 0.019). Severe cognitive
impairment was detected less frequently in patients of group 1 (8%), than in patients of group 2 (29.4%). Adherence to treatment correlated with impaired cognitive status (p<0.017, r=0.36). Conclusions: Adherence to treatment of elderly outpatients was 39.5%. Patients with nonadherence to treatment were older, more often they were lonely, less physically active, and they were taking more medications. Also, in this patients cognitive fluidities and gait/UEF syndromes were more frequently detected, and the clinical condition was more severe than that in patients with adherence to treatment. Along with polymorbidity and polypharmacy, frailty had a significant impact in reducing the adherence to treatment, which, in turn, was associated with the frailty.

P298
Ceiling dose of valsartan improves better ventricular-vascular coupling index than usual dose in severe heart failure
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On behalf of: VAD trial
Funding Acknowledgements: Novartis
Background: Efects of Valsartan on LV Diastolic Function in heart failure(VAD) trial was designed as a multi-institutional, prospective and open-labeled trial in patients with stable HF who are intolerable to ACE inhibitors.
Objectives: To compare the effects of non-ceiling dose(80mg bid, NCD) vs. ceiling dose(160mg bid, CD) of valsartan in HF on surrogate markers of functional capacity, LV diastolic and systolic function.
Methods: One hundred thirty eight patients(93.9±12.4 years old; 66% male; LVEF; 29.9±5.9%) were forced-titrated to 160 mg of valsartan, bid for 24 weeks. Echocardiography, treadmill test, Korean activity scale index(KASI) and biochemical studies including NT-proBNP were measured at baseline and after 24-weeks therapy.
Results: Clinical examination and blinded echocardiogram showed significant improvement in the ventricular-vascular coupling index (VVI) was observed in CD with LVEF <40% (2.4±0.9 – 1.9±0.5, p<0.01). Also, CD showed improvement of symptoms as well as LV mass index compared with NCD(p<0.05). Conclusions: As we expected, valsartan led to a notable improvement in LV systolic and diastolic function and exercise capacity in patients with HF. The CD of valsartan showed better improvement of VVI meaning net cardiac performance in the LVEF <40% and LV mass index, compared with NCD.

P300
Observational Study of the Therapeutic Conduct in Patients with Heart Failure in Mexico: Baseline population characteristics.
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1Hospital Angeles Puebla, Puebla, Mexico; 2Hospital Angeles Durango, Durango, Mexico; 3Hospital Angeles Agropolis, Aguascalientes, Mexico; 4Hospital Angeles Puebla, Puebla, Mexico; 5Centro Medico Alcal, mexico city, Mexico; 6ISSEMMy, Ecatepec, Mexico; 7Medica Sur, Mexico city, Mexico
On behalf of: CONTEN Study
Funding Acknowledgements: Servier Laboratorios Mexico
Background: We don’t have a reliable Heart Failure (HF) Registry in Mexico. Objective: To describe the clinical profile and impact of early treatment optimization after an Acute Decompensated Heart Failure (ADHF) hospitalization.
Methods: We conducted a prospective observational study in patients after an ADHF episode. All the patients were followed at 7, 30, 60 and 90 days after the hospitalization.
Results: We included 41 patients (30 men and 11 women). The mean age was 67.6±12.0 years. The Left Ventricile Ejection Fraction (LVEF) was 28.5±6.6%. The principal etiology was ischemic heart disease (41.5%), followed by cardiomyopathies (29.3%). Functional Class according with NYHA Classification was III (63.4%), II (19.5%) and IV (17.1%). Heart Rate at discharge was 79.2±15.9 BPM, Systolic Blood Pressure 116±21.1 mmHg. The commonest comorbidities were Diabetes mellitus (29.3%), atrial fibrillation (29.3%) and renal dysfunction (29.3%). Table I show the treatment at hospital discharge.
Conclusions: The clinical profile of HF Mexican patients is similar with another countries. We discover a gap between the recommendations of HF Guidelines and its application in “Real world” scenario, especially with the use of life threatening medications. This represent an urgent call to action. The results of this study will lead us to generate national policies in terms to improve the assessment and care of HF patients in Mexico.

Table treatment after discharge

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number (%)</th>
<th>(N= 41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEIs</td>
<td>15 (36.6%)</td>
<td></td>
</tr>
<tr>
<td>ARBs</td>
<td>7 (17.1%)</td>
<td></td>
</tr>
<tr>
<td>Beta blockers</td>
<td>26 (63.4%)</td>
<td></td>
</tr>
<tr>
<td>Aldosterone antagonists</td>
<td>16 (39%)</td>
<td></td>
</tr>
<tr>
<td>Ibavradine</td>
<td>11 (26.8%)</td>
<td></td>
</tr>
<tr>
<td>Diuretics</td>
<td>33 (80%)</td>
<td></td>
</tr>
<tr>
<td>Digoxin</td>
<td>15 (36%)</td>
<td></td>
</tr>
<tr>
<td>Nitrates</td>
<td>2 (4.9%)</td>
<td></td>
</tr>
<tr>
<td>Oral anticoagulatets</td>
<td>17 (41.5%)</td>
<td></td>
</tr>
<tr>
<td>Antiplatelet agents</td>
<td>18 (43.9%)</td>
<td></td>
</tr>
<tr>
<td>Statins</td>
<td>19 (46.3%)</td>
<td></td>
</tr>
<tr>
<td>Cardio rehabilitation sessions</td>
<td>21 (51.2%)</td>
<td></td>
</tr>
<tr>
<td>Sodium restriction</td>
<td>34 (82.9%)</td>
<td></td>
</tr>
<tr>
<td>Nutritional advice and support</td>
<td>30 (73.2%)</td>
<td></td>
</tr>
</tbody>
</table>

P301
The effect of ibavradine on reduction of heart rate and improvement of the quality of life in patients with angina or heart failure in morocco.
A Benni1; A Ktitan1; N Chemau2; K Adam1
1Private Cardiology Practice, casablanca, Morocco; 2Private Cardiology Practice, Tangier, Morocco
Introduction: A selective reduction of heart rate (HR) has an anti-ischemic and antianginal properties and has demonstrated beneficial effects on cardiovascular events, particularly in heart failure.
Purpose: The ESSENTIEL study aims to observe the effectiveness of exclusive heart rate reduction with ibavradine on clinical status, LV function and quality of life in patients with angina or heart failure treated over a 4 months.
Methods: Non-interventional, observational conducted on an open cohort in Morocco, in patients with angina or heart failure. Heart rate, a current cardiovascular treatments, an Ejection Fraction, a functional classification of NYHA as well as the SEATTLE self-assessment quality of life questionnaire for angina patients, were documented after 1 and 4 months. The results were analyzed using descriptive statistic methods, by the STATA version 13.
Results: Six hundred and thirteen patients were included, their mean age was 65.77±10.51 years and 60.20% of them were men. 88.11% were receiving a beta-blockers, 42.66% of which was carvedilol. Other concomitant medications included angiotensin-converting enzyme inhibitors (81.06%), long-acting nitrates (32.59%) and calcium channel blockers (37.75%). At baseline, the mean HR of patients was 90.17±14.43 bpm, 14.09% of the patients were in the HR <75 bpm, 14.96% at the 7580bpm, 37.78% and 40.34% of patients were classified as NYHA II and III, respectively. The mean value of the five SAQ domains of coronary artery disease was: physical limitation 27.91±19.67, stabilization of angina 54.99±29.63, angina frequency 64.25±30.76, treatment assessment 42.75±26.30, and perception of disease 33.96±29.02. After 1 and 4 months of ibavradine treatment the mean HR was reduced to 70.73±18.65 bpm and 62.40±7.60 bpm, respectively. A 4.83% improvement in mean LVEF was observed after one month of treatment and 8.27% at 4 months, Accompanied by a shift in NYHA classification towards better functional class 55.81% in the V1 and 80.98% in the V2. The mean value of the five SAQ domains at 1 month and 4 months was 43.27±21.09 and 55.11±20.28 for the physical limitation of 77.66±21.79 and 90.18±14.77 for the stabilization of angina, 81.46±22.15 and 91.65±13.54 for the frequency of angina 69.44±20.41 and 82.9±17.19 for the evaluation of the treatment, 62.34±26.33 and 78.37±21.49 for the perception of the disease. The rate of adverse events was 1.14%.
Conclusions: over 4 months of treatment, using ibavradine is associated with a significant reduction in HR, an improvement in the symptoms of heart failure and stable angina, these benefits were accompanied by improved QoL and good general tolerability. Key words: heart rate, angina, ibavradine, NYHA, Quality of life, heart failure.
Background: Red Cell Distribution Width (RDW), a measure of the variability in the size of circulating erythrocytes, is an easily available parameter in clinical practice. In some studies a higher RDW has been described as a marker of poor prognosis in patients with heart failure (HF). However, it is unknown whether the upper limit of reference range or another cut-off value should be used in this setting.

Purpose: To evaluate the prognostic significance of RDW and to determine a cut-off value associated with an increased risk of mortality in patients with chronic HF.

Methods: We evaluated all consecutive patients admitted in a single-center HF clinic between January 2008 and December 2013. Patient baseline characteristics, laboratory values, echocardiographic evaluation and current medication were obtained in the first visit. The primary endpoint was all-cause mortality.

Results: Two-hundred and thirty-four (234) patients (mean age 65 ± 11 years, 73% male) were studied. During a mean follow-up of 57 ± 27 months, 72 patients (31%) died. The multivariate Cox regression model selected RDW (HR 1.20, p = 0.0017), creatinine level (HR 1.46, p = 0.0031) and age (HR 1.04, p = 0.0014) as independent predictors of mortality while the use of angiotensin-converting enzyme (ACE) inhibitors (HR 0.35, p = 0.0005) and angiotensin II receptor antagonists (ARAII) (HR 0.38, p = 0.0148) were independently associated with lower mortality. The optimal cut-off value for RDW by receiver operating characteristic (ROC) curve was 14.5% (AUC 0.590, p = 0.02), which corresponds to the upper limit of reference range. The Kaplan-Meier analysis demonstrated that a RDW above this value was associated with an increased long-term mortality (p [logrank] = 0.0002) (figure).

Conclusion: In this population of chronic HF patients, RDW was an independent predictor of mortality and a value greater than 14.5% was associated with an increased risk of long-term mortality.

Kaplan-Meier survival curve

P303

Prognostic significance of asymptomatic hyperuricemia and allopurinol therapy in chronic systolic HF outpatients

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1Careggi University Hospital (AUOC), Arrhythmic Unit, Florence, Italy; 2Italian College of General Practitioners, Florence, Italy

Background: Heart failure (HF) is a disease of epidemic proportions, with relevant social impact and increasing hospitalization and mortality rates. Hyperuricemia has been identified as a potential risk factor for HF development and progression. However, guidelines concerning asymptomatic hyperuricemia (AHU) have not yet been published and specific literature is lacking. Association between high serum uric acid (SUA) levels and cardiovascular (CV) disease such as hypertension, ischemic stroke and HF has been demonstrated. Some authors underlined that xanthine oxidase inhibitors improves outcome in patients with elevated SUA. However recent findings reported opposite results.

Purpose: To evaluate the impact of AHU and of Allopurinol therapy on CV events, including hospitalizations and death, in chronic systolic HF outpatients.

Methods: We retrospectively evaluated 239 consecutive systolic HF outpatients undergoing a complete clinical and instrumental cardiac examination between 2003 and 2010 at a single Cardiologic Unit. All patients were followed up to 5 years. Hyperuricemia was defined for SUA levels > 8 mg/dL and > 6 mg/dL for men and women respectively, as previously suggested. To avoid the confounding effect of treatment, the study population was divided into 2 subgroups: Group T included patients treated with Allopurinol, Group NT those not treated. The study endpoint was the combination of CV hospitalization and death. Cumulative event rates for CV events were estimated by the Kaplan-Meier method. Multivariable Cox analysis was performed to evaluate the endpoint related risk, according to SUA levels, after correction for gender and estimated glomerular filtration rate (eGFR) as covariates.

Results: Among 239 patients, (mean age 70 ± 9 years), 96 (40%) had hyperuricemia; 50 (21%) received Allopurinol therapy (Group T), whereas 189 (79%) did not (Group NT). In Group T hyperuricemic patients were 46 (45%), in Group NT 20 (24%). Baseline clinical characteristics were comparable, except for eGFR (NT: 66 ± 23 ml/min; vs T: 65 ± 20 ml/min; p = 0.004). Over a mean follow-up of 45 ± 13 months, 143 (60%) CV events occurred: 111 (78%) in Group NT and 32 (22%) in Group T. Hyperuricemic patients in Group NT showed a higher rate of CV events when compared to normouricemic patients [54 (74%) vs 77 (54%); p = 0.018] and AUS was an independent predictor of CV events (HR:1.108; 95% CI:0.436-1.791; p = 0.033). By contrast, in Group T, CV events rate was similar between normouricemic patients (responder to Allopurinol treatment) and hyperuricemic patients (non-responder to Allopurinol treatment) [19 (59%) vs 13 (41%); p = 0.904], and CV events risk did not differ between responder and non-responder to treatment (HR:0.884; 95% CI:0.436-1.791; p = 0.733).

Conclusions: In chronic systolic HF outpatients, SUA level proved an independent predictor of major CV events. However, Allopurinol therapy is not able to improve prognosis in such patients.
The model prediction of systolic heart failure consists of simple indicators of patient health and history. By examining these parameters, regression analysis was performed. A model of systolic heart failure was built. In deceased patients, it was observed that factors such as age, sex, and comorbidities like hypertension, diabetes, and renal disease were associated with an increased risk of hospitalization. Further investigations are necessary to confirm this data.

**Background and Purpose:** To evaluate the impact of thyroid function on heart failure, we retrospectively analyzed the subgroup of 35 patients with HFmrEF. Study population included patients with NYHA classes II-III (26 male, mean age 59.9 ± 12.6 years, mean EF = 44.3 ± 3.4%). The primary outcome measure was the 6-minute walk test (6-mwt) and cardiopulmonary exercise testing. Average follow-up amounted 35.9 ± 22.5 months. Composite end-point of cardiovascular death and hospitalization for HF was considered a primary analysis variable.

**Results:** Composite end-point was observed in 51.4% of patients (n = 18). Numerical and clinical variables were analyzed with respect to their prognostic value. ROC-analysis demonstrated that patients with low atrial fibrillation (LVEF) had a significant independent predictive value of left atrial volume (AUC = 0.79; CI 0.61 ± 0.918; p = 0.0022). E/e’ = AUC = 0.741; CI 0.533 ± 0.891; p = 0.016) and EF and 6-minute walk test distance appear to be strong predictors of cardiovascular death or heart failure hospitalization similarly to HF patients with reduced or preserved EF. Further investigations are necessary to confirm this data.

**Methods:** We retrospectively analyzed the subgroup of 35 patients with HFmrEF. NYHA classes II-III (25 male, mean age 59.9 ± 12.6 years, mean EF = 44.3 ± 3.4%) previously included in the prospective observational study. All patients were on optimal medical treatment. At baseline the patients underwent comprehensive investiga-
and T4 were divided into quartiles and the characteristics between them were compared. The occurrence of events (rehospitalization/death/combined endpoint) was determined and compared.

**Results:** Our population included 150 patients, aged 67.1 ± 11.1 years and mostly men (72%). Mean TSH values were 1.75 ± 0.69mU/L and mean T4 values were 1.06 ± 0.18ng/dL. Of the patients evaluated none had abnormal values of thyroid function and 3 were treated with levothyroxine. During the follow up of these patients 8 died (5.3%) and 50 were re-admitted (33%) for decompensated HF. We compared the quartiles of T4 and verified higher prevalence of hypertension in higher values of T4 and higher prevalence of anemia in lower values of T4. There was no difference in sex, age, ejection fraction, NYHA class or HF etiology between the quartiles. A higher prevalence of mortality was demonstrated in patients with T4 values in the upper quartiles (1,10 ± 1,22; p<0.001).

Conclusion: In our population we fail to verify a significant association between value of TSH and T4 and the endpoints of death and rehospitalization. Probably, a larger population will be necessary to verify a predictive association between thyroid hormones and the endpoint studied.

**Table I**

<table>
<thead>
<tr>
<th>T4</th>
<th>≤0.89</th>
<th>0.90-1.1</th>
<th>1.11-1.22</th>
<th>&gt;1.23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BNP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Re-hospitalization</td>
<td>2</td>
<td>4 (33.3%)</td>
<td>4 (33.3%)</td>
<td>2 (16.7%)</td>
</tr>
<tr>
<td>Death</td>
<td>0</td>
<td>0 (0%)</td>
<td>1 (6.6%)</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Comparison of characteristics of population and events in the quartiles of T4 values.

**P311**

**Echocardiography parameters in heart failure patients with moderate functional mitral regurgitation and correlation with six months outcome**

DR Vakilian Aghouee1; DR Ghaderi 1; MR Sheikhandalibi1; MS Bijari1; MS Sahranavar1

1Mashad University of Medical Sciences, Cardiology Department, Mashad, Iran (Islamic Republic of)

**Introduction:** Heart failure is a growing problem with different etiologies. Left Ventricular Ejection Fraction (LV EF) and functional Mitral regurgitation (FMR) are important prognostic factors. This study planned to evaluate echocardiography as an available tool in differentiating etiologies of FMR and correlation with 6 months outcome.

**Methods:** and Material: In this prospective cross-sectional study 62 HFreduced EF less than 40%) patients with moderate FMR (40 CIM and 22 NCM) were enrolled. Patients were followed for 6 months. Primary end-points were death, re admission and NYHA class. Logistic regression and multivariate analysis was done.

**Results:** Mean age was 62±11.7 and 47±18.2 in ischemic and non-ischemic groups respectively.LV spirometry index, posterior tenting angle (PTA) and time to pick inferior S was significantly different within groups (p<0.01). The best cut point for LV spirometry index was 1.46 and for PTA >40 degrees.Time to pick inferior S ≥ 140 msec and anterior S-m-velocity < 4 m/s indicate ischemic etiologyletable 1). Primary end-point (readmission or death) was observed in 35.2% (17.5% and 9.1% in ischemic and non-ischemic groups, respectively). Age, diabetes, smoking, time to pick inferior S≥ 140 msec and ischemic etiology of FMR was associated with re admission and higher mortality(HR=3.2).

**Conclusion:** PTA≥ 40 degrees and time to peak inferior S≥ 140 msec are independent predictors of MR etiology, readmission and mortality.

**Table 1**

<table>
<thead>
<tr>
<th>Parameters of Mitral valve deformity</th>
<th>Anterior tenting angle (degrees)</th>
<th>35.2 ± 9.8</th>
<th>34.3 ± 11.7</th>
<th>34.9 ± 10.4</th>
<th>0.671a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior tenting angle (degrees)</td>
<td>50.7 ± 12.2</td>
<td>40.1 ± 11.4</td>
<td>43.7 ± 12.6</td>
<td>0.032b</td>
<td></td>
</tr>
<tr>
<td>Medial lateral MVAD (cm)</td>
<td>2.8 ± 0.5</td>
<td>2.9 ± 0.8</td>
<td>2.9 ± 0.6</td>
<td>0.099b</td>
<td></td>
</tr>
<tr>
<td>Anterior posterior MVAD (cm)</td>
<td>2.8 ± 0.5</td>
<td>3.0 ± 0.5</td>
<td>2.9 ± 0.5</td>
<td>0.255b</td>
<td></td>
</tr>
<tr>
<td>Tenting area (cm²)</td>
<td>2.2 ± 0.9</td>
<td>2.3 ± 0.9</td>
<td>2.2 ± 0.8</td>
<td>0.691b</td>
<td></td>
</tr>
<tr>
<td>Coaptation depth (cm)</td>
<td>9.3 ± 2.0</td>
<td>10.4 ± 4.4</td>
<td>9.7 ± 3.0</td>
<td>0.423b</td>
<td></td>
</tr>
<tr>
<td>TDI parameters in the level of mitral valve annulus</td>
<td>Inferior S-velocity (m/s)</td>
<td>3.7 ± 1.1</td>
<td>4.8 ± 1.2</td>
<td>4.1 ± 1.3</td>
<td>0.001b</td>
</tr>
<tr>
<td>Time to pick inferior S (milliseconds)</td>
<td>194 ± 71.0</td>
<td>146 ± 72.9</td>
<td>164 ± 72.5</td>
<td>0.031b</td>
<td></td>
</tr>
<tr>
<td>Anterior S-velocity (m/s)</td>
<td>3.8 ± 1.1</td>
<td>5.0 ± 1.5</td>
<td>4.2 ± 1.4</td>
<td>0.004b</td>
<td></td>
</tr>
<tr>
<td>Time to pick anterior S (milliseconds)</td>
<td>155 ± 67.9</td>
<td>151 ± 63.4</td>
<td>153 ± 62.3</td>
<td>0.857b</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1:** Echocardiography parameters of LV, RV, mitral deformation and TDI

**P312**

**Improving heart failure care in hospitals with and without a multidisciplinary heart failure program:results from optimize Colombia project**

C I Clara Ines Saldarriaga1; G Gonzalez2; S Navarrete3; L Estechevarria4; M Novoa5; M Muñoz6; A Rivera2; MJ Rodriguez2; B Roslog7; G Truf7; C Martinez; CV Aragüel1; L Semanche1; E Contreras1; J Vanegas3

1Cardiovascular Clinic Santa María, Universityof Antioquia cardiology department, Medellin, Colombia; 2Fundacion Santa Fe de Bogota, Cardiology - heart failure, Bogota, Colombia; 3Universef Cardiology - heart failure, Bogota, Colombia; 4Clinical fundadores, medicos asociados, cardiology, Bogota.
Purpose: Anemia and chronic kidney disease (CKD) are common and frequently coexist in patients with acute coronary syndrome. The aim of this study was to analyze the prognostic impact of anemia and CKD on long-term mortality in patients with reduced and preserved ejection fraction following myocardial infarction (STEMI).

Method: We included 2157 consecutive STEMI patients who were treated with primary percutaneous coronary intervention (pPCI). Anemia was defined as baseline hemoglobin level <13 <g/dl in women and <13 <g/dl in men. CKD was defined as baseline creatinine clearance <60 <mL/min/1.73 m2. Reduced EF was defined as ≤ 40%. Echocardiographic examination was performed before discharge. Patients presenting with cardiogenic shock and patients on hemodialysis were excluded.

Results: Among analysed patients 753 (35%) patients had reduced and 1496 patients (74%) had preserved EF; anemia was present in 98 (4.5%) patients, CKD in 273 (12.6%) patients and combined presence of anemia and CKD in 70 (3.2%) patients. Five mortality rate was 21.1% and 2.9% in patients with reduced and preserved EF respectively. Estimated five year survival probability in patients with reduced and preserved EF according to the presence of anemia, CKD and CKD+ anemia is shown in the Figure 1. After multivariable adjustment in Cox regression model CKD, anemia and the combined presence of CKD and anemia were independent predictors of 5-year mortality in patients with reduced and preserved ejection fraction (EF) following STEMI. In STEMI patients with preserved ejection fraction anemia and chronic kidney disease are not risk factors for long-term mortality.

Prognostic impact of the combined presence of anemia and chronic kidney disease on long-term mortality in patients with reduced and preserved ejection fraction following myocardial infarction

P313

Gender difference of obesity paradox in systolic heart failure

BIS Byunguo Yoo1; JW Son1; JY Kim2; MS Ahn1; SH Lee2; JH Yoon1

1Wonju College of Medicine, Yonsei University, Division of Cardiology, Department of Internal Medicine, Wonju, Korea Republic of

Background: Obesity is often associated with better clinical outcomes in heart failure. This so-called ‘obesity paradox’ still remains controversial. The aim of present study was to investigate the prognostic value of the obesity in patients hospitalized with systolic heart failure.

Method: We performed a pooled analysis of data from the three multi-center, observational heart failure studies, Survey of Guideline Adherence for Treatment of systolic Heart Failure in Real World; COAST, Clinical Outcomes in Relation with Serum Sodium Level in Asian Patients Hospitalized for Systolic Heart Failure; Patients (> 18 years old) who were hospitalized with systolic heart failure (EF<45%) were eligible for present study. We divided the subjects into 2 groups, Normal BMI group (BMI < 25) and High BMI group (BMI ≥ 25). Study endpoints included all cause mortality and any re-hospitalization within 1 year. All analysis was performed separately by gender.

Results: Total 3145 patients (male 1824, female 1321) were enrolled. In men, high BMI group (n = 563) presented more hypertension (52.9% vs. 47.9, p = 0.048). The high BMI was significantly associated with lower 1 year mortality rate (OR 0.543, 95% CI 0.355-0.839) after adjusting for age, hypertension, diabetes, ischemic heart failure, previous myocardial infarction, serum creatinine, anemia (Hb <10 g/dL) and ejection fraction. In women, patients with high BMI (n=404) more presented hypertension (61.4% vs. 54.1%, p = 0.016), diabetes (45.2% vs. 35.2%, p<0.001), and chronic kidney disease (12.9% vs. 8.1%, p = 0.005). After adjustment for clinical characteristics, high BMI was not significantly associated with 1 year mortality (OR 0.739, 95% CI 0.450-1.216) or 1 year rehospitalization (OR 0.958, 95% CI 0.696 - 1.319).

Conclusions: In pooled analysis from 3 Korean heart failure registries, there was a gender difference of obesity paradox. The high BMI was independently associated with lower 1 year mortality rate in systolic heart failure, especially in men.

Clinical predictors of mortality in patients with severe aortic stenosis undergoing surgical and percutaneous aortic valve intervention

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1Hospital Universitário de Santa Maria/CAML, CACM, CCMU/Faculdade de Medicina, Universidade de Lisboa, Lisbon, Portugal

Introduction: Symptomatic severe aortic stenosis (AS) presents high mortality, and the valve replacement therapy is aortic valvular intervention (AVI). There are some factors identified as predictors of mortality in patients (pts) undergoing
AVI, such as the presence of ventricular dysfunction and coronary artery disease; however, it's not known which co-morbidities and factors associated with the clinical presentation influence the prognosis most directly.

**Purpose:** To determine the clinical predictors of mortality in the pts diagnosed with AVI submitted to AVi.

**Methods:** A retrospective uniconcuss study was made, with inclusion of consecutive pts with AVI (excluding low flow low gradient and and paradoxic aortic stenosis), diagnosed during 2015 in a tertiary center, who underwent AVI until the end of the follow-up period. Clinical data were collected and their relationship with mortality was analyzed using the Cox regression statistical method and Kaplan-Meier survival analysis.

**Results:** A total of 278 pts (54% women and 46% men, mean age 74 ± 9 years) were included, with a mean follow-up of 389 ± 186 days, of which 192 were submitted to intervention (51.8% women, mean age 75 ± 8.8 years; 87% underwent aortic valve replacement surgery and 13% underwent percutaneous implantation). Mortality in this subgroup was 9.7% (vs. 51% in the subgroup not submitted to AVI). The mean time from the diagnosis of AV to AVi was 59 days. In patients undergoing AVI, NYHA functional class (p = 0.007) and NTproBNP (p = 0.003) were identified as clinical predictors of mortality at diagnosis, using univariate Cox analysis. None of the cardiovascular comorbidities analyzed (hypertension, diabetes, obesity, coronary artery disease, cerebrovascular disease and chronic kidney disease) showed a significant relationship with mortality in this group. Using multivariate analysis by Cox regression, only the NYHA functional class was an independent predictor of mortality: patients in class > 2 had a 12 times higher risk of death (hazard ratio = 11.7, 95% CI, 1.37-100, P = 0.005; [p = 0.001]).

**Conclusions:** In this group of pts with AS, the NYHA functional class was the only clinical predictor of mortality. This reflects the importance of early intervention in the course of the disease, as soon as the first symptoms appear, avoiding the delay clinical predictor of mortality. This reflects the importance of early intervention in the course of the disease, as soon as the first symptoms appear, avoiding the delay clinical predictor of mortality.

**European Journal of Heart Failure**

**V N Protasov1; AA Skvortsov1; O Narusov1; D E Protasova2; G A Tkachev1; V P Masenko1; S N Tereshchenko1; M E Hebbar1; C L Goftic1; T Mercier1; V Cousin1; R Hiddon1; A Duva Pentsahl1; M Fertin1; N Lambini1; C. Bauters1; P De Groot1; A Duvapeniation1; Lille University Hospital, Institut Coeur-Poumon, Lille, France

**Background:** There are conflicting results concerning the prognostic impact of glycated hemoglobin (HbA1C) in patients with systolic heart failure.

**Objectives:** To analyze the prognostic impact of HbA1C in stable patients with chronic systolic heart failure.

**Methods:** All the patients were ambulatory, stable with optimal medical therapy at the time of inclusion. All the patients performed an echocardiography, a cardiopulmonary exercise test and a radionuclide angiography. Blood samples were drawn at rest.

**Results:** 1593 patients were included, of whom 436 were diabetics. Mean age was 50 ± 12 years old, left ventricular ejection fraction (LVEF) was 37 ± 12%, ischemic cardiopathy was more frequent in diabetic patients (59% vs 39%, p < 0.0001). Dur- ing a follow-up period of 4.2 years (2.42 – 7.09), there were 508 deaths, of whom 391 were cardio-vascular related deaths, 74 non-urgent cardiac transplantations, 28 UNOS1 transplantations, 24 LVAD implantations and 11 patients were lost of follow-up. Cut-off values for HbA1C were determined by ROC curves analyses in diabetic and in non-diabetic patients. As shown in the Figure, non-diabetic patients with a HbA1C ≥ 6% had the same survival than diabetic patients with a HbA1C ≥ 7.5% (hazard ratio = 15.8, p < 0.001 between the 2 subgroups of non-diabetic patients and χ2 = 7.5, p < 0.001 in diabetic patients). HbA1C ≥ 7.5% in diabetic patients was an independent predictor of survival even after multiple adjustments (clinical data, LVEF, VO2 and BNP) (HR = 1.56 [1.09-2.24], p = 0.02). However, in non-diabetic patients, HbA1C ≥ 9% was not an independent predictor of survival.

In conclusion, HbA1C is a predictor of survival in a population of stable patients with systolic heart failure, particularly in diabetic patients.
P318
Prognostic importance of inclusion serum cystatin C level for eGFR calculation by CKD-EPI equation in patients with first decapsulation of HFPEF

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1I.M. Sechenov First Moscow State Medical University, Moscow, Russian Federation

Background: HFPEF is a common phenotype of HF with substantial increase in incidence and prevalence. There is no direct prognostic estimator for these patients to the date. Decreased renal function is a well-known independent negative prognostic factor in heart failure patients populations. Several formulas are accepted for eGFR. The best formula for eGFR estimating in HFPEF patients regarding prognostic information remains unknown. The aim of the study is to compare prognostic significance of decreased eGFR derived by CKD-EPI equation based on serum creatinine and cystatin C formula. versus CKD-EPI equation based on serum creatinine only in patients with first decapsulation of HFPEF.

Materials and methods: 117 patients with first decapsulation of HFPEF (average age 71.6 ± 9.1 years; 65.8% - women) were included in prospective study. 85.5% of the patients had atrial fibrillation with persistent form in 38.5%;25.6% had diabetes mellitus; 19.5% had ischemic origin of HF. HFPEF was diagnosed according to EGS guidelines. All patients signed informed consent. The study was approved by ethical committee. Blood samples for biomarkers estimation were derived during index hospitalization. The patients were monitored by phone monthly during first six months and every three months until 24 month period. Mortality, HF hospitalization and combined end point were used. Kaplan-Mayer curves with Log-rank test were used for survival analysis. P value of 0.05 or less was considered to be significant.

Results: Average eGFR at inclusion was 50.2 ± 16.9 ml/min/1.73 sq.m by serum creatinine formula and 46.4 ± 16.1 ml/min/1.73 sq.m by combined formula (p < 0.05). Addition of cystatin C to equation regrouped the patients by CKD classification with more numbers for 3B stage (41.0% vs 35.9%; p < 0.05). During follow-up 45.3% of the patients reached combined end-point, mortality was 11.9%,hospitalization due to HF was necessary in 33.3% of the patients. Study population was divided for two groups, with eGFR < 45 ml/min/1.73 sq.m or eGFR ≥ 45 ml/min/1.73 sq.m by both formulas. The groups divided by serum creatinine formula did not differ significantly in mortality, morbidity and combined end-point achievement during survival analysis (p = 0.07; p = 0.7 and p = 0.2). However, if the patients were divided by combined creatinine and serum cystatin C formula, the patients with eGFR <45 ml/min/1.73 sq.m demonstrated significantly increased achievement of combined end-point (p = 0.03) and increased mortality (p = 0.03).

Conclusions: Decreased baseline eGFR by CKD-EPI equation based on serum creatinine and cystatin C levels is a negative prognostic factor in patients with first decapsulation of HFPEF. However decreased eGFR by CKD-EPI equation based on serum creatinine only does not. Significance of serum cystatin C level in HFPEF can be attributed to more accurate renal function measurement or GFR-independent estimation of alerted collagen turnover.

P319
A simplified bedside prognostic tool for heart failure: the proSCANNED score

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1University Hospital Arnaud de Villemeur, cardiology, Montpellier, France; 2University Hospital Montpellier, economic evaluation unit, Montpellier, France

Background: Heart failure (HF) represents a major cause of death and hospitalisation. Evaluation of the prognosis remains challenging. Various prognostic risk models have been already developed. The MAGGIC model is promising but is in complicated and with poor additional-value variables were excluded and natriuretic peptides were added. The primary outcome was to predict one-year mortality.

Methods: 182 patients with stable HF were prospectively included in cardiology outpatient clinic. Based on the original mortality model of MAGGIC, some of its complicated and with poor additional-value variables were excluded and natriuretic peptides were added. The primary outcome was to predict one-year mortality.

Results: 182 patients were included. 65 (38%) patients died during a median follow-up of 42 months. 8 independent predictor variables were identified to built the score: age (0.54 ± 0.24 vs. 0.90 ± 0.15; p = 0.0001) and IIH RR (14.7 ± 7.9 vs. 18.3 ± 4.2 min-1, p = 0.03), worse left ventricular ejection fraction ≤ 0.35%, diabetes. This score is able to predict 1-year survival, with an area under the curve of 0.78 (95%CI: 0.70-0.88).

Conclusion: The proSCANNED score appears as a new tool, to integrate in daily practice in HF patients. The power of this score has to be validated especially on larger population.

predicted mortality by integer score

P320
Heart rate response to exercise in heart failure patients: the prognostic role of metabolic-chronotropic relation and heart rate recovery

J Jan Bibers1; P Hajdusek1; M Kotre1; E Benesova1; J Kautzner1; P Jarolim3; V Melnikovly1
1IJE, Prague, Czech Republic; 2First Faculty of Medicine and General Teaching Hospital, Institute for History of Medicine, Prague, Czech Republic; 3Brigham and Women’s Hospital, Department of Pathology and TMI-group, Boston, United States of America


Background: The dynamics of the sinus node response to exercise is linked to functional capacity and outcome in heart failure (HF). The goal of the work was to analyze determinants and impacts of cardio-acceleration, described by the concept of metabolic-chronotropic relation (MCR) and of heart-rate recovery, described by heart rate recovery (HRR).

Methods: A cohort of 25 healthy controls and 78 patients with advanced systolic HF and optimized medical and/or device therapy (97% receiving beta-blockers, 54% ICD) underwent maximal cardiopulmonary exercise test and were prospectively followed.

Results: HF patients had impaired exercise performance compared with controls (V[eO2] 15.4 ± 4 vs. 29.7 ± 7 mg.kg-1.min-1, p < 0.0001) and lower both MCR slope (0.54 ± 0.24 vs. 0.90 ± 0.15; p = 0.0001) and HRR (14.7 ± 7.9 vs. 18.3 ± 4.2 min-1, p = 0.03), representative MCR slope of a control subject and HF patients are in Fig. 1. In HF patients, MCR slope was inversely associated with beta-blocker dose (r = -0.24), NYHA class (r = -0.28) and HF duration (r = -0.25), whereas HRR with estimated glomerular filtration rate (eGFR, r = 0.39, age (r = 0.28) and BMI (r = -0.30, all p < 0.05). During a follow-up of 1269 ± 933 days, 64% patients experienced an adverse outcome (death, urgent transplantation, left ventricular assist device implantation). Those patients had higher NT-proBNP (p = 0.02), worse left ventricular ejection fraction.

Select variables for the integer score

<table>
<thead>
<tr>
<th>Variable</th>
<th>Rate ratio</th>
<th>95% CI</th>
<th>Log Rate Ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 75 years</td>
<td>3.01</td>
<td>(1.61-5.63)</td>
<td>1.10</td>
<td>0.0006</td>
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<td>NYHA III-IV</td>
<td>2.28</td>
<td>(1.12-4.65)</td>
<td>0.83</td>
<td>0.0228</td>
</tr>
<tr>
<td>LVEF &lt; 35%</td>
<td>2.61</td>
<td>(1.31-5.17)</td>
<td>0.96</td>
<td>0.0061</td>
</tr>
<tr>
<td>NT-proBNP &gt;5000 pg/ml</td>
<td>3.22</td>
<td>(1.64-6.33)</td>
<td>1.17</td>
<td>0.0007</td>
</tr>
<tr>
<td>No beta-blockers</td>
<td>3.55</td>
<td>(1.70-7.42)</td>
<td>1.27</td>
<td>0.0007</td>
</tr>
<tr>
<td>Diabetes</td>
<td>3.32</td>
<td>(1.74-6.34)</td>
<td>1.20</td>
<td>0.0003</td>
</tr>
<tr>
<td>COPD</td>
<td>1.79</td>
<td>(0.84-3.82)</td>
<td>0.58</td>
<td>0.1340</td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.83</td>
<td>(0.92-3.64)</td>
<td>0.61</td>
<td>0.0844</td>
</tr>
</tbody>
</table>

CI, confidence interval; COPD, chronic obstructive pulmonary disease; LVEF, left-ventricular ejection fraction; NT-proBNP, NT-pro brain natriuretic peptide; NYHA, New York Heart Association.

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systolic function (LVEF, p = 0.03) and lower MCR slope (p = 0.02) but not HRR (p = 0.19). MCR slope (but not HRR) was a significant outcome predictor (p = 0.02 for Cox unadjusted model) even after adjustment for LVEF, serum natrium, systolic blood pressure, eGFR and NT-proBNP (p = 0.039), Table 1.

Conclusion: MCR slope is associated with different clinical variables than HRR. Compared to HRR, MCR slope provides significant prognostic information in HF patients.

Predictive power of MCR slope

<table>
<thead>
<tr>
<th>Hazard ratio</th>
<th>95% confidence interval</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>0.25</td>
<td>0.075-0.82</td>
</tr>
<tr>
<td>Model 2</td>
<td>0.19</td>
<td>0.036-0.95</td>
</tr>
<tr>
<td>Model 3</td>
<td>0.23</td>
<td>0.054-0.93</td>
</tr>
</tbody>
</table>

Cox proportional hazard model. Model 1: MCR slope alone; Model 2: MCR slope adjusted to left ventricle ejection fraction, serum natrium, systolic blood pressure, estimated glomerular filtration rate; Model 3: Model 2 + NT-proBNP

MCR slope in a control and HF patient

P322
Hospitalization for heart failure following cardiac resynchronization therapy: Impact in mortality

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1Hospital Center of Porto, Cardiology, Porto, Portugal
2Rigshospitalet - Copenhagen University, Copenhagen, Denmark

Introduction: Cardiac resynchronization therapy (CRT) in advanced heart failure (HF) is not always accompanied by improvement. Some patients fail to respond to CRT and their evolution is complicated by hospitalization for HF and decreased survival rates. We aimed to study the impact in mortality of hospitalization for HF after CRT implantation.

Methods: Single-center retrospective observational study including 303 patients who underwent cardiac resynchronization therapy (CRT). The median follow-up time was of 34.1 ± 21.1 months. Cox hazard models were adjusted for variables which were significant (p < 0.1) in univariate regression analysis: clinical response (improvement in at least 1 NYHA class 6-12 months after CRT), echocardiographic response (improvement of > 5% in left ventricular ejection fraction (LVEF) 6-12 months after CRT), etiology (ischemic vs non-ischemic), chronic kidney disease [CKD] defined as a creatinine clearance ≤ 60 ml/min determined by MDRD), diabetes and impaired right heart function after CRT. Kaplan-Meier survival curves were determined for the association between hospitalization for HF and all-cause mortality at 5 years.

Results: The study population (n = 303) had a mean age of 69 ± 10 and previous to CRT implantation, most patients (77%) were in NYHA class III. The mean LVEF was 27.5 ± 6.1% and mean QRS duration was 160 ± 24ms. During follow-up 19% of patients (n = 57) were hospitalized for HF. In univariate analyses, they were more likely to be ischemic (p = 0.02) diabetic (p = 0.03) and have CKD (p < 0.01). Age, gender, pre-implantation LVEF, QRS duration and pattern were not statistically different between the groups. Patients who presented worst clinical and echocardiographic response to CRT were at increased risk for hospitalization (p < 0.01 in both cases), as were those with impaired right heart function after CRT (p = 0.02). In multivariate analysis absence of echocardiographic response (HR 4.58; p = 0.07) and CKD (HR 4.09; p = 0.01) proved to be independent predictors of HF hospitalization.

The primary outcome of all-cause mortality at 5 years occurred in 60% of patients with HF hospitalizations and in 22% of the control group (log rank p = 0.01). After adjusting for confounding factors by cox regression HF hospitalizations was an independent predictor of mortality (HR 5.9; 95% CI 1.6-21.2).

Conclusions: Hospitalization for HF after CRT implantation is independently associated with mortality. Absence of echocardiographic response and CKD identified a subgroup of CRT patients who are at significantly increased risk for adverse outcomes.

P323
Long-term prognostic information of BNP levels in patients with stable systolic heart failure

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BNP is a powerful prognostic parameter in pts with systolic heart failure (SHF). Few studies have analyzed the long-term prognostic power of a single determination of BNP.

Methods: BNP was measured with the Shionoria BNP RI kit. Survival analyses were performed in all the pts and in subgroups with the exclusion of deceased pts during the first yrs of follow-up (FU).

Results: We included 459 ambulatory pts: 56 ± 12 yrs, NYHA class III: 25%, ischemic:46%; LVEF:33 ± 12%, left atrial diameter:44.6 ± 8 mm, peak VO2:15.4 ± 5.1 ml/min/kg, (59.3 ± 17.2 %), BNP: 110 [41-322] pg/mL. During a FU of 7.78 yrs [0.26 - 14], there were 311 deaths (68%) of whom 245 (53%) were cardiac related, 5 pts were lost to FU, 45 had cardiac transplantation. In univariate analyses, BNP was a predictor of survival even after the exclusion of deceased pts during the 7 first years of FU. In Cox analyses, BNP was an independent predictor of survival during the 3 first yrs of FU (Table). In contrast, peak VO2 remained an independent predictor of long-term survival (at least 7 yrs).

In conclusion, in stable pts with SHF, despite the variability of its measurement, BNP was an independent predictor of survival 3 years after its determination.
Independent predictors of survival

<table>
<thead>
<tr>
<th>Variables</th>
<th>HR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>All pts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.042 (1.03 - 1.054)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>9/12V2</td>
<td>0.974 (0.966 - 0.983)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Left atrial diameter (LAD)</td>
<td>1.028 (1.012 - 1.045)</td>
<td>0.001</td>
</tr>
<tr>
<td>BNP</td>
<td>1.002 (1.001 - 1.004)</td>
<td>0.001</td>
</tr>
<tr>
<td>Survivors: 1 yr (397 pts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.047 (1.03 - 1.06)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>9/12V2</td>
<td>0.976 (0.966 - 0.989)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>BNP</td>
<td>1.002 (1.001 - 1.004)</td>
<td>0.005</td>
</tr>
<tr>
<td>LAD</td>
<td>1.019 (1.002 - 1.036)</td>
<td>0.03</td>
</tr>
<tr>
<td>Survivors: 2 yrs (368 pts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.047 (1.03 - 1.05)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>9/12V2</td>
<td>0.976 (0.968 - 0.988)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>BNP</td>
<td>1.003 (1.001 - 1.005)</td>
<td>0.004</td>
</tr>
<tr>
<td>Survivors: 3 yrs (328 pts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.05 (1.04 - 1.07)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>9/12V2</td>
<td>0.975 (0.965 - 0.985)</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

Conclusion: In real-life clinical practice of unselected HF patients, co-morbidities were retrieved and all patients were followed until death or the end of year 2013. Hierarchical cluster analysis was performed using Gower’s distance dissimilarity matrix that included age, sex and comorbidities. Differences between clusters were analysed using ANOVA, Chi square, and Kaplan-Maier with log rank test. All statistical analyses were conducted in R 3.2.2 (R Core Development team).

Results: We identified 8248 patients (45.5% men, mean age 75.4 ± 11.1 years) that were followed for 23808 patient-years. Using the dissimilarity matrix, three clusters of patients were identified: men (cluster 1, N = 2736), women (cluster 2, N = 2693), and men and women with cancer, chronic kidney disease (CKD), and chronic obstructive pulmonary disease (COPD) (cluster 3, N = 2819). Besides sex, cluster 1 and 2 differed mostly in age (71.6 vs. 78.0 years) and prevalence of diabetes mellitus (19.6% vs. 31.2%) – P < 0.0001 for both. Cluster 3, compared to cluster 1 and 2, had higher number of comorbidities (6.5 vs 4.5 and 4.7), higher prevalence of cancer (19.2% vs. 4.3% and 0.8%), CKD (15.7% vs. 8.6% and 10.1%), and COPD (14.2% vs. 4.1% and 3.1%) – P < 0.0001 for all. During follow-up, 3727 (45.2%) deaths were recorded. Cluster 3 had the lowest survival during follow-up (P < 0.0001) – figure.

Conclusion: We identified three distinctive phenotypes and a specific combination of non-cardiovascular comorbidity (cancer, CKD and COPD), irrespective of sex, was associated with poorest survival.
Results: Serum phosphorus was 1.23 (1.08; 1.41) mmol/l in CHF patients. Hyperphosphatemia (P=1.45 mmol/l) was in 23.03%. Hyperphosphatemic patients had more severe NYHA class, higher blood pressure, P<0.01, lower albumin, higher urinary albumin excretion, lower eGFR (P<0.05). Osteoporosis (-score = or < -2.5SD) was found in 32.40% (14.7-91.9) %, osteopenia (T scores between -1.0 and -2.5SD) – in 40.5 (95I: 22.0-69.0) % of CHF patients. PTH was 77.6 (58.2;136.9) pg/ml. 25-vitamin D was 47.3 (38.8;54.6) nmol/l. 67.8% of CHF patients died during follow-up. Survival of patients with hyperphosphatemia was significantly lower than in patients without it (Picture). In Cox regression model, it was found that serum phosphorus was one of the strongest predictors of survival and was comparable with the value of LV EF and eGFR (Table). Also there was a trend to increase the 10-year risk of any fracture in FRAX model in patients with hyperphosphatemia.

Conclusions: Hyperphosphatemia is a predictor of poor prognosis in patients with chronic heart failure. Further work is required to determine whether lowering serum phosphate levels may improve the prognosis in CHF.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>β</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV EF, %</td>
<td>-0.04</td>
<td>0.019</td>
</tr>
<tr>
<td>Serum phosphorus, mmol/l</td>
<td>1.02</td>
<td>0.54</td>
</tr>
<tr>
<td>eGFRCKD-EPI, ml/min/1.73m2</td>
<td>-0.016</td>
<td>0.009</td>
</tr>
</tbody>
</table>

Hyperphosphatemia and surviving in CHF

P327 Prevalence and determinant of cognitive impairment in elderly patients with heart failure - A pilot study in a geriatric hospital
Shuto Shuto, J Ishikawa, T Okawa, T Tanaka, T Ishiyama, Y Tsuibo, K Takei, H Fujimoto, K Harada
Tokyo Metropolitan Geriatric Hospital, Cardiology, Tokyo, Japan

Backgrounds: In elderly patients who admitted to a hospital due to heart failure, we excluded patients who had the pre-diagnosed dementia and those who were unable to walk. We evaluated echocardiography, blood test, Mini Mental State Examination (MMSE) score and body composition using bioelectrical impedance analysis (Inbody 510) just before discharge.

Results: Mean age was 85.1 ± 8.0 (range 60-99) years (male 44.2 %). The ejection fraction was 46.9 ± 16.2 % and stroke volume was 36.5 ± 12.4 ml. Median B-type natriuretic peptide was 269.1 pg/dl. The Mini Mental State Examination (MMSE) score was 29.5 ± 5.4 and there were 66.7 % of patients with cognitive impairment (MMSE<25). MMSE score was significantly related to Age (n=0.344, P=0.032), Regular alcohol drinking habit (r=0.437, P=0.007), urinary acid (r=0.413, P=0.018), and extracellular water to total body water (ECW/TBW ratio r=0.437, P=0.007). In stepwise regression analysis that included these covariates, MMSE score was significantly associated to ECW/TBW ratio (β=0.445, P=0.009) (by body weight distribution). However, when echocardiographic parameters of end-diastolic left ventricular volume (EDVI) r=0.327, P=0.048, left atrial volume index (LAVI) (n=0.411, P=0.012), and A wave of transmural flow (n=0.385, P=0.001) were included to the model, MMSE score was related to A wave of transmural flow (P=0.001) and LV EF (P=0.019) (measures of diastolic function).

Conclusion: Cognitive function in elderly patients with heart failure might be affected by distribution of body water and cardiac diastolic function.

P328 Optimizing atrial fibrillation management in primary care by utilizing an electronic medical record dashboard for population health management
JH Michael Qu, D Ngul, F Lo
1 University of Edinburgh, College of Medicine & Veterinary Medicine, Edinburgh, United Kingdom; 2University of British Columbia, Department of Family Medicine, Vancouver, Canada; 3University of British Columbia, Microbiology and Immunology Undergraduate Program, Vancouver, Canada

Funding Acknowledgements: Thanks to Pfizer for their unrestricted educational grant

Background: Systematically applying evidence based guidelines for Atrial Fibrillation (A. Fibr) management in family practice can be challenging. Some physicians may benefit from automated and sustainable methods to improve patient care and outcomes leveraging the use of EMRs.

Purpose: By piloting an A. Fibr Electronic Medical Record (EMR) dashboard in a multi-physician family practice, our objectives were to determine the EMR dashboard’s ability to identify care gaps in Atrial Fibrillation. We also want to assess our ability to address these care gaps with 1:1 physician reviews and team based pharmacist medication reviews with patients within the practice.

Methods: We reviewed the medical literature regarding ideal design characteristics and review articles (needs reference) on utilization of EMR dashboards in health care. Also, we reviewed relevant A. Fibr clinical guidelines (needs reference) and developed a prototype A. Fibr tool through an interactive process with feedback from physicians. From a period of x to y, we used this dashboard to review one physicians patient roster. We recalled patients with care gaps identified by the EMR dashboard for management reassessment by a physician or alternatively, eligible patients were also seen by clinical pharmacists to review their medications. The results were tracked in real-time by the dashboard and allowed us to generate a report at the end of our intervention.

Results: A review of the dashboard for one physician resulted in identifying 15 patients who were recalled for review and we achieved the following tasks divided up into themes.
1. Patient panel/roster clean up: correctly revised atrial fibrillation in 5 patients. We had an overall increase in clinic patients identified with A. Fibr through improved ability to review cases.
2. Improved identification of investigation and lab monitoring care gaps: the number of A. Fibr patients without eGFR in 12 months decreased and the number of A. Fibr patients without ECHO on file decreased.
3. Improved identification of medication care gaps: the number of A. Fibr patients without anticoagulation agent decreased.
4. Increased referrals for shared care with team members to improve patient education.
5. Improved ability to generate meaningful data for clinical audit and monitoring effect of interventions:
   - Conclusion: Our A. Fibr EMR Dashboard allowed us to manage our A. Fibr patients more systematically, efficiently and effectively. This tool improved our recall’s and ability to generate physician alerts increase referrals to clinic team members. The concept of utilizing the A. Fibr dashboard is applicable to any EMR and is a needed paradigm shift to promote the use of technology to target care gaps. This holds promise to improve the management of A. Fibr in primary care, but requires further investigation.

P329 Demographic, clinical, and biological characteristics of outpatient heart failure patients in oman
M Matlaboo Azadzai
Royal Hospital, Cardiology, Muscat, Oman

Introduction: The clinical profile, and outcome of HF in western population is well demonstrated, little systematic data exist regarding the clinical profile and management of HF patients in Oman. Hence, the heart failure registry established after development of heart failure clinic to provide systematic report of the characteristics of HF patients.

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Background/Introduction: Cardiovascular safety of oral antibiotic drugs in patients with diabetes mellitus (DM) and heart failure (HF) with reduced left ventricular systolic function (LVSF) has not been established yet.

Purpose/Methods: We analyzed characteristics and treatment patterns in diabetic patients with symptomatic HF followed prospectively in the Heart Failure Unit (HFU) of a non-tertiary hospital.

Results: Since the begin of Unit in 2010 until 2016, 367 patients have been followed (median 44 months, 76.1% men, mean age 68.7 ± 12.5 years [median 73]). The majority of patients presented severe LV systolic dysfunction (67.6%), functional class II (50.8%) and ischemic origin of cardiomyopathy (47.5%). Rate of treatment with beta blockers, angiotensin converting enzyme inhibitors/angiotensin receptor blockers and aldosterone antagonists were 86.1%, 95.8% and 62.9% respectively without significant differences between diabetic or no diabetic patients. The prevalence of DM was 32.9%, mainly type 2 (96%). Oral antibiotics alone were the main scheme of hypoglycemic treatment (61.5%), being metformin the main drug used (73.3%) both in monotherapy and in combination, followed of dipeptidyl peptidase IV inhibitors (40.0%). Treatment with insulin was utilized in 38.3% diabetic patients, mainly with bolus-basal regimen (52.7%). The percentage of well-controlled patients was 48.1% (according with therapeutics goals established in guidelines) with a rate of micro and macrovascular complications of 51.6% and 67.2% respectively.

Regarding the prognosis, the overall accumulated survival rate at 5 years was 65.6%. Diabetic patients did not present a higher mortality although the subgroup of diabetic patients with worse metabolic control, those treated with insulin and those with a higher renal failure rate did present a higher mortality compared to the rest of the patients. The use of antibiotic drugs was not associated with a worse prognosis or a higher incidence of decompensation with any of the pharmacological groups.

Conclusion: Incidence and evolution of DM in patients with symptomatic HF due to LV systolic dysfunction followed in a HFU of a non-tertiary hospital is similar to that described by other groups. Mortality was higher in those patients with worse metabolic control and impaired renal function. The use of different oral antidiabetic drugs were safe and not associated to worse prognosis or a higher rate of decompensation.
with FID there was no relationship between those who did iron therapy and the 

Patients with CHF have a high incidence of functional iron deficiency.

to the short period of time that is considered.

Whether the infection susceptibility is mainly due to the CHF itself or to the FID is

<table>
<thead>
<tr>
<th></th>
<th>Odd ratio</th>
<th>95%CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYHA class 3-4</td>
<td>1.89</td>
<td>1.14-3.11</td>
<td>0.013</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>2.10</td>
<td>1.25-3.54</td>
<td>0.005</td>
</tr>
<tr>
<td>Dilated cardiomyopathy</td>
<td>3.20</td>
<td>1.88-5.45</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Systolic blood pressure (by 10mmHg)</td>
<td>0.85</td>
<td>0.77-0.94</td>
<td>0.002</td>
</tr>
<tr>
<td>Heart rate (by 10bpm)</td>
<td>1.16</td>
<td>1.00-1.34</td>
<td>0.045</td>
</tr>
<tr>
<td>Hemosglobin</td>
<td>1.17</td>
<td>1.07-1.28</td>
<td>0.001</td>
</tr>
<tr>
<td>Natuoretical peptides (BNP or NTproBNP) &lt;1000</td>
<td>3.22</td>
<td>1.94-5.34</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NTproBNP as % of total</td>
<td>4.76</td>
<td>2.73-8.30</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Non-indexed transferrin saturation and ferritin levels were significantly lower in patients with functional iron deficiency compared to those without functional iron deficiency.

Introduction: Cardiac arrhythmias are important co-morbidities in heart failure (HF) patients associated with worse prognosis. Given the new classification of HF presented in 2016 ESC guidelines, the prevalence of arrhythmias in particular HF types requires re-evaluation.

Aim: To evaluate the prevalence of rhythm and conduction disorders in three different HF types in the population of acutely decompensated chronic heart failure (ADHF).

Methods: Prospective observational two-centre cohort study enrolled consecutive patients admitted to the emergency department with acute dyspnea. Patients with final ADHF diagnosis and available left ventricular ejection fraction (LVEF) were included in the analysis as n = 329, median of age 72 (25-80). Atrial fibrillation (AF), left and right bundle branch block (LBBB and RBBB), combined intraventricular conduction defect and AV block were collected at admission electrocardiogram. Analysis was done by SPSS v20 statistical package using Chi-Square test. The significance level was p < 0.05. Atrial fibrillation was found in 167 (50.8%) participants, remaining 162 (49.2%) patients were in sinus rhythm. 35 patients (10.6%) had pacemakers. Intraventricular conduction disorders were detected in 76 (23.1%) patients: LBBB, RBBB and combined defects in 54 (16.4%), 11 (3.4%) and 19 (4.0%) patients, respectively. AF was detected in 15 (4.5%) patients. Combination of cardiac rhythm and conduction abnormalities was found in 37 (11.2%) of patients. The distribution of rhythm and conduction disorders in HFrEF, HfMR EF and HFpEF are presented in the Table. The highest prevalence of AF (54.9%) was found in HFrEF group (n = 51), however, without significant difference. Intraventricular conduction disorders and combined abnormalities were significantly less frequent in HfMR EF group compared to HFrEF, and though not significantly different, were observed more frequently in HFpEF compared to HFrEF.

Conclusions. Even half of the patients with acutely decompensated chronic heart failure present with atrial fibrillation, which is found to be similarly frequent in different HF types. Heart failure with mid range ejection fraction demonstrates different profile in terms of rhythm and conduction disorders compared to other two types of HF.

Table 1

<table>
<thead>
<tr>
<th>Rhythm and conduction disorders</th>
<th>HFrEF (&lt;40%)</th>
<th>HfMR EF (40-49%)</th>
<th>HFpEF (≥50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial fibrillation</td>
<td>60 (31.3%)</td>
<td>28 (54.9%)</td>
<td>9 (46.8%)</td>
</tr>
<tr>
<td>Intraventricular conduction</td>
<td>50 (32.3%)</td>
<td>9 (17.6%)</td>
<td>17 (33.9%)</td>
</tr>
<tr>
<td>abnormalities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined abnormalities</td>
<td>24 (30.4%)</td>
<td>4 (15.3%)</td>
<td>9 (14.3%)</td>
</tr>
<tr>
<td>p =&lt;0.05 HFrEF vs HfMR EF</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P334

The prevalence of rhythm and conduction disorders in three different types of heart failure

This study was conducted to assess the association between Buckberg index and functional capacity in chronic stable HF patients.

Methods: 156 clinically stable HF patients, whose weight, condition and medications had not changed in the previous 3 months, participated. Buckberg Index was completed using SyPhysmoCor system. Systolic-to-diastolic pressure shifts were assessed by the systolic and diastolic pressure-time integrals and expressed as a percentage. Patients were then categorised as follows; Group 1= Buckberg index

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P336 Understanding heart failure with middle range ejection fraction: results from a Colombian population

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Funding Acknowledgments: This study was funded by universidad Pontificia bolivariana and clinica CardioWID

Middle range ejection fraction (HFmEF) is a group of patients with different features and prognosis. There is no data about this population in Latin America, despite epidemiology that differs from the rest of the world.

Objective: To identify the clinical characteristics, treatment and prognosis of the HFmEF patients in a Colombian heart failure (HF) program.

Methods: Observational, retrospective study.

Results: In a population of 994 patients from a HF program, 147 patients had HFmEF. The mean age was 67.4 ± 13.5 years, and 44.2% were women. The mean EF was 42.8% ± 2.7% and the systolic blood pressure (SBP) was 142.1 ± 18.8 mmHg. The most common comorbidities were arterial hypertension (30.6%), diabetes (27.9%), coronary artery disease (25%), chronic kidney disease (23.5%), and atrial fibrillation (22.4%). The mean EF was 42.8% ± 2.7%.

Conclusion: The HFmEF group was younger and had a higher prevalence of comorbidities compared to the general HF population. Further studies are needed to better understand the characteristics and outcomes of this group.

P337 Non-invasive cardiac output monitoring after cardiopulmonary exercise testing in patients with heart failure

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1 Medical University of Bialystok, Department of Cardiology, Bialystok, Poland
2 Medical University of Bialystok, Department of Community Medicine and Civilization Disease Prevention, Bialystok, Poland
3 Medical University of Bialystok, Department of Community Medicine and Civilization Disease Prevention, Bialystok, Poland

Funding Acknowledgements: The study was found by statutory grants and funds from National Scientific Leading Center of Medical University of Bialystok.

Introduction: Heart failure with reduced ejection fraction (HF-REF) is one of the most severe outcomes of cardiovascular diseases. Reliable non-invasive evaluation of hemodynamic parameters in rest and exercise may improve patient assessment and care. Some valuable hemodynamic variables may be obtained by continuous non-invasive cardiac output monitor (ICON) that relies on impedance cardiography. However, this method was not tested after exercise.

Purpose: To evaluate the hemodynamic parameters obtained by ICON in HF-REF patients before and after exercise in relation to the measurements obtained in cardiopulmonary exercise testing (CPET).

Methods: The study included 24 stable, optimally treated patients (median 60.5 IQR 54.5-64 years, 4 females) with HF-REF in NYHA II, who were assessed with ICON before and after CPET. The latter hemodynamic measurement was performed within 90 seconds after the end of the exercise. Because of muscular movements during physical exercise it was not possible to make measurements during the CPET. The control group included 20 patients without history of HF-REF (median 62 IQR 57.5-65.5 years, 4 females).

Results: The study did not reveal significant differences between hemodynamic parameters measured using ICON at rest between HF-REF and controls. After CPET, however, HF-REF patients were characterized by lower cardiac output (CO) (p = 0.037) and systolic volume (SV) (p = 0.018), and higher heart rate (HR) (p = 0.018), while there were no differences in pulmonary capillary wedge pressure (PCWP) (p = 0.15) or stroke volume index (SVI) (p = 0.19). The study did not reveal differences between hemodynamic parameters measured using ICON at rest between HF-REF and controls. After CPET, however, HF-REF patients were characterized by lower cardiac output (CO) (p = 0.037) and systolic volume (SV) (p = 0.018), while there were no differences in pulmonary capillary wedge pressure (PCWP) (p = 0.15) or stroke volume index (SVI) (p = 0.19). The study did not reveal differences between hemodynamic parameters measured using ICON at rest between HF-REF and controls. After CPET, however, HF-REF patients were characterized by lower cardiac output (CO) (p = 0.037) and systolic volume (SV) (p = 0.018), while there were no differences in pulmonary capillary wedge pressure (PCWP) (p = 0.15) or stroke volume index (SVI) (p = 0.19).

Conclusion: This study showed that ICON is a reliable method for non-invasive cardiac output monitoring before and after exercise in patients with HF-REF. Further studies are needed to validate the method in larger populations and different settings.

Table 1: comorbidities

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artrial fibrillation</td>
<td>30.6%</td>
</tr>
<tr>
<td>Coronary disease</td>
<td>51.7%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>73.5%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>27.9%</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>27.2%</td>
</tr>
</tbody>
</table>
Precipitating factors of HF admission

P339
Optimize Brazil – Analysis of a multidisciplinary approach in a multicenter brazilian cohort to optimize heart failure treatment

P. Schwartzmann1; H. T. Moreira1; R. Mourilhe-Rocha2; H. Villacorta3; J. D. Messejana; M. A. Gomes1; M. A. M. Lopes1; M. A. F. Santos1; T. P. Rodrigues4
1School of Medicine of Ribeirão Preto, University of São Paulo, Internal Medicine, Ribeirão Preto, Brazil, 2State University of Rio de Janeiro (UERJ), Rio de Janeiro, Brazil, 3University of Medicine and Dentistry of Ribeirão Preto, Ribeirão Preto, Brazil, 4Ribeirão Preto Federal University, Ribeirão Preto, Brazil

Introduction: Heart Failure (HF) is a major health problem worldwide, with elevated proportion of deaths, hospitalizations and morbidity. In Brazil, a national prospective registry demonstrated an even higher rate of death and re-hospitalizations. The treatment is challenging and requires a multidisciplinary initiative to improve pharmacological and non-pharmacological treatment in this population. This comprehensive multidisciplinary approach is the main goal of the Optimize Program and is focused beyond the pharmacological treatment in educating patients and their families about the disease and providing information for self-monitoring.

Purpose: We aimed at assessing the clinical effect of Optimize-HF Program in a retrospective multicenter Brazilian cohort of heart failure patients.

Methods: We retrospectively included a total of 219 patients (124 males, 59.9 ± 13.5 y.o.) with heart failure and reduced left ventricular ejection fraction (LVEF) mainly with non-ischemic etiology (151 patients – 68.9%). Patients were followed in HF clinics of five Brazilian HF centers and received the multidisciplinary orientation contained in the Optimize program.

Results: The baseline characteristics were: LVEF <39.9 ± 0.09%, systolic arterial pressure = 111 ± 21 mmHg, heart rate = 72.2 ± 14 bpm, 38.3% of the patients were in NYHA functional class II and 48% of the patients were in NYHA functional class III, NT-ProBNP 2973 ± 3216 pg/mL, 7% had implantable cardioverter defibrillator or cardiac resynchronization therapy. Patients were treated following the recommendations of the guidelines: 84% were using betablockers, 78% ACE inhibitors or ARBs, 15.9% ivabradine. The follow-up time was 414 ± 223 days, with 5% of mortality and 21.3% of the combined outcome of death or rehospitalization. The low mean LVEF, the worse functional class (more than a half of patients were from NYHA III-IV) and the high mean NT-ProBNP level suggested that this is a high risk HF population. The outcome rate of death and a combined outcome of death or rehospitalization were markedly lower in comparison to the Brazilian National Registry of HF, which showed more than 50% of mortality and rehospitalization over a year.

Conclusion: The optimization of HF treatment using a multidisciplinary program in this multicenter Brazilian cohort presented a lower rate of death and death or rehospitalization. These results suggest the potential benefit of this multidisciplinary strategy to improve prognosis of patients with heart failure and reduced LVEF.

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the 6-min walking test and the exercise time on MVOD test significantly improved in combination group A (P < 0.02).

**Conclusion:** Ivabradine with low dose of Carvedilol has better results in stroke rate reduction in chronic heart failure patients as compared to optimized dose of carvedilol alone.

**P341**

**Outcome of a transitional care clinic to reduce heart failure readmission in high-risk inner city population**

J Justin Lee¹; F Reyes¹; M Ramirez²; M Rahman²

¹SUNY Downstate Medical Center, Internal Medicine, Brooklyn, United States of America

**Background:** Heart failure (HF) is a worldwide problem with an astronomical amount of burden on healthcare expenditure that is only projected to increase in the future. Previous studies have shown that black population with low socioeconomic status has significantly higher rates of HF than other ethnicities. Population at our institution consists of 80% black ethnicity, with 31% living below poverty level. Managing our patients with chronic medical conditions is particularly challenging as many of them do not fully understand the complexity of their illness and the importance of adherence with medical treatment plan. Reasons for hospital admissions for HF exacerbation include not only medication non-compliance, but also failure to follow up with primary care appointments and inappropriate use of the emergency room as the medium for immediate aid during crises.

Our institution has established a transitional care clinic (TCC) in May 2015, with aims to aid patients with chronic medical conditions by providing early post-discharge follow up regardless of patient’s financial or insurance status.

**Methods:** Retrospective review was conducted for patients who were scheduled for TCC with a diagnosis of HF, from May 2015 to October 2016. Our TCC model includes, follow-up appointment within 7 days post-discharge and reminders via phone calls a day before TCC appointment, post clinic follow up phone calls and additional TCC clinic visits as needed to bridge patient over to his or her primary care clinic. A 30-day readmission rate was calculated and compared between patients who followed up with our TCC and who did not, by using Fisher’s exact test. Also, readmission rates were compared for patients who followed at TCC vs. cardiology clinic.

**Results:** Total of 204 admissions for HF were identified in the study period. Majority of patients were black (91%) with a mean age of 60 years and median length of stay of 5 days. Out of 137 patients who did not follow up with our TCC, 44 were readmitted (32.12%) within 30 days of discharge. From the 67 patients who followed with our TCC, 7 were readmitted (10.45%). Forty percent of patients who did not show up to neither TCC nor cardiology clinic were readmitted, compared to 8% who showed up to either TCC or cardiology and 6% who followed up with both.

**Conclusions:** Our transitional care clinic model demonstrates early success with 22% decrease in 30-day all-cause HF readmission in patients who were followed up at the clinics. Rate of readmission did not differ significantly on patients who were followed at TCC, compared to those who were followed by their cardiologists. Future study design can be directed towards cost analysis, comparison to historical data from other inner-city population and interventions focused on ways to increase compliance with TCC appointment, including more frequent reminders using emails, text messages, etc.

**P342**

**NO metabolism in patients of elderly age with chronic heart failure.**

1Imma Ekhudo1; L Abu2

1Kharkov National University of V.N. Karazina, Internal Medicine, Kharkov, Ukraine;

2Kharkov National Medical University, Internal Medicine, Kharkov, Ukraine

**Abstract:**

Important role in pathogenesis of chronic heart failure (CHF) is the disturbance of vasodilatory function of endothelium, determined by level of synthesis and metabolism of nitric oxide (NO). S-nitrosothiol – complex: made as a result of introducing NO into dinitroso complexes of iron with thiol ligands forming a physiological oxidation that reflects the intensity of its synthesis. Aim of investigation: determination of peculiarities of NO metabolism in patients of elderly age with CHF.

**Material and methods:** 68 patients with ischemic heart disease of age from 60 to 92 were examined. CHF of II functional class (FC) was determined in 44 (64%), CHF of III FC-in 24 (35%) patients (NYHA). 29% had hypertensive disease (HD), 19% patients diabetes mellitus (DM). Nitrates and nitrates were determined in serum by method of Griess’ diarosynthesis with determination of nitric junction. S-nitrosothiol was determined by fluorometric method.

**Results:** There was a significant decrease of S-nitrosothiol levels compared to control group. Comparing level of S-nitrosothiol in groups 60-75 and >75 years, in men and women, depending on presence of HD and DM in amnanesis of means of this metabolite had no difference. Nitrate levels in patients with II and III FC of CHF was significantly less of those in control (< 0.05; < 0.05). Nitrates level in patients with CHF II FC was lower (< 0.05; < 0.05). In CHF III FC – had no difference from normal one. Level of nitrates and nitrates in CHF II FC was significantly higher CHF II FC (< 0.01; < 0.01). At the age of > 75 years, level nitrates and nitrates were significantly lower than at the age of 60-75 years (< 0.05; < 0.05). Indices of NO were significantly higher in patients with HD and DM comparing to patients without HD and DM in amnanesis (< 0.05).

**Conclusion:** Depression of NO metabolism formation testify about decreasing of intensity of NO metabolism and reflects physiological and pathological processes caused by CHF, endothelial dysfunction. In CHF III FC, HD and DM in amnanesis, they were significantly higher rates of nitrates and nitrates. This fact can be related to induction of iNOS with increasing formation of NO that due to CHF can be caused by growing ischemia, due to HD – increased endothelial dysfunction and high blood pressure, due to DM – metabolic disturbances, which connected to unbalance of pressures and depressors acting of insulin. In such way, changes of vasodilatory function in patients of elderly age depend on severity of CHF, age of the patient and presence of polymorbide background.

**Figure 1.**

<table>
<thead>
<tr>
<th>No show</th>
<th>Show</th>
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<tbody>
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<td>No</td>
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**P343**

**State of the thromboxane-prostaglandine system in patients with chronic heart failure.**

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**Background:** In recent years in the study of the pathogenesis of several diseases of the cardiovascular system, and chronic heart failure (CHF) in particular, careful attention is drawn to the prostanooids, because keeping active physiological balance between thromboxane and prostacyclin is one of the main conditions for maintaining optimal blood flow in the myocardium.

**Aim:** To study thromboxane-prostaglandine systems (TPS) in patients with coronary heart disease (CHD) complicated by CHF.

**Methods:** The status TPS was analyzed during 82 patients with CHD and CHF at the age of 42-60 years. Investigated in blood plasma the stable metabolites of prostacyclin – 6-keto-prostaglandin F1α (6-keto-PGF1α), prostaglandin E – PGF1, thromboxane A2 – TXB2 immunoenzymet method sets of reagents of company IBL. Depending on the functional class (FC) of the CHF patients were divided into 3 groups: 1 gr. – with the CHF FC (34 patients), 2 gr. – with the CHF FC II (27 patients), 3 gr. – with the CHF FC III-V (21 patients).

**Results:** In the control group content of TXB2 in blood plasma amounted to 147,2 ± 2,9 ng/ml, 6-keto-PGF1α – 87,3 ± 2,8 ng/ml, PGF1 – 0,62 ± 0,07 ng/ml, the ratio of TXB2/6-keto-PGF1α – 1,66 ± 0,26. With progression of CHF biosynthesis of prostacyclin was significantly decreasing, level of TXB2 and the ratio of TXB2/6-keto-PGF1α in patients of 2 gr. and 3 gr. was significantly higher compared to the control group and 1 gr. Thus, in patients of 2 gr. and 3 gr. the content of prostacyclin amounted to 70,2 ± 5,6 ng/ml and 64,8 ± 4,9 ng/ml, respectively (p < 0,05; p < 0,01). Level of TXB2 in 2 gr. was 183,4 ± 8,1 ng/ml, 3 gr. – 226,4 ± 9,3 ng/ml (p < 0,01; the ratio of TXB2/6-keto-PGF1α in 2 gr. and 3 gr. – 2,61 ± 0,29 and 3,43 ± 0,36, respectively (p < 0,01). Indicators of PGF1α in patients of 1 gr. were higher than in the control group, but in patients of 2 gr. and 3 gr. the level of PGF1α was declining, however, it exceeded targets. Reduction of the level of 6-keto-PGF1α, increase of TXB2 in plasma with
increasing FC CHF indicates their involvement in the mechanism of progression of heart failure and breach the TIPS as the exacerbation of the pathological process. Comment: The decrease of prostacyclin level in blood plasma, increased thromboxane and their ratio in patients with coronary heart disease probably reflects not only the severity of coronary insufficiency, but also chronic heart failure.

**P345**

Impact of ejection fraction on the clinical features in heart failure patients with concomitant chronic obstructive pulmonary disease

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The problem of management heart failure (HF) patients with concomitant chronic obstructive pulmonary disease (COPD) is relevant and understudied. The research continues for clinical markers for aggravating both diseases, as well as criteria for their unfavorable course and prognosis. It is proved that the state of left ventricular systolic function, determined by the size of the ejection fraction, largely affects the survival of patients with heart failure. It is expected that adherence to heart failure, COPD significantly change clinical phenotype.

**Purpose:** To investigate the clinical features of heart failure in association with chronic obstructive pulmonary disease, depending on the value of left ventricular ejection fraction.

**Methods:** We enrolled 105 HF patients in association with COPD (average age = 68.4 ± 9.4 years, left ventricular ejection fraction = 53.8 ± 11.4%, II-III FC = 43.9%, III-IV = 58.1%). Duration of heart failure did not exceed 6 years. In the study we used Questionnaire Minnesota living with heart failure for assessment quality of life, walk test, clinical assessment scale.

**Results:** All patients, depending on the value of left ventricular ejection fraction (LVEF), were divided into 3 groups according to recommendations of the European Society of Cardiology (2016.): 1. preserved left ventricular ejection fraction – 81 patients (77.1%), 2. midrange – 12 (11.45%), reduced left ventricular ejection fraction – 12 (11.45%). The frequency of severe course COPD was higher in the second group than in the others – 62.5%. The most unfavorable cohort was a group with a reduced left ventricular ejection fraction, which was confirmed by the worst results of the test distance (190.6 ± 96.1 m) and clinical assessment test (6.9 ± 2.1 points), worse quality of life (62.3 ± 20.9 points). The direct correlation of moderate intensity was determined between LVEF and Tiffno index (r = 0.354, p < 0.05), functional vital capacity of the lungs (FCVC) = r = 0.325, p < 0.05, and also between heart failure functional class (FC) and clinical features of COPD, measured by clinical assessment test (CAT) and MRC (r = 0.444, p = 0.01 and r = 0.344, p < 0.05).

**Conclusions:** The results of this study indicate mutual influence on the clinical characteristics of both heart failure and bronchial obstructive disease on the formation of the clinical phenotype of the patient. The study showed that LVEF in patients significantly affects the course of both diseases. At the same time, the clinical criteria for COPD have an impact on the course of both diseases, evidenced by a correlation between CCQ and clinical assessment scale (p < 0.05, r = 0.444), CCQ and CHF FC (p < 0.05, r = 0.344). The positive correlation between the results of COPD Assessment Test – CAT, reflecting the clinical condition of the patient at the time of the study, and CHF FC (p < 0.05, r = 0.346), clinical assessment scale (p < 0.05, r = 0.415), quality of life (p < 0.05, r = 0.48) was founded.

**Inclusion criteria** was adult patients who had heart failure and received tolvaptan. Data was collected through interview, physical examination, medical record, and laboratory examinations. The outcome of tolvaptan administration was assessed from the decrease in body weight and edema, as well as 24-hour urine volume. Data analysis was done using SPSS 20.0. The severity of hyponatremia is classified into below or above 120 mEq/L.

**Results:** Thirty-one subjects were included in this study, Seventy-one percent of the subjects were male, with average age of 51.2 ± 2.3 years old. NYHA classes of the population were as following: II (6.4%), III (81.3%), IV (32.3%). The median baseline sodium level was 131 (103-138) and median LVEF was 29% (14%-71%). All of the participants were prescribed furosemide (median dose 332 [80-840] mg) and 38.7% were prescribed spironolactone (median dose 25 [12.5-50] mg). Thirty percent of the participants had comorbid conditions. Tolvaptan effects on participants with hyponatremia below (n = 6) or above (n = 25) 120 mEq/L are not significantly different (p = 0.05), with average diuresis of 302 (SD 1279) cc/day.

**Conclusion:** Tolvaptan can effectively improve diuretic effects of furosemide in heart failure patients despite various severity of hyponatremia.

**ADVANCED HEART FAILURE**

**P347**

Influence of a continuous veno-venous hemofiltration on the long-term prognosis in patients with an advanced heart failure and an acute coronary syndrome

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**Introduction:** Heart failure (HF) is one of the most common and challenging therapeutic problems. Coronary artery disease (CAD) can lead to HF and coronary angiography followed by PCI are utilized for its diagnosis and treatment. The use of contrast media could impair renal function while prophylactic fluid infusion is a standard of care. An adequate hydration in overloaded HF patients with urgent indications for intervention in acute coronary syndrome (ACS) setting is challenging. Periprocedural use of continuous veno-venous hemofiltration (CVVH) in such patients could be a valuable option.

**Purpose:** To analyze the long-term prognosis of patients with an advanced HF, undergoing PCI with periprocedural CVVH use.

**Methods:** We performed prospective interventional study, which included 52 patients with chronic HF (NYHA II-IV), reduced ejection function (EF < 45%) and chronic kidney disease (stages III-IV), referred for coronary angiography/PCI due to ACS.

In 26 patients CVVH was used during the PCI procedure and 24 hours afterwards as an addition to a standard care. Another 26 patients received only standard treatment. We measured serum creatinine levels at 24, 48 and 72h post PCI in both groups as well as NT-proBNP levels at 24 and 48h in CVVH group. In 3.5 years follow-up we assessed the risk of cardiovascular death and mortality from any cause.

**Results:** Patients in CVVH group were more often diabetic (73.1% vs. 38.5%, p = 0.025), active smokers (38.5% vs. 7.7%, p = 0.02), had history of previous PCI (57.7 vs. 23.1%, p = 0.023), were in significantly higher NYHA class (p = 0.03) and had pulmonary edema at admission (46.1% vs. 15.1%, p = 0.01). Both groups were similar in routine laboratory measurements, except for higher initial creatinine (p = 0.017) and potassium levels (p = 0.018) in CVVH group. In CVVH group creatinine level significantly declined at 24h after the PCI (161.8 ± 63.4 vs. 124.7 ± 39.8 μmol/l) with subsequent nonsignificant rise at 48 and 72h. In controls, the lowest observed creatinine level at admission (129.5 ± 38.5 μmol/l) significantly increased at 24h (136.4 ± 43.6, p = 0.049 μmol/l). NT-proBNP levels significantly decreased at 24 and 48h after the CVVH (p = 0.015). In CVVH group we observed a trend toward higher bleeding rate and need for transfusion (19.2 vs. 7.7%, p = 0.42). All bleeding events were related to vascular access site and occurred exclusively in female patients (100%, p = 0.004).

**Conclusions:** Use of CVVH in patients with an advanced HF might result in a decrease of 1-year mortality with no such effect at a longer follow up. The use CVVH in women could increase the risk of bleeding complications.
Purpose: The goal of this study was to find out factors predictive of 1-year event-free survival in 42 AHF patients (LVEF < 40%, NYHA 3-4 despite optimal therapy). Results: After adjustment for HR and BB, only BB dose, percent of BB target dose and heart rate after 3 infusions predicted endpoint occurrence (Table). Conclusions: repeated levo infusions offer the opportunity to uptitrate HF back-ground therapy, particularly BB, which in turn may predict mid-term outcome.

Background: Prognosis of Advanced heart failure (AHF) is very poor. Because of low blood pressure (BP) and fluid overload, uptitration of Angiotensin converting enzyme inhibitors (ACEi), Angiotensin receptor antagonists (ARA), beta-blockers (BB) and mineralocorticoid receptor antagonists (MRA) is not tolerated. Intermittent levosimendan-infusions may predict outcome (Table). After adjustement for HR and BB, only BB dose and percents of BB target dose predicted endpoint occurrence.

Methods: Medical files were reviewed for the composite endpoint of mortality, rehospitalization or LVAD implantation during 1 year after first infusion. Patients’ baseline characteristics and status at inclusion and after 3 infusions were compared between the 14 who reached the endpoint (33%) and the 28 event-free survivors. Results: Non patients’ characteristics (age 61.4 ± 8.9y vs 59.7 ± 7 y; P =0.52; female 17.8% vs. 7.14%, P =0.04; NYHA 3-4 vs 3-2, P =0.11; LVEF 21.0 ± 0.5% vs. 22.2 ± 0.06% nor patients’ baseline status predicted outcome (Table). Only BB therapy, percent of BB target dose and heart rate after 3 infusions predicted endpoint occurrence (Table). After adjustment for HR and BB, only BB dose >35% target dose remained significant (DR=0.64; 95%CI 0.07-0.87).

Conclusions: repeated levo infusions offer the opportunity to uptitrate HF back-ground therapy, particularly BB, which in turn may predict mid-term outcome.
Predictors of mortality at six months after in advanced heart failure patients attended in primary care

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Background: To know the predictors of survival in patients with advanced heart failure is crucial to decide end-of-life options.

Purpose: To determine the factors related to the six months mortality of heart failure patients at functional status New York Heart Association (NYHA) IV attended in primary care.

Methods: Retrospective cohort study including 726 heart failure patients at NYHA IV functional status in Catalunya (Spain) was carried out. Demographic and clinical data, laboratory tests, treatments, comorbidity and vital status were drawn from primary care electronic medical records.

Logistic regression models and multiple imputations were performed.

Results: Mean age was 83.2 years (SD 7.8) and 62.9% were women, 43.0% were diabetic, 32.8% had coronary heart disease, 15.6% had history of stroke, atrial fibrillation was present in 49.7%, and 19.1% of patients had cancer.

Adjusted multivariate analysis found that: age (OR 1.04, 95% CI 1.01-1.06), low systolic blood pressure (OR 3.75, 95% CI 1.68-8.33), low body mass index (OR 4.62 95% CI 2.19-9.76), heart rate > 100/min (OR 2.14, 95% CI 1.05-4.35), renal impairment (OR 1.80, 95% CI 1.11-2.93), limitations in daily living activities (OR 1.68, 95% CI 1.02-2.75) and furosemide dosis (mg/day) (OR 1.007, 95% CI 1.003-1.02) were related to a higher mortality.

Conclusion: A small number of variables easily obtained from primary care can predict which kind of patients are more probably going to be death in the six months after reaching the NYHA IV functional status.

Low dose of basiliximab for induction immunosuppression therapy for heart transplant results in favourable outcomes

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Background: Patients with anemia had more decompensated heart failure episodes. The aim of this study was to reach the clinical evolution of the patients undergoing this therapy in our hospital.

Methods: We studied all the outpatients with chronic advanced heart failure treated with intermittent levosimendan therapy, recording clinical features, analytical values and events during the follow-up.

Results: From the 23 patients we have studied (65 years, 35% women), 11 (47.8%) of these had an ischaemic etiology. The mean of NT-proBNP was 286 and the mean of Charlson Comorbidity Index was 5.5. 14 patients (60.9%) were admitted due to heart failure episode in the previous year before starting the therapy, and 9 (39.1%) had decompensated heart failure episodes. The mean of NT-proBNP pre-therapy was 3798 pg/ml, decreasing in 56.5% of the patients in the next 3 months and getting better in the 21.7% in the next 6 and 12 months. The median follow up duration was 11 months (IQR 5-18), recording at the 12th month an improvement of functional class in 10 patients (43.5%), 3 (13%) of these patients were readmitted to hospital, 7 (30.4%) deaths and 3 (13%) heart transplantation. Patients with anemia had more decompensated heart failure episodes (37.5% vs 0%, p = 0.032).

Conclusions: NT-proBNP levels decreased in a high percentage of patients at the third month and less at the sixth and twelfth month of the follow-up.

- The prevalence of readmission and decompensated heart failure after intermittent therapy with levosimendan decreased according to the previous year pre-treatment.
Background: Palliative care for patients with advanced heart failure is recommended in the guidelines for the acute and chronic heart failure. It has been the focus of attention in this pandemic of heart failure. Because cardiologists are not familiar with opioids, there might be the underuse of those drugs for fear of those negative effects.

Purpose: To investigate the safety and the efficacy of opioid agents for palliative care in patients with advanced heart failure.

Methods: We investigated 4640 patients admitted to our cardiovascular center from January 2013 to September 2016, and extracted 28 patients with advanced heart failure treated with opioid agents to palliate their dyspnea. We examined patient’s background, starting dosage and maintenance dosage of opioids, concomitant drugs and clinical responses.

Results: About all 28 patients, their mean age was 79.4 years-old and 13 (46.4%) were male. Of those patients, 25 (89.3%) had renal dysfunction defined as estimated glomerular filtration rate (eGFR) of under 60 ml/min and 20 (71.4%) had severe renal dysfunction defined as eGFR of under 30 ml/min. Morphine hydrochloride, fentanyl and oxycodone were administered for 22, 3, and 3 patients respectively. The mean starting dosage of morphine, fentanyl and oxycodone were 6.8 ± 3.2, 0.71 ± 0.55, and 4.7 ± 0.58 mg/day, and the maintenance dosage were 8.7 ± 7.6, 0.77 ± 0.49, and 14.7 ± 13.6 mg/day, respectively. Inotropic agents, diuretics, and sedative medication were administered in combination with opioids in 89.3%, 17.9%, and 25.0%. Systolic and diastolic blood pressure did not change significantly after administration of opioids (97.2 ± 22.1 to 98.1 ± 20.2 mmHg and 49.9 ± 13.6 to 52.3 ± 14.1 mmHg). Heart rate and respiratory rate were significantly reduced by opioids (87.8 ± 25.2 to 83.9 ± 24.3 bpm, p < 0.01, and 27.3 ± 7.9 to 22.0 ± 6.5 bpm, p < 0.01) but nobody experienced significant respiratory depression nor symptomatic brady-cardia. Their dyspnea score assessed by “Face Scale” was significantly improved by opioids (2.9 ± 1.0 to 1.2 ± 0.8, p < 0.01).

Conclusions: Low dose opioids were relatively safe and effective for palliative care in patients with advanced heart failure and renal dysfunction.

P354
End of life care and symptom control in the final year preceding mortality from end-stage heart failure - Observations from a heart failure disease management programme.

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Background: End of life care (EOLC) preceding end-stage heart failure (ESHF) death is poorly described, even within the context of a HF disease management programme (HF-DMP). It is thought that extending this period of recognition may provide greater opportunity for better care, particularly specialist palliative care (SPC). Therefore, we aimed to characterize EOLC, especially symptom control, during the final year preceding ESHF death.

Methods: All patient deaths (n = 53) within University Hospital HF-DMP in 2014-2015, were identified and categorized as ESHF and non-ESHF deaths. We retrospectively compared medical record data between both groups for demographics, HF clinic visits, hospitalizations and SPC referral during 12 months preceding death. Missing data was excluded. Data were expressed as mean ± SD or %.

Results: All ESHF deaths had at least NYHA III dyspnea prior to last hospitalization. HF clinic visit None were eligible for heart transplant. No significant differences were observed between ESHF (n = 21) vs Non-ESHF (n = 20) deaths in terms of age, gender or nursing home admission within last year of life. Left ventricular ejection fraction in all patients was 30 ± 13% with approximately a third of patients in both groups with implantable cardiac defibrillators (ICD). Within last 12 months of life, ESHF deaths had more HF clinic visits for HF symptom control with diuretics, versus non-ESHF deaths (1.2 ± 0.3 vs 0.3 ± 0.2, p = 0.04). However, there were no significant between-group differences in HF and non-cardiovascular hospitalizations. In both groups, less than a quarter of patients had documented ICD deactivation discussions and less than a third of patients had documented SPC referrals, which were only initiated within the last 3 months of life. During this period, reported symptoms for control in ESHF deaths were dyspnea (86%), pain (19%), fatigue (57%) and oedema (67%), and were not significantly different to comparator group.

Conclusions: There is a paucity of documented SPC referral for symptom control and ICD deactivation discussions was observed during EOLC of ESHF deaths. This is despite greater HF symptom burden during final 12 months of life within the ESHF deaths group. More work is required to explore these observations, including the use of structured assessment to document such parameters.

ARRHYTHMIAS AND TREATMENT

P355
Prolonged P-wave duration is associated with atrial fibrillation recurrence after radiofrequency catheter ablation

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Background/Objectives: A change in the P-wave duration (PWD) was approved in patients with atrial fibrillation recurrences before radiofrequency catheter ablation (RFCA). The correlation between the PWD and AFR and the potential utilization of a prolonged PWD in the prediction of AFR after RFCA remains unclear.

Methods: A meta-analysis of observational studies that investigated the relationship between PWD and AFR after RFCA was performed. Studies regarded PWD in patients with or without AFR after RFCA, and also studies concerned with the predictive effect of prolonged PWD on the AFR after RFCA, were included and summarized. Outcome measures are reported as absolute risk differences with 95% confidence intervals. A receiver operating characteristic (ROC) curve was used to evaluate the potential cut-off value of PWD for AFR. Summary receiver operating characteristic curve (SROC) analysis was performed to show the overall predictive efficiency of PWD for AFR.

Results: Nine studies were included in the meta-analysis. An overall effect test based on 8 studies that contained a total cohort of 1,010 patients showed a highly significant association between prolonged PWD and AFR after RFCA (Z = 14.20, P < 0.000). A statistic summary included 4 studies that included a total of 593 patients indicated an obviously higher risk of AFR among patients with prolonged PWD (Z = 8.86, P < 0.000). ROC curve analysis indicated 14.5 ms as the potential cut-off value of PWD for AFR after RFCA. SROC analysis suggested an acceptable predictive efficiency of PWD for AFR (AUC = 0.66).

Conclusions: The risk of AFR after RFCA is strongly related to a prolonged PWD. PWD is one potential low-cost and feasible predictor for AFR after RFCA.

P356
Extrasystoles from the point of view of its functional importance

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Atrial fibrillation is considered to be a risk factor of thromboembolic events because of the high probability of mural thrombus in auricles with ability of its further fragmentation. The majority of researches acknowledge the kardioembolic nature of stroke. However it’s not paid attention to the role of elastic and muscle-elastic arteries on the background of multifocal arterial atherosclerosis with extrasystoles and atrial fibrillation in thromboembolic danger.

Aim: To determine the influence of intra-arterial hemodynamic and kinetic disorders of main arteries on the probability of thromboembolic events in the patients with different types of extrasystoles and atrial fibrillation.

Methods: We examined 186 patients with the permanent form of atrial fibrillation and supraventricular and ventricular extrasystoles. We used extrasystoles classification in accordance to the moment of their appearance in cardiac cycle. We have identified:

Extrasystoles before the mitral valve opening.

Extrasystoles in rapid ventricular filling phase before the transmural blood flow peak. Extrasystoles in rapid ventricular filling phase after the transmural blood flow peak.

Extrasystoles in late ventricular diastolic filling phase after the transmural blood flow peak.

We registered sphygmograms and doppler -ultrasound of carotid, radial, ulnaris, posterior tibia, arch of foot arteries. We analyzed the peak speed direct blood flow, blood flow volume. To know the clinical significance of extrasystoles appearance in cardio cycle and ecocardiographic localization we used apex-cardiography and electrocardiography. The volume of cardiac output and transmural blood flow were measured by echocardiography. We determined the parameters of heart biomechanics and main arteries kinetics, which characterized speed, acceleration, capacity and work in each phase of heart cycle in systole and diastole, and also the periods of dominance of outflow over inflow. We valued the contribute to the circulation of the premature contraction and first postextrasystolic contraction.
Conclusion: The main importance to the hemodynamics changes has the post-extrasystolic contraction to reestablish an adequate resulting blood flow. The background of multifocal lesions of main arteries the main importance has the first post-extrasystolic contraction. It is accompanied by the sharp increase of inotropic parameters of arteries and the increased deformation of vascular wall. The maximums of these parameters are revealed in first post-extrasystolic contraction in case ofextrasystoles before the mitral valve opening and before the transmural peak flow. In atrial fibrillation the main danger are the first ventricular contractions after the maximum time pauses. It causes the significant increase of cardiac output, arteries diameter as well as non-stability of atheromas and mural thrombus fragmentation with high embolism probability.

Kinetics of cardiac daisy work with the extrasystoles before the mitral valve opening, in phases of fast and slow filling.

P357 Ventricular tachycardia and atrial fibrillation complicating the clinical course of takotsubo cardiomyopathy

Background: Takotsubo cardiomyopathy (TTC) has increasingly been recognized during the past years. Most studies, however, are too small. A German TTC registry has been initiated to further characterize this syndrome in a larger patient population.

Methods: From 37 heart centres, 324 pts (296 f, 28 m, age 65 (61; 72) years) were included according to the following criteria: 1) acute chest symptoms, 2) (aspecific) ECG changes, 3) reversible LV akinesia not corresponding to a single coronary artery territory, 4) absence of coronary artery stenoses. During hospitalisation, 7/324 pts (2.2%) died (cardiogenic shock n=4; myocardial rupture, stroke and asystole n=1 each).

Results: During the first 48 hours, 209 pts were continuously monitored and had diuretics, and mortality were not significantly different among pts with and without newly diagnosed AF.

Conclusions: The incidence of AF in TTC is rather high. A German registry is helpful to identify at-risk patients for VT/VFib during hospitalization. Early disposition of previous revascularization (HR=1.91; 95%CI=1.82-2.05), need of inotropic agents (HR=1.53-1.72), without beta-blocker at admission (HR=1.79; 95%CI= 1.63-1.85), history of previous revascularization (HR=1.91;95%CI=1.92-2.05), need of inotropic agents (HR=2.70;95%CI=1.90-3.65) were found to be independent risk factors for incident sVT/VFib during hospitalization.

P358 Life threatening ventricular arrhythmias in patients hospitalized for acute heart failure

Methods: During hospitalization for acute heart failure (AHAH), some patients may experience life-threatening ventricular arrhythmias, including sustained ventricular tachycardia (sVT) and ventricular fibrillation (VFib), placing them at high risk of in-hospital mortality. Aim: To identify clinical variables independently associated to incidence of sVT/VFib during hospitalization for AHAH.

Methods: The Romanian AFHS-AHAFS registry prospectively enrolled 3224 consecutive patients admitted for AHAH in 5 academic and 8 community hospitals, over a 12-month period. A multivariate logistic regression model was developed to identify baseline clinical variables predictive of incident sVT/VFib.

Results: During hospitalization for AHAH, the incidence of sVT and VFib was 3.6% and 3%, respectively. Patients who experienced sVT/VFib had higher in-hospital mortality compared to patients who did not (24.8% vs 5.7%; p<0.001). The incident sVT/VFib was associated to in-hospital mortality in the whole cohort (HR=3.82;95%CI=1.59-5.21) and this association has been maintained even after adjustment by 18 baseline clinical variables (HR=2.60; 95%CI=1.63-3.75). Patients who experienced sVT/VFib in a ICU/ICU setting had a lower mortality compared to patients who had arrhythmias on regular ward (21.5% vs 26.7%; p<0.03). Using a multivariate logistic regression model, creatinine at admission (HR=1.06;95%CI=1.03-1.11), diabetes (HR=1.20;95%CI=1.09-1.35), EF <40% (HR=1.64;95%CI=1.53-1.72), without beta-blocker at admission (HR=1.79;95%CI=1.63-1.85), history of previous revascularization (HR=1.91;95%CI=1.92-2.05), need of inotropic agents (HR=2.70;95%CI=1.90-3.65) were found to be independent risk factors for incident sVT/VFib during hospitalization.

Conclusions: Clinical variables commonly measured at the time of admission may help to identify at-risk patients for VT/VFib during hospitalization. Early disposition decision-making, as well as intense monitoring may help to prevent mortality in this group of patients.

P359 Left atrial remodeling and ventricular-arterial coupling in patients with recurrent atrial fibrillation: effects of amiodarone and sotalol

Background: Impaired left ventricular-arterial coupling (VAC) might lead to diastolic dysfunction (DD) and therefore structural and functional changes of the left atrium (LA) that are substrate for atrial fibrillation (AF). The effects of amiodarone and sotalol on LA remodeling and VAC parameters remain unclear.

Purpose: To compare the effects of amiodarone and sotalol on LA remodeling and VAC parameters in patients with recurrent AF and preserved left ventricular systolic function.

Methods: The study included 60 hypertensive patients [45% male, median age 65 (61; 72) years] with paroxysmal and persistent AF and preserved left ventricular systolic function. The patients were treated with amiodarone (A) 200 mg + metoprolol 50 mg daily (n = 30) or sotalol (S) 160 mg daily (n = 30). All the patients underwent echocardiography and specie trackking analysis before and 3 months after treatment. Global peak LA longitudinal strain (PALS) and strain rate (PALSr) in the reservoir (r) and contractile (c) phases were assessed using 6 segments in the 4-chamber and 2-chamber views. To estimate VAC arterial elastance index (Ea), left ventricular end-systolic elastance index (Ees), Ea/Ees, systemic vascular resistance index (SVR) and total arterial compliance (TAC) were calculated.

Results: A and S had comparable favorable effect on most clinical and echocardio- graphic parameters. Both A and S significantly reduced Ees (from 1.41 to 1.25 and from 1.7 to 1.6 mm Hg/ml/m², respectively, p <0.001) and increased TAC (from 1.15 to 1.36 and from 1.11 to 1.40 ml/mm Hg, respectively, p <all- 0.001).

There were no significant changes in Ea and SVR in A and S groups. The reduc- tion of LA size was significantly greater in A group compared to S group (p < 0.05)
Atrial Fibrillation

P360
Left atrial size as predictor of recurrences after catheter ablation in paroxysmal atrial fibrillation: a systematic review and meta-analysis
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Methods: We systematically searched PubMed-Medline, EMBASE, Scopus, Google Scholar and the Cochrane Central Registry, up to December 2016 in order to select clinical trial and observational studies, which assessed the predictive role of LA diameter in AF recurrence after catheter ablation. 2962 patients from 16 studies with paroxysmal AF (PAF) were included.

Results: The pooled analysis showed that after a follow-up period of 19.66 ± 8.31 months, patients with AF recurrence had larger LA size compared with those without AF recurrence, with a weighted mean difference (WMD) 2.31 (95% CI 1.27 to 3.34), P < 0.0001.

LA diameter ≥40 mm predicted AF recurrence HR:1.04 [95% CI 1.00 to 1.08], P=0.04, but the best cut-off value, in all included patients, was ≥50 mm HR:1.08 [95% CI 1.47 to 6.49], P=0.003.

Conclusions: Enlarged left atrium in patients with PAF undergoing catheter ablation predicts recurrences. The diameter more than 50 mm is the best cut-off of the recurrences of AF, but diameter of 40 mm also can predict recurrences in these patients.

Multivariate HR (hazard ratio) of AF rec

P361
Step by step treatment of patients with congestive heart failure and long-standing persistent atrial fibrillation using combining of CRT and catheter ablation
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Aim: to assess clinical results of combining CRT-D and catheter ablation in long-standing persistent atrial fibrillation (AF) pts with congestive heart failure (HF) and reduced ejection fraction (EF).

Material and methods: We studied 8 consecutive patients (2 women, 51 ± 15.6 years of age) with long-standing persistent AF, HF who underwent CRT-D placement as the first step of treatment. After CRT-D placement biventricular pacing mode (VVI from 70 to 85) was activated and rate control drugs dose was titrated. As the second step all patients underwent catheter ablation (PFA) for AF 3 mos. later. The ablation performed using 3D mapping system and included atrial isola tion of the PVs with additional left atrial linear ablation of the roof, mitral isthmus and substrate modification of the left atrium posterior wall. Switch of mode pacing from biventricular VVI to DDD was performed at the end of procedure after sinus rhythm restoration. Follow up included repeat echocardiography, device interrogation with percent of pacing and ventricular events checks, NYHA HF functional class (FC) evaluation at baseline and at months 3, 6, and 12.

Results: At the first step there were no complications associated with CRT-D implantation. At the 3 month of follow up the NYHA FC improved from 3.1 ± 0.4 to 2.3 ± 0.6, percent of biventricular pacing ranged from 72 to 99 (mean 88 ± 7%). Echocardiography showed a mean LV EF of 32.9 ± 7.5%, an increase from a baseline of 29.2 ± 7.8%. There were no complications associated with PFA of AF: At 6 months follow up 5 of 8 pts were free from AF. Two pts had 3 episodes of AF which required external cardioversion performing. NYHA FC improved from 2.3 ± 0.6 to 1.9 ± 0.6, a mean LV EF increased from 32.9 ± 7.5% to 42.1 ± 4.8%. At 12 months of follow up 5 of 8 pts were free from AF. Three pts had 7 episodes of AF which required external cardioversion performing (3 pts) and redo ablation of AF (2 pts). NYHA FC improved from 1.9 ± 0.6 to 1.5 ± 0.6, a mean LV EF increased from 42.1 ± 4.8% to 46.6 ± 5.2%. Device interrogation showed 5 episodes of non-sustained ventricular tachycardia without therapy in 2 pts during all period of follow up.

Conclusion: Combining CRT-D and catheter ablation in patients with congestive HF and long-standing AF may be reasonable approach, although there is little data supporting its use.
Conclusion: The treatment of atrial fibrillation (AF) is complex. There are conflicting data regarding the effects of digoxin used for rate control in these patients.

Background: The aim of this study was to investigate the association between HATCH score and atrial fibrillation (AF) after coronary artery bypass graft (CABG) surgery.

Methods: 369 patients (103 patients with AF and 266 patients without AF) undergoing isolated CABG surgery were analyzed. Complete medical records were retrospectively collected to investigate HATCH score.

Results: The median age of patients with AF was significantly higher than the median age of sinus rhythm group (60.8 ± 10.3 years vs. 67.8 ± 9.5 years, p < 0.001). HATCH score was significantly higher in patients who developed AF after CABG surgery than the sinus rhythm group (p = 0.017). Multivariate logistic analysis showed that, HATCH score (odds ratio (OR): 1.334; 95% confidence interval (CI), 1.022-1.741, p = 0.034) was an independent predictor of AF after CABG surgery (Table 1). Receiver operating characteristic curve analysis showed that the cut-off point of HATCH score related to predict AF was 1, with a sensitivity of 42% and specificity of 70%.

Conclusion: Patients with elevated preoperative HATCH score may have a higher risk for AF after CABG surgery.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted OR†</th>
<th>95% CI†</th>
<th>p value</th>
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<td>1.022-1.741</td>
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<td>0.560-4.757</td>
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<td>Distal anastomosis</td>
<td>1.415</td>
<td>0.942-2.126</td>
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</tbody>
</table>

OR: odds ratio; CI: confidence interval

P364

Results from a comparison of cryoballoon vs radiofrequency ablation using carto 3 system for paroxysmal atrial fibrillation, (the first Algerian experience of ablation with DR Bouama2; DR Tebbache1

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Introduction: Cryoballoon ablation has emerged as a new alternative for the treatment of symptomatic drug-refractory atrial fibrillation (AF). Comparative data of early recurrence rates of atrial fibrillation (ERAF) following second-generation cryoballoon (CB-G2) and radiofrequency current (RFC, using the carto 3 system with smarttouch) ablation for pulmonary vein isolation (PVI) in paroxysmal AF (PAF) are rare. We randomized PAF patients into either PV with CB-G2 (group 1) or PV with a combined RFC-approach applying contact force (CF, smarttouch) with the endpoint of unexcitability (group 2) to investigate ERAF (for a duration of six months).

Methods: In group 1 (n = 19), CB-G2-PVI was performed. After CF-PVI in group 2 (n = 19), bipolar pacing on the ablation line and additional ablation until unexcitability was conducted. Follow-up included 72 h of in-hospital monitoring followed by 15-day Holter ECGs (3 h, and 3 months, post ablation to evaluate ERAF). Results: Acute PVI was reached in 98% of group 2 and in 97% of group 1. Shorter procedure durations (114.5 ± 13.9 vs. 167.3 ± 18.7 min, P < 0.05) but extended fluoroscopy times (22.5 ± 11.5min vs. 17.5 ± 10.3 min, P < 0.05) were found in the CB-G2 group. Six non-severe complications occurred (4 vs 2 in group 1 and 2, P = 0.73). In group 2, three patients suffered from ERAF vs. three patients in group 1 (P = 0.67). The time until the occurrence of ERAF was shorter in group 2 when compared with group 1 (P = 0.003).

Conclusion: ERAF rates were equal among groups at six months; however, they occurred earlier in the initial phase (the first month) after RFC ablation when compared with CB-G2 (the third month). PVI utilizing cryoballoon is associated with shorter procedure durations but extended fluoroscopy time while being similarly secure. We acknowledge an advantage of superiority in the efficiency and safety of one technique compared to another.

P365

Chronic digoxin utilization in patients with atrial fibrillation is associated with hospitalization for de novo acute heart failure

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Background: Chronic digoxin utilization in patients with atrial fibrillation is associated with hospitalization for de novo acute heart failure.

Methods: Patients with chronic atrial fibrillation were included in this prospective study. We compared digoxin patients with atrial fibrillation with non-digoxin patients with atrial fibrillation having similar age, sex, and disease severity.

Results: A total of 146 patients with atrial fibrillation were included in the study. Digoxin patients were older (75 vs. 68 years, P < 0.001), had a higher prevalence of previous heart failure (40 vs. 27%, P = 0.03), and were more likely to be on other medications known to cause heart failure (60 vs. 47%, P = 0.04). Digoxin patients had a higher hospitalization rate for de novo acute heart failure (26.7 vs. 10.5%, P = 0.027).

Conclusions: Digoxin utilization in patients with atrial fibrillation is associated with hospitalization for de novo acute heart failure.

P366

Why don’t beta-blockers work in patients with heart failure and atrial fibrillation? Pauses?

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Background: Recent analyses suggest that patients with heart failure and atrial fibrillation (AF) benefit from beta-blockers. This might be because the benefits of beta-blockers are offset by induction of arrhythmias, particularly pauses.

Methods: Ambulatory patients with symptomatic chronic heart failure treated with loop diuretics but with no implanted device were invited to wear a patch to record
their ECG for up to 14 days. Baseline differences between those with AF and SR were made using Mann–Whitney U or Fisher’s exact tests. The primary endpoint was a composite of bradycardia (<30 bpm for ≥1 minute; high-degree antibradycardic AV block; pauses ≥3 seconds; average of ≥1,000 ventricular ectopics beats per day; ventricular tachycardia (VT) with ≥100 bpm for ≥3 beats).

Results: Patients were predominantly in NYHA class II with a median UDEF of 37%; 30 were in AF and 47 in SR. Patients with AF were older (77 vs. 68 years), had higher heart rate (73 vs. 64 bpm) and were less likely to receive beta-blockers (53% vs. 87%) and ACE-I/ARB (70% vs.96%) and more likely to receive digoxin (43% vs. 4%). The median duration of monitoring was similar between groups (331 hours). Of patients in AF, 23 (77%) met the primary endpoint compared to 22 (47%) in SR (p = 0.02). Compared to patients in SR, more patients in AF had pauses (20% vs. 2%, p = 0.01) or heart rate <30 bpm (6% vs 0%). The median clinic heart rate for those with AF and pauses was 760 bpm (IQR: 67-76) bpm. The rate of bradycardia-related VT was similar in AF and SR (6.2% vs. 8.5%; P = 1.0). One patient in SR developed an idio-ventricular rhythm at 40 bpm during recording, then symptomatic VT and ventricular fibrillation from which they were resuscitated.

Conclusions: Although patients with heart failure and AF have higher clinic heart rates than those in SR, they have a high incidence of brady-arythmias, some of which are followed by episodes of VT. Whether this accounts for the failure of beta-blockers to improve prognosis in patients with HFREF requires further research.

**CARDIOMYOPATHY**

P367 Pregnancy in women with hypertrophic cardiomyopathy: data from the European Society of Cardiology Inherited Registry of Pregnancy and Cardiac Disease (ROPAC)

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Aims: We report the maternal and fetal outcomes at birth and after 6 months in a cohort of pregnant women with hypertrophic cardiomyopathy (HCM).

Methods: All pregnant women with HCM entered into the prospective worldwide Registry of Pregnancy and Cardiac disease (ROPAC) were included in this analysis. The primary endpoint was a major adverse cardiovascular event (MACE), which included death, heart failure (HF), thromboembolic event and arrhythmia. Baseline and outcome data were analysed and compared for patients with MACE versus without MACE and for patients with obstructive HCM versus non-obstructive HCM.

Results: Sixty pregnant women (mean age 30.4 ± 6.0 years) with HCM (41.7% obstructive) were included. No maternal mortality occurred in this cohort. In 14 (23%) patients at least one MACE occurred: 9 (15.0%) HF and 7 (12%) an arrhythmia (6 ventricular and 1 atrial fibrillation). MACE occurred most commonly during the 3rd trimester and postpartum period. In total, 3 (5.0%) women experienced fetal loss. Women with MACE had a higher rate of emergency Caesarean delivery for cardiac reasons (21.4% vs. 0%, p < 0.01). No significant differences in pregnancy outcome were found between women with obstructive and non-obstructive HCM. NYHA functional class of ≥ II and signs of HF before pregnancy, were associated with MACE.

Conclusions: Although most women with HCM tolerated pregnancy well, cardiovascular complications were not uncommon and predicted by pre-pregnancy status facilitating pre-pregnancy counselling and targeted antenatal care.

P368 Serum NT-probrain natriuretic peptide and high-sensitivity cardiac troponin I levels in carriers of myosin-binding protein C founder mutation

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On behalf of: The Icelandic HCM project

Background: Increased levels of serum NT-probrain natriuretic peptide (NT-proBNP) and cardiac troponins have been observed in patients with overt hypertrophic cardiomyopathy (HCM) and are associated with various clinical features such as severity of left ventricular hypertrophy (LVH), symptoms of heart failure and degree of fibrosis. Additionally NT-proBNP concentration predicts overall prognosis and survival in HCM. However, limited data exists on the role of cardiac biomarkers in sarcornome mutation carriers with normal left ventricular (LV) wall thickness.

Purpose: The aim of this study was to determine if serum NT-proBNP and high-sensitivity cardiac troponin I (hsTNI) may play a role as markers of LV remodeling in MYBPC3 mutation carriers before the development of LVH.

Methods: In total of 290 genotyped individuals were studied from Icelandic families with the MYBPC3 c.979-2A>G founder mutation. Subject were divided into 3 groups based on genotype status and the presence or absence of LVH (≥12mm). NT-proBNP and hsTNI levels were compared between 60 genotype-positive individuals without LVH (G+/LVH-; age 33 ± 17), 108 genotype-positive with LVH (G+/LVH+; age 62 ± 17), and 122 healthy control relatives (G-/LVH-; age 41 ± 18).

Results: A stepwise increase in mean NT-proBNP levels was observed between groups: 37.5 ± 1.09 pg/mL in controls, 65.3 ± 1.1 pg/mL in G-/+LVH- subjects and 179 ± 1.14 G +/+LVH+ (+ values expressed as means ± SE, adjusted for age and gender; p < 0.0001 between each group). However, there was a substantial overlap in NT-proBNP levels between the G-/+LVH- and control groups. In G +/+LVH+ subjects, hsTNI was significantly higher (5.46 ± 1.12 pg/mL) compared to the other groups. There was not a significant difference in hsTNI levels between G-/+LVH- subjects (1.71 ± 1.24 pg/mL) and controls (1.26 ± 1.11 pg/mL; p = 0.113).

Conclusions: Higher concentration of NT-proBNP in G-/+LVH- subjects compared to controls may reflect early LV remodeling process in HCM. A follow-up study is needed to determine if serum concentrations of NT-proBNP in genotype-positive individuals can predict the risk of developing LVH.

P369 Echocardiographically estimated pulmonary artery systolic pressure predicts progressive heart failure and systemic embolic events in patients with hypertrophic cardiomyopathy

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Background: Echocardiographically estimated pulmonary artery systolic pressure (PASP) is a non-invasive widely available method that is used to estimate pulmonary arterial pressure. Although elevated PASP predicts mortality in patients with hypertrophic cardiomyopathy (HCM), the details of adverse events is not available. This study aimed to determine whether elevated PASP is predictive of progressive heart failure and systemic embolic events in a tertiary referral HCM cohort.

Methods: This study included 374 clinically diagnosed patients with HCM. PASP was estimated from tricuspid regurgitant jet velocity using the modified Bernoulli equation at the initial evaluation.

Results: The median (interquartile range) PASP was 33 (28–37) mm Hg, and elevated PASP (>40 mm Hg) was observed in 66 (17.6%) patients. Patients with elevated PASP had a higher proportion of female sex, were more likely to have atrial fibrillation, and had a larger left atrial dimension than those without elevated PASP (>40 mm Hg). Twenty of the 66 (30.3%) patients with elevated PASP and 30 of the 308 (9.7%) patients without elevated PASP experienced episodes of progressive heart failure with an increase to ≥3 New York Heart Association functional class (P < 0.001). In addition, 17 of the 66 (25.8%) patients with elevated PASP and 24 of the 308 (7.8%) patients without elevated PASP experienced stroke and systemic embolic events during the 10.3 ± 7.4 years of follow-up (P < 0.001). Figure. Multivariable analysis showed that PASP >40 mm Hg was independently associated with progressive heart failure (adjusted odds ratio, 2.08; P=0.049) and embolic events (adjusted hazard ratio, 2.66; P<0.008).

Conclusions: PASP estimated by Doppler echocardiography could help risk stratification for progressive heart failure and embolic event in patients with HCM.

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Background: The level and function of circulating miRNA21 in young and elderly patients with symptomatic hypertrophic cardiomyopathy has been studied not enough.

Aim: Our aim was to study the level of circulating miRNA21 in patients with familial hypertrophic cardiomyopathy (HCM) in different age groups.

Methods: 72 individuals were examined. The study group included 27 probands with HCM at the age 19 - 70 years (45.67 ± 3.23 years). The diagnosis of HCM was established according to the guideline of the European society of cardiology on the diagnosis and treatment of HCM, 2014. The control group included 45 healthy donors without cardiovascular diseases and other severe pathologies, matched by age and sex with the studied group. Total RNA was extracted from plasma of patients. miRNA21 and reference RNA U6 cDNA was prepared based on StemLoop-technology. Expression was examined using semiquantitative RT-PCR protocol. Calculation of the relative gene expression level of miRNA21 was done according to the standard procedure 2-△CT.

Results: The level of the miRNA21 in the group of patients with HCM compared to control group ranged from 0.86 to 337.79 (77.33 ± 13.51) versus from 0.01 to 9.85 (1.84 ± 0.40), p < 0.001, respectively. 16 patients had symptomatic HCM and in 11 cases there was diagnosed asymptomatic HCM. In patients with symptomatic HCM the level of miRNA21 was compared to asymptomatic HCM ranged from 1.87 to 337.79 (77.33 ± 21.49) versus from 0.66 to 45.25 (8.45 ± 3.85), respectively. Elevated levels of circulating miRNA21 were found in patients with symptomatic HCM (p < 0.004). Patients with symptomatic HCM were divided into 2 subgroups: 1 — young patients at the age from 19 to 43 (39.56 ± 3.09) 2 — elderly patients at the age from 51 to 68 (63.14 ± 2.38). The main symptoms in young patients were dizziness, syncope, ventricular arrhythmia (III- V class according to Lown classification). The risk of sudden death corresponded to the intermediate and high-risk groups according to the 5-year risk of SCD using the HCM Risk-SCD model (a Web-based calculator is provided with the Guidelines, 2014). The leading syndrome in older patients was heart failure NYHA II-III. In both groups the majority of patients had an adverse cardiac remodeling. In young patients with symptomatic hypertrophic cardiomyopathy the level of miRNA21 ranged from 7.46 to 337.79 (83.84 ± 34.51) and it was higher (p < 0.042) than in the group of patients with symptomatic HCM older than 45 years, in which the level of miRNA21 ranged from 1.87 to 119.43 (24.73 ± 15.92).

Conclusion: The significant increase of the level of miRNA21 was found in young patients with HCM with a high risk of sudden cardiac death and adverse cardiac remodeling. Age is an important determinant of the clinical course of the HCM.
P373
Clinical risk factors of new onset atrial fibrillation in patient with hypertrophic cardiomyopathy.
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1Busan National University Hospital, Busan, Korea Republic of

Backgrounds: Atrial fibrillation(AF) is common clinical manifestation of HCMP patients. Prevalence of AF in HCMP patients is known to approximately 20%. There are limited data available to predictive factor of AF in patient of HCMP. The aim of this study is to investigate of clinical risk factor of AF in HCMP patients.

Methods: This study is retrospective observational study. We investigated the HCMP patients who performed echocardiography and had sinus rhythm at presentation(n=40) from 2011 to 2015 at our national university hospital. We divided into two groups according to the newly developed AF during follow up period(AF group: n=40; AF was defined by electrocardiogram and Holter monitoring at index visit. We compared clinical characteristics and conventional echocardiographic parameter and atrial electromechanical delays. AEMD was defined as the time interval between the onset of ECG P wave and the initial(AEMD) or peak a’ wave(AEMDp) on the medial mitral annular tissue Doppler velocity curve(TDI) or PW Doppler at the mitral valve inflow level.

Results: Compared to sinus rhythm group, new onset AF group had more conventional echocardiographic parameter including RVSP(36.58±7.99, p<0.001), LAVI(59.01±21.49, p<0.001), Mitral E velocity(77.03±27.78 vs 61.74±17.56, p<0.001) and AEMD(72.07±15.90 vs 63.08±15.43, p<0.004), AEMDp(152.41±27.59 vs 141.98±15.43, p<0.022) by PW Doppler. After using multivariate logistic regression, we explained dyspnea. Compared to sinus group, new onset AF group had more conduction disorders according HMEKG showed that I st. AV block significantly was lower on 12.1% and 16% (both p<0.01) in gr I and II, amounting to 68% and 77% versus 28.9% (p<0.01). However, it noted the prevalence of the number of pts with atrial fibrillation in gr I (p<0.05).

Thus, in pts with dilated cardiomyopathy and LBBB with the presence of the ECG pseudo-Q-wave observed more pronounced destructive changes in the myocardium, as evidenced by the low contractility function, the prevalence of the presence of high grade ventricular arrhythmias and conduction atrioventricular violation and also a high incidence of registration signs of right heart failure compared with pts without the presence of those changes.

P374
The course of dilated cardiomyopathy, depending on the availability of ECG changes.
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Objective: The study of the clinical and functional status of pts with dilated cardiomyopathy (DCM) with and without pathological changes on ECG.

Methods: The study included 274 pts with DC at the age of 17 to 61 years (mean 42.9±1.1 years). In addition to the clinical examination all pts underwent ECG, Holter ECG monitoring (HEMCQ), echocardiogram, 6MWT. All pts were divided into 4 grs. Gr 1 included 47 pts in whom the ECG recorded blockade of the left bundle branch block (LBBB), Pts of the 2 gr (44) in the ECG were detected pseudo-Q wave. The 3 gr consisted of 124 pts, which were characterized on the ECG by decreasing of R wave amplitude, a deep S wave in the right leads, and high R wave in the left precordial leads. 4 gr of pts on the ECGs were found complete blockade of right bundle branch block (n = 16) or a bundle branch block (44 pts), which were excluded from the study of this fragment.

Results: Source FC HF in the I and II gr was significantly higher in gr II, (3.5±0.1 and 3.3±0.1 vs 3.1±0.1; p<0.01), the clinical status of pts that in gr II. 6MWT parameters were significantly higher (232±69m) than in grs I and III, respectively (198±12m and 202±11m p<0.01). A number of indicators, indicating the presence of right ventricular heart failure, such as ascites, peripheral edema were significantly more frequent in the gr with LBBB pseudo-Q-wave and ECG changes. Analysis of the parameters of intracardiac hemodynamics revealed an increased in the linear dimensions of the left heart of pts I and II: improving performance of EDD - on 9.2% and 3.2% (both p<0.01), ESQ - on 12.5%, 5.1% (p<0.01), LV EF was lower on 12.1% and 16% (both p<0.01) in gr I and II, respectively. Analysis of conduction disorders according HMEKG showed that I st. AV block significantly more common in the I and grs II (32% and 39% vs. 12%; p<0.01). It should be noted that the progression of heart failure in the 15 pts with AV blockade of I degree in 4 cases, the AV-conduction violation worsened up to the III degree, requiring pacemaker implantation in the future, in the absence of this kind of dynamism in other grs. Analysis of the frequency of occurrence of heart rhythm disturbances has shown that high grade ventricular arrhythmias were significantly more frequent in gr I and II, amounting to 68% and 77% versus 28.9% (p<0.01). However, it noted the prevalence of the number of pts with atrial fibrillation in gr I (p<0.05).

Conclusion: The course of dilated cardiomyopathy, depending on the availability of ECG changes. Enrichment analysis allowed the identification of specific pathways which were observed to become up- and down-regulated in at least 66% (6 out of nine experiments). Pathways which were seen to be up-regulated in DCM have been associated with: 1) Immune cell infiltration effects seen in rheumatoid arthritis, 2) c-AMP signalling, 3) Cardiac B-Adrenergic signalling and - 4) HGF signalling (Figure 1). Pathways down-regulated were 1) PTEN signalling, 2) Protein Kinase A signalling, and 3) the STAT3 Pathway.

Conclusions: PGERs successfully established a genetic consensus in identifying intracellular pathways which have become dysregulated in idiopathic DCM. This novel type of meta-analytical technique shows promise in establishing intracellular aetiology in systemic pathology.
Lamin-related phenotype of DCM associated with a high risk of sudden cardiac death (SCD) even in the absence of significant dilatation and left ventricular contractile dysfunction.

**Purpose:** The aim of this study was to evaluate clinical predictors of the LMNA-associated DCM phenotype and non-invasive prognostic markers of life-threatening ventricular tachyarrhythmic events.

**Methods and results.** The study included 165 patients with DCM who had a heart rhythm disorder and conduction disturbance (aged 49.2 ± 11.5 years; 135/81.8% male; NYHA 2.87 ± 0.45; UEF 27.6 ± 10.1%; follow-up 39.7 ± 12.4 months). All patients underwent clinical studies, screening of tamine A/C (LMNA) gene, CPK and NT-proBNP levels definition, neuromuscular investigation. LMNA mutations were detected in 45 (27.3%) patients. As a result of ROC analysis only ECG predictors (PR ≥ 215 ms; AUC 0.967, 95% CI 0.973 - 0.999, p = 0.0001; sensitivity 95%, specificity 95%; pathological mTWA test ≥ 5%; AUC 0.775, 95% CI 0.701 - 0.846, p = 0.0001; QRS ≥ 122 ms AUC 0.773, 95% CI 0.689 - 0.857, p = 0.0001) were demonstrated a priori predictive significance to assess LMNA-positive phenotype compared to laboratory tests (serum CPK level ≥ 118 u/l: AUC 0.671, 95% CI 0.548 - 0.793, p = 0.009; sensitivity 65%, specificity 69%; NT-proBNP: AUC 0.538, 95% CI 0.275 - 0.802, > 0.75) and echocardiography parameters (LV GLS: AUC 0.645, 95% CI 0.548 - 0.793, p = 0.003; specificity 75%, sensitivity 69%). Events of sustained ventricular tachycardias (sVT) and/or ventricular fibrillation (VF), and documented SCD were accepted as a primary endpoints to the multivariate Cox regression model. By analysis independent predictors of life-threatening tachyarrhythmias were revealed such as nsVT events and LMNA-positivity: HR 5.23; 95% CI 1.45-16.9, p = 0.013) that should be used to improve the risk-stratification of SCD and optimization of the general management for DCM.

**Conclusions:** Our findings support an important position of genetic research LMNA mutations in DCM patients for an early prediction of adverse clinical outcomes. According to the Cox regression analysis were detected an independent predictors (cumulative effect of the combination identified predictors such as nsVT events and LMNA-positivity: HR 5.23; 95% CI 1.45-16.9, p = 0.013) that should be used to improve the risk-stratification of SCD and optimization of the general management for DCM.
Patients (pts) with dilated cardiomyopathy (DCM) are developing life-threatening ventricular tachyarrhythmias (VTAs) sometimes in the early stages even in the absence of symptoms of severe heart failure and a link fixed with systolic dysfunction. This clinical phenotype is arrhythmogenic and associated with an increased risk of sudden cardiac death (SCD). The aim of this study was to evaluate a clinical prevalence of arrhythmogenic DCM and identify a non-invasive prognostic predictors of life-threatening ventricular tachyarrhythmic events.

Methods and results. One hundred sixty patients with a recent diagnosis of DCM (aged 47.3±11.4, 132/82.5% male; NYHA 2.36±0.49; LV EF 29.8±6.3% were comprehensively evaluated and followed for 47.9±12.4 months. Arrhythmogenic DCM phenotype was defined by Holter 24h monitoring ECG (or CRT-D/ICD device interrogation) as past presence of ventricular tachycardia (nsVT/VT) ≥1500 premature ventricular contractions/24 hours, and ≥50 ventricular couplets/24 hours. Of the 160 patients, 92 (57.5%) pts demonstrated these criteria. In 45 (28.1%) pts with DCM were identified changes in Lamin A/C gene (LMNA). As a primary end point to the multivariate Cox analysis patients were accepted successful resuscitation, ICD-shock, documented SCD, sustained ventricular tachycardia (sVT) or ventricular brillation (VF). By the Cox regression multivariable model analysis criteria as nsVT (5 beats with HR≥150 bpm; HR:2.24; 95% CI:1.00-4.9); p=0.029) and LMNA missense mutations (≥1 nucleotide changes; HR:1.99; 95% CI: 1.09 -3.97; p = 0.032) were identified as independent and cumulative predictors (HR:5.63; 95% CI:1.60-17.5; p = 0.011) of life-threatening VT.

Conclusions: Thus, more half of DCM patients develop an arrhythmogenic phenotype associated with increased risk of VTAs during follow-up. Independent predictors (as fast nsVT and LMNA missense mutations) predicts a poor prognosis and an increased risk of SCD and therefore an improvement of risk-stratification should be used purposely to select of potential candidates for preventive ICD therapy.

P382
Risk stratification of life-threatening ventricular tachyarrhythmias in patients with dilated cardiomyopathy

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The study had prognostic factors of life-threatening ventricular tachyarrhythmias with tightly related sudden cardiac death (SCD) remains the cornerstone issue still.

Purpose: Design of prognostic model to identify a population at high risk of life-threatening ventricular tachyarrhythmias in patients with dilated cardiomyopathy (DCM) was the aim of this study.

Material and methods. The study enrolled and followed up 53.1±12.6 months 268 pts with DCM (74.6% male, aged 47.2±11.7 years, LVEF 28.7±10.1%; NYHA class 2.7±0.4). We analyzed age, gender, NYHA, 6-MWT, peak VO2; EchocG, Holter ECG (PVES, sVT, nsVT, VF); ORS width, device interrogation and high definition ECG (InteCard-7) with assessment of HRT, mTWA, JTD, and QTD. For multivariate ROC analysis and binary logit-regression model as a primary endpoints were accepted SCD documented, successful resuscitation, sustained VT, and CRT-D/CIED appropriate discharges.

Results: Predictors and their cut-off parameters defined as a result of ROC analysis were included in the binary logit regression model (table). As a result binary logit regression analysis of independent risk factors (PVES, sVT, mTWA, HRT, JTD and LV GLS mean) predictive model was constructed (F=31.2; p<1.432; p<0.0001).

Parameters Constant

PVES: nsVT: JTD

≥ 6.9% ≥ 1500/24h ≥ 5.03

P = 1/(1 + e^-(-7.25-0.38×LV GLS-0.76×PVES+4.35×nsVT+1.46×JTD+4.28×HRT+5.03×mTWA))

The range of probability of P was divided into the risk level quintiles: 0.5 to 0.6 for low risk; 0.6 to 0.9 to mid risk; 0.6 to 0.8 to high risk. Risk grading is presented in Figure 1. The calibration matrix demonstrated a high prognostic significance of discriminant function (p=31.2; p=1.432; p<0.0001; sensitivity of 80.8%; specificity 99.1%)

Conclusion: The proposed risk stratification allows to classify correctly to 93.9% DCM pts. Non-invasive and an individualized method enable to stratify patients with higher risk of life-threatening VT by standard clinical investigations (ECC, Echo, Holter ECG) that allows to select of potential candidates for preventive ICD therapy.

P381
Association between bisphenol A exposure and dilated cardiomyopathy

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1 Low-density lipoprotein receptor-related protein 1

Effects of Bisphenol A (BPA) have became a common environmental chemical released into food or beverage over time, especially under heat and acidic solutions. BPA exposure also occurs in human through inhalation. Studies have suggested potential links between BPA exposure and diseases including cancer, obesity, reproductive disorders, neuroendocrine, immune systems and Cardiovascular system disorders. BPA exposure may be a risk factor for a range of CVS abnormalities as cardiomyopathies and cardiac arrhythmias. Aims: This study aimed to determine serum (BPA) concentrations in patients with dilated cardiomyopathy (DCM) as well as the serum level of estradiol and testosterone compared with a healthy control group.

Materials and Methods: Fifty DCM patients and thirty healthy controls subjects were included. A thorough physical examination, ECG and a complete echo-cardiographic assessment was performed. Serum BPA levels, estradiol and testosterone were measured by using corresponding ELISA Kits. RESULTS: BPA was significantly more detected in the DCM groups than in the normal group (P value = 0.048). Patients with DCM and detected BPA had more significant right side chambers affection (in terms of dimensions and function) and left atrial dilation (P value=0.001 and 0.05 respectively). Atrial fibrillation was significantly detected in the DCM patients than in the normal group (P value = 0.004). Estradiol level was significantly higher in the DCM patients than in the normal group. CONCLUSION: Our findings demonstrated that BPA exposure increased in DCM patients compared with healthy controls, which raise the possibility that BPA exposure might be responsible for some of the cases of dilated cardiomyopathy.

prevalence of BPA in the study groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cases/N=55</th>
<th>Control/N=30</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPA (bisphenol A)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>0.048</td>
</tr>
<tr>
<td>Detected/patient</td>
<td>12 (24%)</td>
<td>2 (6.7%)</td>
<td></td>
</tr>
<tr>
<td>Not incorporated</td>
<td>38 (76%)</td>
<td>28 (93.3%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: *nsVT ≥ 5 PV Es complexes with HR ≥ 150 bpm; **TO ≥ 0% and/or T<5≤2.5 ms/RP; *** mTWA ≥ 25 % test abnormal ≥ 46 mcV
Risk grading of P-values

P083

Women vs. men in takotsubo cardiomyopathy
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On behalf of: SUNSHINE

Introduction: Takotsubo cardiomyopathy (TCM) is a cardiac syndrome characterized by transient left ventricular dysfunction in the absence of coronary artery disease. It usually affects postmenopausal women but it can also affect men. Differences between genders regarding TCM are still not clearly defined.

Aim: To determine the differences between men and women regarding clinical presentation, evolution and complications in TCM.

Methods: We performed a multicentre study involving 12 Portuguese hospitals including every patient diagnosed with TCM in the last 12 years. Clinical, electrocardiographic and echocardiographic data were collected and analysed in order to establish the differences between genders. SPSS 23.0 was used for statistical analysis.

Results: We included 234 patients, 24 men and 210 women (168 were postmenopausal). Physical stressor was mainly observed in men (54.2% vs. 14.3%; p < 0.001) and emotional stressor in women (50% vs. 16.7%, p = 0.002). Symptoms at presentation were also different between genders, being chest pain more prevalent in females (90.5% vs. 58.3%, p < 0.001) and syncope in males (25% vs. 3.3%, p < 0.001). Mean follow-up was 33 ± 33 months. Mortality was significantly higher in men (20.8% vs. 4.8%, p = 0.002) and due to cardiac causes in all men and non-cardiac in women (p = 0.002).

Conclusion: This study showed significant differences between men and women regarding type of precipitating factor, clinical presentation and prognosis of TCM. Men, compared to women, have more commonly a physical stressor, present more often with syncope and less frequently with chest pain and have higher mortality from cardiac causes.

P384

Development of tachycardia is not related to ejection fraction in patients on clozapine with suspected cardiotoxicity
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Introduction: Clozapine is the most effective management for treatment-resistant schizophrenia however, its use is limited due to side effects. Tachycardia is a common side effect, although considered relatively benign but, clozapine-associated myocardiats & cardiomyopathy are associated with significant mortality. Patients on clozapine who develop tachycardia are often referred due to concern of cardiotoxicity. In such patients we assessed the relationship between heart rate (HR) & ejection fraction (LVEF).

Method: Retrospective study of 27 patients on clozapine referred to a cardiology tertiary unit with suspected cardiotoxicity. Echo, ECG & demographic data were analysed by students t test & linear regression analysis.

Results: There was no significant correlation between HR & LVEF, in fact, a higher LVEF was associated with a marginally higher HR (r=0.148 p = 0.058,Fig 1). There was no significant difference in age, gender, length of time on clozapine, QRS or QTc durations between these two groups (Table 1). Clozapine was frequently discontinued in both groups, but earlier in those with reduced LVEF; see table 1. During a follow-up period of 6.1±5 years no patient suffered cardiac mortality.

Discussion: We find that clozapine associated tachycardia is associated with a normal LVEF. We isolated two distinct manifestations of cardiotoxicity related to clozapine: those with tachycardia had normal LVEF & those with reduced LVEF did not exhibit significant tachycardia.

This confirms that the development of tachycardia is not sensitive for cardiomyopathic process but might infer a benign cardiac course to treatment. We suggest that management of these patients should be interdisciplinary with close liaison between cardiologists & psychiatrists to prevent unnecessary cessation of an effective psychiatric medication.

Table 1

<table>
<thead>
<tr>
<th>Clozapine ‘Cardiomyopathy’ group (n = 11)</th>
<th>Clozapine ‘Tachycardia’ group (n = 16)</th>
<th>Clozapine Total group (n = 27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>41 ± 15</td>
<td>44 ± 11</td>
</tr>
<tr>
<td>Gender (% female)</td>
<td>4 (36%)</td>
<td>5 (31%)</td>
</tr>
<tr>
<td>Length of time on drug at review, median (IQR) years</td>
<td>4.9 (4-13)</td>
<td>7.2 (13-10)</td>
</tr>
<tr>
<td>Heart rate Median (IQR) bpm</td>
<td>83 (76-90)</td>
<td>103 (97-115)</td>
</tr>
<tr>
<td>QRS duration Median (IQR) ms</td>
<td>90 (88-98)</td>
<td>90 (85-95)</td>
</tr>
<tr>
<td>QTc interval Median (IQR) ms</td>
<td>431 (416-440)</td>
<td>441 (418-468)</td>
</tr>
<tr>
<td>LVEF Median (IQR) %</td>
<td>45 (37-50)</td>
<td>55 (52-55)</td>
</tr>
<tr>
<td>Clozapine discontinued</td>
<td>8 (73%)</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Time to discontinuation from referral (months)</td>
<td>2 IQR 10</td>
<td>19 IQR 56</td>
</tr>
<tr>
<td>p value</td>
<td>0.016</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1
Using longitudinal strain to identify wild type transthyretin amyloidosis in patients with aortic stenosis

G Robin1; T Cognet1; M Galinar1; O Carine1; M Elbaz1; B Berry2; O Victor2; O Laiere1

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2Toulouse Rangueil University Hospital (CHRU), Nuclear Medicine, Toulouse, France;
3Toulouse Rangueil University Hospital (CHRU), Cardiology and Nuclear Medicine, Toulouse, France

Introduction: Wild-type transthyretin amyloidosis (ATTRwt) and degenerative severe aortic stenosis (AS) are both age-related pathologies with influence on prognosis. Diagnostic of cardiac amyloidosis may be confusing with the consequences of AS on the left ventricle. Our aim was to describe a specific echocardiographic pattern for a better screening of cardiac amyloidosis in patients with severe aortic stenosis (AS).

Methods: Echocardiography with speckle tracking analysis of 65 cases without ATTRwt was compared to 15 cases with AS (moderate/severe = 8/7) and 31 cases with no AS. All patients received 740 MBq of 99mTc-DPD intravenously. Genetic test with transthyretin gene sequencing was indicated in all patients with positive 99mTc-DPD scintigraphy to distinguish hereditary from ATTRwt.

Results: Specific echocardiographic pattern in patients with combined ATTRwt and AS was defined by more pronounced left ventricular hypertrophy (LVM) (p < 0.001), lower global longitudinal strain (GLS) (p < 0.001) and higher proportion of patients with longitudinal apical sparing (LAs) with a ratio > 0.93 (100% in AS and 88% in moderate AS), as a consequence of severe decrease in basal (p < 0.001) and mid (p < 0.001) longitudinal strain. Low-gradient AS despite preserved left ventricular function was observed in 43% of AS with ATTRwt versus 9% in AS without ATTRwt (p < 0.05).

Conclusion: ATTRwt in AS may be suspected in patients with specific echocardiographic pattern combining lower GLS with exacerbated LAs, in presence of LVM and low-flow, low-gradient profile.

Echocardiographic data

<table>
<thead>
<tr>
<th>Parameters</th>
<th>All (n=111)</th>
<th>Severe AS (n=69)</th>
<th>AS/ATTRwt (n=15)</th>
<th>ATTRwt (n=31)</th>
<th>Moderate AS (n=8)</th>
<th>Severe AS (n=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLS</td>
<td>-12.2±4.2</td>
<td>-14.5±3.9</td>
<td>-9.1±2.4</td>
<td>-8.3±2.8</td>
<td>-10.6±3.2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mean basal LS</td>
<td>-6.8±5.2</td>
<td>-8.9±5.6</td>
<td>-3.2±3.1</td>
<td>-2.0±2.5</td>
<td>-5.4±3.9</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mean apical LS</td>
<td>-11.5±4.8</td>
<td>-13.4±5.2</td>
<td>-8.4±2.9</td>
<td>-7.6±2.6</td>
<td>-10±3.4</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>LAS &gt; 0.93 (%)</td>
<td>41 (42.2%)</td>
<td>39 (56.8%)</td>
<td>7 (73.7%)</td>
<td>4 (14.6%)</td>
<td>0 (0%)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

GLS: global longitudinal strain; LS: longitudinal strain; LAs: longitudinal apical sparing; AS: aortic stenosis; ATTRwt: wild type amyloidosis transthyretin.

Results: Central aortic systolic pressure (CASP) was above normal level in both groups (group 1: 125.0± 3.46; group 2: 128.0±3.55; norm 80-120 mmHg) by application tonometry was found in AS group. Capillary pressure was decreased in HCM patients 29.37 cap/mm2 (26.87;31.87). Significant reduction of systemic vascular resistance (SVR) measured by rheocardiography (9.14 - 6.82; p < 0.05) was found in HCM patients. A positive correlation between TIMP-1 level and RI (r=-0.517; p < 0.05), and negative correlation between TIMP-1 level and CD (r=-0.413; p < 0.05) in group 1 was determined. IFP level associated with RI (r=0.517; p < 0.05). A positive correlation between VEGF-A level and IFP (r=0.599; p < 0.05) in group 2 was identified. CASP correlated with TGF level (r=-0.401; p < 0.05).

Conclusion: 1. The tendency for enlargement of large vessels vascular stiffness and capillary remodeling was found in patients with progressive course of HCM. 2. Remodeling of small and large vessels correlates with growth factors.
Introduction: Takotsubo cardiomyopathy (TC) is characterized by a transient left ventricular (LV) dysfunction in the absence of significant coronary artery disease. The predictors of prognosis of TC are not yet fully established.

Purpose: To evaluate and characterize a population of patients with TCM and to identify predictors of outcome in patients (P) diagnosed with TC.

Methods: Multicenter study involving 13 hospitals that included all patients diagnosed with TC in the last 12 years. We assessed demographic data, precipitating factors and clinical presentation, trying to establish the predictors of after discharge outcomes. We define the occurrence of an outcome in the follow-up of TC patients as a variable that combine the occurrence of death, stroke/TIA, acute myocardial infarction (AMI) and TC recurrence.

Results: We included 234 P diagnosed with TC predominantly female (89.7%). During hospitalization occurred complications: heart failure (24.4%), cardiogenic shock (8.8%), atrial fibrillation (9.0%), complete ativoventricular block (2.1%), acute pulmonary edema (4.3%), stroke / TIA (1.7%), LV thrombus (1.3%) and death (2.3%). Over a follow-up of 33 ± 33 months, there were: TC recurrence (4.3%), stroke / TIA (6.9%), AMI (6.4%) and death (6.4%). An outcome in the follow-up occurred in 12.4% of patients.

The following variables were identified by the CHA2D2 score as predictors of complications at follow-up: (1) Presentation without an emotional stress factor (p = 0.019); (2) Presentation with dyspnea (p = 0.048).

Conclusion: TC has a relatively low rate of complications in the follow-up. Presentation without an emotional stress factor or dyspnea are independent predictors of complications in the follow-up of TC patients.

Introduction: Takotsubo Cardiomyopathy (TCM) is increasingly been described as a “stress” cardiomyopathy that can be triggered by physical and emotional factors. A higher prevalence of neuropsychiatric disease has been described in these patients but little is known about their characteristics.

Objectives: To evaluate and characterize a population of patients with TCM and history of psychiatric disease.

Methods: Multicenter retrospective study including 234 patients hospitalized with TCM. Two groups were formed: Group A, with a history of psychiatric disease (n = 17, 7.3%), and Group B, without psychiatric history disease (n = 217, 92.7%). The groups were compared in terms of their demographic characteristics, comorbidities, precipitating factors, clinical presentation, electrocardiographic, echocardiographic changes and in-hospital evolution. Statistical analysis was performed using SPSS version 23.0.

Results: Patients with a history of psychiatric disorder did not present significant differences in gender, comorbidities or postmenopausal status compared to the rest.

These patients do not present more frequently a precipitating factor (47.1% vs 60.4%, p = 0.282), nor factors associated with emotional stress (35.3% vs 47.5%, p = 0.333). The clinical presentation of the patients did not differ between the two groups, with chest pain being the main complaint at presentation (100% vs 86.2%, p = 0.139). Also the characteristics of ECG and echocardiogram did not differ significantly between the 2 groups, including the type of TCM.

During hospitalization, patients with psychiatric conditions did not present a significant difference in the new event rate compared to the rest.

Conclusions: In our study, patients with Takotsubo Cardiomyopathy with a psychiatric history did not present significantly different characteristics when compared with the remaining TCM patients.

The in-hospital prognosis of patients with psychiatric conditions seems to be similar to that of the remaining TCM patients.
Introduction: The amyloidosis cardiac is an entity of great clinical relevance, often underdiagnosed with potentially curable medical treatment, its diagnosis requires a high clinical suspicion and a compatible anatomicopathological sample. Our objective is to describe the etiology of the disease, presentation form, diagnostic methods, therapeutic strategy and follow-up.


Results: We analyzed 10 patients with a mean age of 64 (58-86) years, 5 (50%) were women. The etiology responds in 8 (80%) to primary amyloidosis (LA), 1 (10%) senile, 1 (10%) secondary. The main symptoms were dyspnea in 11 (91.7%), edema in 9 (75%), cachexia in 4 (33.3%), nephropathy in 3 (25%), splenomegaly in 2 (16.7%), pleural effusion in 1 (8.3%), tachycardia in 1 (8.3%), and rectum in 1 (8.3%). Protein electrophoresis was also performed, which was positive in 7 (58.3%) patients, of whom they presented subendocardial late enhancement 6 (50%). Other diagnostic procedures included bone marrow biopsy in 7 (58.3%), abdominal fat in 10 (83.3%), cardiac biopsy in 1 (8.3%) and rectum in 1 (8.3%). Protein electrophoresis was also performed, which was positive in 6 patients (50%). Regarding the treatment, 7 (58.3%) were treated with inhibitors of the angiotensin-converting enzyme, being interrupted in one of them (8.3%) for symptomatic hypotension; Moreover they also received beta-blockers 4 (33.3%), loop diuretics 11 (91.7%), antialdosteronic 4 (33.3%) and thiazide 1 (8.3%). Oral anticoagulant therapy was performed 4 (33.3%). The chemotherapist was, melphalan in 1 patient (8.3%), cyclophosphamide in 2 (16.7%) and therapy by BM 2 (16.7%). Cardiac MRI was performed in 8 (66.7%) patients, of whom they presented subendocardial late enhancement 6 (50%). All patients recovered from TCM and were evaluated at mean follow-up 33 months and overall 33 months ± 33 months. NYHA at admission was III-IV in 2 (16.7%), stage II in 8 (66.7%), stage I in 2 (16.7%). Cardiac MRI was performed in 8 (66.7%) patients, of whom they presented subendocardial late enhancement 6 (50%). Other diagnostic procedures included bone marrow biopsy in 7 (58.3%), abdominal fat in 10 (83.3%), cardiac biopsy in 1 (8.3%) and rectum in 1 (8.3%). Protein electrophoresis was also performed, which was positive in 6 patients (50%). Regarding the treatment, 7 (58.3%) were treated with inhibitors of the angiotensin-converting enzyme, being interrupted in one of them (8.3%) for symptomatic hypotension; Moreover they also received beta-blockers 4 (33.3%), loop diuretics 11 (91.7%), antialdosteronic 4 (33.3%) and thiazide 1 (8.3%). Oral anticoagulant therapy was performed 4 (33.3%). The chemotherapist was, melphalan in 1 patient (8.3%), cyclophosphamide in 2 (16.7%) and therapy by BM 2 (16.7%). Cardiac MRI was performed in 8 (66.7%) patients, of whom they presented subendocardial late enhancement 6 (50%). All patients recovered from TCM and were evaluated at mean follow-up 33 months and overall 33 months ± 33 months. NYHA at admission was III-IV in 2 (16.7%), stage II in 8 (66.7%), stage I in 2 (16.7%). Cardiac MRI was performed in 8 (66.7%) patients, of whom they presented subendocardial late enhancement 6 (50%). All patients recovered from TCM and were evaluated at mean follow-up 33 months and overall 33 months ± 33 months.
Results: Patients were mainly female (57%), with mean age of 34.4 ± 10.3 years and mean disease duration of 4.2 ± 6.4 years. Harvey-Bradshaw index activity showed that 30 patients were in remission. 8 patients had moderate disease activity, and 2 patients had moderate disease activity. 32.5% patients had already been submitted to surgery because of CD complications.

CD patients had significantly lower ejection fraction than controls (58.18 ± 0.66 vs. 65.58 ± 0.82, p < 0.001). Regarding diastolic function parameters: E/A ratio (1.49 ± 0.37 vs. 1.49 ± 0.38; p = 0.982), septal E' velocities (16.65 ± 0.65 vs. 16.76 ± 0.66 cm/s; p = 0.808), and mean E/E' ratio (6.08 ± 0.23 vs. 6.09 ± 0.22; p = 0.993) were normal for age without differences between CD patients and controls. Indexed left atrial volume was significantly higher in patients (23.3 ± 0.7 vs. 19.8 ± 1.1 ml/m²; p = 0.007) although within normal range. E/E' ratio was significantly higher in CD patients than controls (48.0 ± 7.5 vs. 42.4 ± 7.4/cm; p = 0.006). This difference neither correlates with disease activity (p = 0.790) or disease duration (p = 0.999) nor was associated with past complications (p = 0.224), previous surgery (p = 0.106) or medication (p = 0.870).

Conclusion: This is the first study evaluating left ventricular diastolic dysfunction in CD by myocardial deformation imaging. Our study showed that CD, like other systemic inflammatory diseases, results in subclinical left ventricular diastolic dysfunction.

P398 Prognostic Value of Echocardiography in Peripartum Cardiomyopathy - Speckle tracking study

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Normal pregnancy is associated with reversible changes in both systolic and diastolic mechanics, consistent with an increase in preload and decrease in afterload and systemic vascular resistance. The aim of the study is to evaluate left ventricular cardiac mechanics via speckle tracking echocardiography in a population of pregnant women with peripartum cardiomyopathy and prescampsia(PE) after intrafertilization (IVF) during different stages of pregnancy.

The study population included 42 pregnant women with PE, after IVF, 10 of them with multiple pregnancy (46.5 ± 3.3 years) and 20 healthy nonpregnant women (33 ± 4.3 years). Apical and basal short axis and apical view for three, two and four chamber for 2D images were acquired (65 ± 7 frames/s) during the first, second and third trimester of the pregnancy, as well as up to two months post partum. The curves of longitudinal(LS), circumferential(CS), radial strain(GRS) and LVTeLVUR were extracted using a commercial software.

Results: Peak LVU and LVUR increased significantly in the 3rd trimester in both pregnancy groups (13.48 ± 2.90, 13.12 ± 3.30, 18.63 ± 3.61, P < 0.001; and -111.52 ± 23.54%/sec, -107.40 ± 26.58%/sec, -144.30 ± 45.14%/sec, P < 0.001; in the 1st, 2nd, and 3rd trimester, respectively). The pregnant women with twins have the highest LVU and LVUR compared with others (P < 0.01), but in the last trimester, the time to peak LVUR is prolonged. An independent correlation was found between the change in LVU and LV end-systolic volume in 1st and 3rd trimester (P = 0.06). Peak LVU at the 3rd trimester correlated significantly with LV end-diastolic volume. Multiple regression analysis indicates that only systolic blood pressure (r = 0.384, P = 0.025) was an independent predictor for increased LVU torsion. Arterial hypertension (AH) and prevalence of preclampsia (PE) are more often in IVF group. Longitudinal strain decreased significantly (p < 0.001) during 3rd trimester in women with AH and PE. Global longitudinal strain measures of the LV were non-significantly different between the different groups in first and second trimester (GLS-20.6 ± 3.14 vs. -19.29 ± 2.71). There are not found significant differences for GCS and GRS for pregnancy. Conclusions: During pregnancy LV twist and peak-unwistting rate increase in the 3rd trimester and correlate with end-systolic and end-diastolic volume, respectively. Blood pressure and condition of multiple pregnancy are independently associated with increased torsion during pregnancy and may predict the new onset heart failure and perinatal cardiomyopathy. Global longitudinal strain is the main predictor of new onset peripartum cardiomyopathy.

P400 Multimodality non-invasive imaging diagnosis of cardiac amyloidosis

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1University Hospital of Jena, Department of Internal Medicine I, Division of Cardiology, Pneumology, and Intensive Medicine, Jena, Germany; 2University Hospital of Jena, Institute of Medical Statistics, Informatics and Documentation (fMISI), Jena, Germany

Introduction: Colchicine inhibits mitotic processes via interference with formation of microtubule, which eventually also inhibits the activation of immunocompetent cells. Colchicine has been used for the treatment and secondary prevention of pericarditis (PC) and postpericardiotomy syndrome (PPS).

Aim: Meta-analysis of investigations on the clinical effects of colchicine for the treatment and secondary prevention of PC and PPS.

Methods and Results: By systematic literature search pathways, we identified 110 relevant prospective trials, with 1,981 patients (mean age: 57.8 ± 7.3 years; men: 62.5%; mean follow-up: 13.6 ± 91 months). Two studies with n=981 patients (mean age: 57.6 ± 6.7 years) used an open label design, in which the patients were randomized to the respective study group. The remaining eight trials were randomized controlled trials (RCT). The n=1,000 control patients (mean age: 57.9 ± 8.0 years) had a conventional therapy. In the colchicine treated study patients, the daily dose of colchicine was 0.5-1.0 g (depending on tolerance) in n=7 trials, 1.0 g daily in n=2 trials, and 1.5 g daily in one further trial. Colchicine treatment was associated with a significant reduction of a recurrence of pericarditis (OR: 0.33; 95%-CI: 0.25-0.44), and of rehospitalization both for PC and PPS (OR: 0.25; 95%-CI: 0.13-0.49). The rate of gastrointestinal non-invasive imaging effects was not significantly higher in the colchicine treated patients (OR: 2.6; 95%-CI: 1.82-3.72).
P402 Chronic heart failure as a specific form of the arrhythmogenic right ventricle dysplasia/cardiomyopathy and a consequence of associated myocarditis.

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1Sana Kliniken, Luebeck, Germany; 2Nedospudov Center for Cardiovascular Surgery RAMS, Moscow, Russian Federation; 3Roszdrav Medical Rehabilitation Center, Moscow, Russian Federation; 4Russian Research Center of Surgery, Petrovsky, Moscow, Russian Federation

Background: Arrhythmogenic right ventricle dysplasia/cardiomyopathy (ARVD) was described in 1977, however, generally accepted clinical classification of the disease is still missing. Frequency and factors of the development of chronic heart failure (CHF) in various forms of ARVD are not determined.

Purpose: To evaluate the frequency and factors of the development of CHF in three main clinical forms of ARVD and to relate CHF with the presence of associated myocarditis.

Methods: forty seven patients (mean age 38,8 ± 15.9 ± 40.4% males) with ARVD according to Revised Task Force Criteria 2010 (TFC) were evaluated (32 patients with definite, 13-with borderline and 12 with possible diagnosis). All patients underwent ECG, 24-h Holter monitoring, echocardiography, blood tests for detection of anti-heart antibodies and DNA of cardiotropic viruses. Mutations were identified by Sanger sequencing. Also were performed magnetic resonance imaging (MRI, n=40), signal-averaged ECG (n=10), morphological study of the myocardium (endomyocardial biopsy, n=3, and autopsy, n=3).

Results: According to the features of clinical course of ARVD, we identified three diagnostic categories: 1) absence of the disease); 2) structural-functional characteristics; 3) presence/absence of myocarditis; 4) the results of the DNA-diagnostics. Patients with the III form (severe CHF) differed from others patients with higher confidence of diagnosis, significantly larger size of the right ventricle, lower ejection fraction of both ventricles, low voltage ECG but with a lower incidence of SVT. Significant differences in the frequency of detection of mutations have not been detected, however, in patients with the III form are dominated by mutations in DSP gene, which are associated with CHF and left ventricle involvement. The frequency of associated myocarditis in patients with III form was not significantly higher than in patients with manifested arrhythmogenic (61.5% and 30.0%). Probably, in patients with CHF the presence of myocarditis facilitated the manifestation of abnormal genetic program, which resulted in more severe clinical course: congestive CHF, greater requirement in implantable cardioverter defibrillator (53.8 ± 11.8%), presence of lethal outcomes (15.4 % vs 0%).

Conclusion: The patients with possible or definite diagnosis of ARVD with CHF had a different pattern of myocardial involvement than patients without CHF. This may be due to the presence of myocarditis in patients with severe CHF. The frequency of the presence of myocarditis facilitated the manifestation of abnormal genetic program, which resulted in more severe clinical course: congestive CHF, greater requirement in implantable cardioverter defibrillator, presence of lethal outcomes and different course of the disease.

P404 Electrocardiographic changes in takotsubo cardiomyopathy: differences between acute and mid-ventricular involvement

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Background: Takotsubo cardiomyopathy (TTC) is increasingly recognized all over the world. Left ventricular thrombi (LVT) complicating TTC have been reported only sporadically. This study evaluated the incidence and clinical relevance of LVT in patients (pts) of a large TTC registry.

Methods: From 37 hospitals, 324 pts (296 f, 28 m; age 68 ± 12 years) were included according to the following criteria: 1) acute chest symptoms, 2) ischamic ECG changes, 3) reversible LV akinesis not corresponding to a single coronary artery territory, 4) absence of coronary artery stenoses.

Results: Within the first week of symptom onset, 301 pts were studied by echocardiography (echo, n=301) and/or cardiac MRI (n=40). In 8 female pts (incidence 2.7%), LVT was diagnosed between day 1 and day 5. Apical ballooning was present in 7 pts and mid-ventricular ballooning in 1 pt. Multiple mobile thrombi were seen in 3 pts, and in 1 pt spontaneous echo contrast was present within the dyskinetic apex. In 3 of 4 pts studied by both echo and CMRI, LVT were detected only by CMRI. No pt had right ventricular thrombus.

Conclusions: Pts with LVT were significantly older (76 ± 12 vs 67 ± 12 years, p < 0.05). Symptoms, triggering events, time from symptom onset to hospital admission and cardiac markers were not different among both groups. The admission ECG in pts with LVT more frequently displayed negative T-waves (100% vs 66%, p < 0.05), heart rate, ST-segment elevation and Q waves were similar. The QTC was longer (491 ± 67 vs 465 ± 62 ms day 1, 539 ± 87 vs 500 ± 64 ms day 3) and ventricular tachycardia (29% vs 8%, p < 0.05) occurred more frequently in pts with LVT, whereas atrial fibrillation was similar (14% vs 15%). LV ejection fraction (48 ± 21% vs 49 ± 14%) was not different, but right ventricular involvement (65% vs 17%, p < 0.02) and the need for an intraaortic balloon pump (12.5% vs 0.7%, p < 0.001) were significantly more frequent in pts with LVT. Acute medication (AAS, clopidogrel, heparin, beta-blocker, ACE-inhibitor, catecholamines) was similar in both groups. In 2 of 8 pts (25%) LVT were progressing despite thera- peutic doses of heparin, aspirin and clopidogrel. Both suffered a large stroke, 1 pt died.

One additional pt had a stroke on day 2 after TTC onset; echo did not show LVT. CMRI, however, had not been performed.

Conclusion: LV thrombi occur in 2.7% of pts with TTC and a severe clinical course. CMRI is the imaging method of choice as echo underestimates the incidence of LVT. Despite therapeutic anticoagulation, LVT may grow and embolize, resulting in disabling stroke.

COMORBIDITIES

P405 Sequential cyclophosphamide-bortezomib-dexamethasone (CyBorD) unmasks the harmful cardiac effect of dexamethasone in primary (AL) cardiac amyloidosis

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1GRC-Amyloid Research Institute - APHP - INSERM, Créteil, France; 2University Hospital of Limoges, Limoges, France

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On behalf of: GRP Amyloid Research Institute

Funding Acknowledgements: None

Background: Cardiac Amyloidosis (CA) is a rare disease. Therefore, cardiac involvement in systemic light-chain (AL) amyloidosis is more frequent than expected and carries poor prognosis. Chemotherapy combining (at the same time) cyclophosphamide, bortezomib and dexamethasone (CyBorD) is widely used in CA and improves long-term outcome in mid CA. However, chemotherapy might destabilize severe cardiac amyloidosis (CA) particularly during the early phase of administration leading to death. Indeed, 26 of the 67 patients with CA who were treated in our center between 2010 and 2014, died within the first month all in the score III of the Mayo Staging. These disappointing results led to a change in the protocol i.e., escalation-sequence treatment regimen with the hypothesis that the combination of the drugs might increase the cardiac toxicity: Dexamethasone is known induced fluid retention, bortezomib is suspected of direct cardiac toxicity and both drugs might induce an release of free light chain that might increase the amyloid burden.

Methods and Findings: In an attempt to understand the underlying mechanisms, the first nine patients with the new protocol were closely followed. The first cycle of this protocol consisted of three sequences, with weekly successive introduction of low-dose dexamethasone, cyclophosphamide and bortezomib. Serum cardiac biomarkers including NT-proBNP and troponin III as well as free light chains were quantified at time 0, 4h and 24h for each sequence. Kinetic of Serum Bortezomib concentration was also measured at 9, 4h and 24h after administration of this drug. Interestingly, NT-proBNP serum concentrations increased 2-folds at 24h for the mid concentration was also measured at 0, 4h and 24h after administration of this protocol consisted of three sequences, with weekly successive introduction of low-dose dexamethasone, cyclophosphamide and bortezomib. Serum cardiac biomarkers including NT-proBNP and troponin III as well as free light chains were quantified at time 0, 4h and 24h for each sequence. Kinetic of Serum Bortezomib concentration was also measured at 9, 4h and 24h after administration of this drug. Interestingly, NT-proBNP serum concentrations increased 2-folds at 24h for each of the three sequences following Dexamethasone. No significant variation was observed for troponin, light chains and bortezomib concentration and no patient died during the first month.

Conclusions: Corticoids may destabilize the frail heart function of patients with CA most likely through fluid retention. Strategies that limit abrupt exposition to corticoid might reduce the latency period of the amyloid burden.

Table 1 Biological and clinical characteristics

<table>
<thead>
<tr>
<th>Patient</th>
<th>nFLC type</th>
<th>nFLC level</th>
<th>Latex assay</th>
<th>Troponine at diagnosis</th>
<th>NT pro BNP</th>
<th>Mayoclinc score</th>
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<tr>
<td>1</td>
<td>kappa lambda lambda lambda lambda lambda lambda kappa lambda lambda kappa</td>
<td>35</td>
<td>369</td>
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<td>2</td>
<td>kappa lambda lambda lambda lambda lambda lambda lambda kappa</td>
<td>92</td>
<td>27</td>
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</table>

Table 2: Exercise Echo Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline</th>
<th>Peak</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Longitudinal Strain(%)</td>
<td>-21.1 ± 2.7</td>
<td>-16.5 ± 3.8**</td>
<td>-19.5 ± 2.7*</td>
</tr>
<tr>
<td>Strain AP4 (%)</td>
<td>-21.3 ± 2.9</td>
<td>-16.7 ± 2.6**</td>
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<tr>
<td>Strain AP2 (%)</td>
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<tr>
<td>Strain AP3(%)</td>
<td>-20.9 ± 3.3</td>
<td>-17.9 ± 5.1</td>
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</tr>
<tr>
<td>Global Circumferential Strain (%)</td>
<td>-21.9 ± 4.4</td>
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</tr>
<tr>
<td>Strain SAX Base (%)</td>
<td>-19.7 ± 5.0</td>
<td>-17.7 ± 6.8</td>
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<tr>
<td>Strain SAX Mid Wall (%)</td>
<td>-23.4 ± 4.8</td>
<td>-18.0 ± 5.3**</td>
<td>-19.2 ± 3.8**</td>
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<tr>
<td>LV Diastole (cm)</td>
<td>5.0 ± 0.5</td>
<td>4.5 ± 1.3</td>
<td>4.7 ± 0.5**</td>
</tr>
<tr>
<td>LV Volume diastole mL (2D Biplane Simpson)</td>
<td>95.9 ± 22.9</td>
<td>79.0 ± 19.5*</td>
<td>82.1 ± 20.4*</td>
</tr>
<tr>
<td>LVEF % (2D Biplane Simpson)</td>
<td>64.3 ± 7.0</td>
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<td>64.6 ± 6.2</td>
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<tr>
<td>LVEF (ID)</td>
<td>50.0 ± 7.1</td>
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<tr>
<td>RVS( cm/s)</td>
<td>12.6 ± 1.6</td>
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#p < 0.05 *p < 0.01 **p < 0.001 : significance when compared to baseline values.

P406
Detection of cardiac dysfunction in asymptomatic cancer survivors with exercise strain echocardiography

K Katlyn Lam1; F Leé2; T Long1; L Nayloe3
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Background: Cardiac dysfunction can have a latency period when patients are asymptomatic for several years after the completion of cancer therapy. Abnormalities may not be detected until the process is advanced & costly therapy is required.

Purpose: The purpose of this study was to use stress echo to detect pre-clinical stages of cardiac disease in young adult survivors of childhood cancer.

Method: 15 asymptomatic survivors of ALL had exercise Vo2 /stress echocardiography. Echo images obtained assessed chamber size & biventricular function by 2D, 3D imaging, 2D speckled strain analysis & Doppler assessment.

Results: 10 Males, 5 Females with mean age 18.8 ± 3 years. The mean VO2max/9.4 ± 12.4. The stress-echoes showed significant reductions in cardiac strain at peak exercise & recovery. When compared to baseline values, global longitudinal strain reduced by 21.8% & 7.6%, global circumferential strain by 16.5% & 10.5% at peak exercise & recovery respectively.

Conclusion: Exercise stress strain echocardiography can detect early cardiotoxicity in asymptomatic cancer patients.

Exercise Echo Parameters

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P407
Echocardiography parameters as predictors of left ventricular ejection fraction reduction in cancer patients

M Laufer Perl1; A Milewski1; B Sadah1; D Raviv1; N Amram1; G Keren1; Y Topilsky1; Y Arbel1
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Background: Advances in treatment have led to improved survival of cancer patients, but with the price of increased morbidity and mortality, mainly due to cardiac causes. Echocardiography is the method of choice for the detection of myocardial dysfunction during and after cancer therapy. Early identification of Left Ventricular (LV) Dysfunction may prevent the development of Heart Failure. Currently, diastolic parameters are known to be common among cancer patients, but have not been found to be prognostic for Left Ventricular Ejection Fraction (LVEF) reduction. Objectives: To evaluate Echocardiography parameters as predictors of LVEF reduc- tion (defined as EF reduction ≥5%) in cancer patients with normal baseline LV function. Methods: A retrospective, single-center observational study that included 82 consecutive patients evaluated in the Cardio-oncology clinic from January 2015

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to September 2016. Clinical and echocardiographic variables were evaluated for all patients. All patients performed at least two echocardiography exams and excluded were patients with reduced LV function (fraction <65%) at baseline.

Results: Among 82 consecutive patients, 18 patients (21%) developed LVEF reduction. Several echocardiography parameters were found to be a significantly predictors of LVEF reduction, including larger LV end diastolic diameter (LVEDD) (49 ± 5 mm vs 46 ± 5 mm, p < 0.002), lower e’ septal (6.1 ± 2.2 cm/s vs 7.7 ± 2.4 cm/s, p = 0.019), lower e’ lateral (8.2 ± 2.5 cm/s vs 10.1 ± 2.7 cm/s, p = 0.015), higher E/e’ septal (13.8 ± 6.6 cm/s vs 11 ± 5.3 cm/s, p = 0.046). However, E/A and deceleration time were not predictive of deterioration in EF (p = 0.520, 0.627).

Conclusions: Early identification of cardiac dysfunction is essential for the prevention of symptomatic heart failure. Our study demonstrates that parameters associated with depressed diastolic function, and larger LV size may identify early cardiac dysfunction which may lead for early cardioprotective treatment and prevention of irreversible LV reduction and heart failure.

P408
Characterization of the clinical and echocardiographic profile of a population of women with breast cancer.

J. juvenile1; B. B. P. Garcia1; A. Bernardino2; C. Tatoa; D. Bras3; J. Carvalh1; K. Cong1; A. Santos2; R. Matos1; C. Cruz1; J. Aguiar1
1Hospital Espirito Santo de Evora, Evora, Portugal
2Hospital Espirito Santo de Evora, Department of Cardiology, Evora, Portugal
3Hospital Espirito Santo de Evora, Evora, Portugal

Introduction: Cancer patients are treated with several therapies with potential harmful cardiovascular effects. Carrying out appropriate cardiovascular therapy to the clinical profile of these patients may minimize the risk of such cardiotoxicity.

Purpose: To characterize the clinical and echocardiographic profile of a population of women with breast cancer.

Methods: In a 2-year period, all women with breast cancer who underwent an echocardiogram in our echocardiography laboratory were evaluated. All women had started some type of oncologic therapy (chemotherapy or radiotherapy). Cardiovascular risk factors, echocardiographic data and type of chemotherapy and/or radiotherapy were recorded.

Results: The study included 116 women, with a mean age of 60.5 ± 13.0 years. 99% of these women underwent chemotherapy and 70% were submitted to radiotherapy. Cardiovascular risk factors were: hypertension - 34.7%, Diabetes Mellitus - 20.8%, dyslipidemia 30.7%, smoking - 7.9%, smoking habits in the past - 5%, and coronary disease - 3%. The echocardiographic evaluation revealed that the great majority of the women had good left ventricular function (93.3%) and that only 1.9% had moderate or severe left ventricular function depression. In 58.7% of the women, minor valve disease were reported, but in only 8.2% of these patients the disease were moderate or severe. The presence of pericardial effusion was found in 4.8% of the women, and in all cases the effusion was slight.

Conclusions: In our population of women with breast cancer there was a low prevalence of cardiovascular risk factors. Most of these patients have good left ventricular function, with no significant valve disease.

P409
Basal renal function and its evolution in patients admitted for decompensated heart failure.

L. Secodi; SM Mettini1; F. Jaffé1; J. Zubiri1; DA Fernandez2; L. Lapadula2; C. Cejas1; G. Sunya1; MG Masullo1; SM Pereiro Gonzalez1
1Hospital Center Churruca-Vilaca, Buenos Aires, Argentina

Background: The worsening of renal function (RF) is very common in patients hospitalized because of decompensated heart failure, it is associated with high prevalence of events on the follow up.

Methods: It is a prospective analysis of 474 patients (p) admitted for decompensated heart failure, consecutively, in our Cardiology Department, from June 2012 to November 2016, with a median follow up of 26 months (Q1 13 – Q3 33). We divided groups (G): G1 with basal normal RF (n 236) and G2 (n 2012) to November 2016, with a median follow up of 26 months (Q1 13 – Q3 33). We divided two groups (G): G1 with basal normal RF (n 236) and G2 (n 226) with basal abnormal RF. We defined normal RF those with serum creatinine levels < 1.3 mg/dL and creatinine clearance > 60 mL/min/1.73m2; those which lower clearance and/or higher creatinine serum levels were classified as abnormal basal RF. We also classified as worsening renal function, those with increased serum creatinine greater than 0.3 mg/dL and/or decrease in creatinine clearance > 10 mL/min/1.73m2. Quantitative variables with normal distribution were expressed with mean and with standard deviation (analyzed by test Fisher’s Test); those with not normal distribution, were expressed with median (m) and quartiles (analyzed by Mann Whitney’s Test). Dichotomous variables were analyzed by Chi².

Results: We observed that G1 had more worsening RF that G2, with differences statistically significant (DSS) (p < 0.0000, G1 57.2% vs G2 36.7%-table 1), we analyzed the median of maximum furosemide dose and it was 80 mg/day, for both, without DSS. Hospital mortality was higher for those in G2 with DSS (p = 0.0421, G1 3% vs G2 7.1%) as the amount of p older than 75 years old (p = 0.0005, G1 46.2% vs G2 62.4%). There were no differences in the rehospitalization, follow-up mortality, combination of both, or if they had ejection fraction higher than 50%.

Conclusions: The cardiac remodel syndrome was present in the older patients and had more hospital mortality (DSS). There were no differences between groups in rehospitalizations or mortality in the follow-up. Nevertheless, we observed, that those with better renal function worsen it, despite not having differences in the doses of furosemide. Our next step is analyze it.

Table 1

<table>
<thead>
<tr>
<th>Basal RF (%)</th>
<th>Worsening RF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal 51.1% (236)</td>
<td>57.2% p = 0.0000 OR 0.43IC 95% 0.29-0.63</td>
</tr>
<tr>
<td>Abnormal 48.9% (226)</td>
<td>38.7%</td>
</tr>
</tbody>
</table>

P410
Prevalence and prognostic value of comorbidities in patients with decompensated heart failure and acute kidney injury

A. Klimenko1; S. Vilevalde1; Z. KobaIva1
1RUDN University, Moscow, Russian Federation

Background: Patients admitted with acute decompensated heart failure (ADHF) often have multiple concomitant diseases that complicate management and may adversely affect outcomes. Up to 70% of ADHF patients had at least 1 noncardiac comorbidity (CoM), of which the most common are chronic kidney disease (CKD), anemia, diabetes mellitus (DM) and chronic obstructive pulmonary disease (COPD).

Purpose: The aim of the study was to determine the prevalence of CoM in ADHF patients depending on the presence of acute kidney injury (AKI) and to evaluate the impact on short-term (30-days mortality) and long-term (6 months rate of ADHF rehospitalizations) outcomes.

Methods: In 183 patients admitted with ADHF (125 male, 68.9 ± 9 years (M ± SD), arterial hypertension 87.6%, ischemic heart disease 56%, myocardial infarction 53%, atrial fibrillation 51%, DM 36%, known CKD 40%, COPD 29%, anemia 20%, ejection fraction 44 ± 15) the prevalence of AKI and main CoM was assessed. AKI was defined using 2012 KDIGO Guidelines. Mann-Whitney and multiple logistic regression analysis were performed. P < 0.05 was considered statistically significant.

Results: Patients with AKI versus patients without AKI had higher rates of DM (40 vs 26%, < 0.05) and anemia (33 vs 11%, p < 0.001), 41% of patients developed AKI and 79% of them had at least 1 CoM and 5% pts all 4 of them. AKI in patients with COPD versus without COPD was transient (76 vs 49%, p < 0.05), had higher rate of long-term outcomes (71 vs 41%, p < 0.05) and there was tendency to more frequent community-acquired (presenting on admission) AKI (76 vs 50%, p = 0.05). There was not found any difference in prognosis between anemic and non-anemic pts. AKI in DM patients versus AKI without DM was persistent (87 vs 18%, < 0.001), had higher risk of 30-days mortality (30 vs 9%, p < 0.05) and tendency to higher 6 months rate of ADHF rehospitalizations (53 vs 44%, p = 0.06). Development of AKI in the presence of CKD versus AKI de novo less often was transient (45 vs 71%, p < 0.01), had lower risk of 30-days mortality (11 vs 29%, p < 0.05) and higher 6 months rate of ADHF rehospitalizations (60 vs 29%, p < 0.01). Evaluation the impact of CoM on outcomes demonstrated the increasing risk of long-term outcomes in parallel with the increasing number of CoM (1 CoM 44%, 2 vs 50%, 3 vs 76%, 4 vs 100%, p < 0.05).

Conclusions: 79% of ADHF patients with AKI had at least 1 main comorbidity. The presence of comorbidities is the independent risk factor for adverse short- and long-term outcomes in ADHF patients with AKI.

P411
Prognostic impact of renal dysfunction in the patients with acute heart failure E. Mezhontsev1; Y. Yavinal1; S. Shalaev1
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Background: Renal disease as a target organ is often found in patients with cardiovascular disease patients. The question of influence on the state of renal function during acute heart failure (AHF), as well as the extent to which these disorders
Cardiovascular morbidity and mortality in patients with AHF. Wherein in patients without AKI – 11.8% (p=0.027). Development AKI associated with an increase of the frequency of the primary endpoint in 6 times (OR 95% 5.946 (1.236-28.611), p=0.007) and the risk of death from cardiovascular causes of 5 times (OR 95% 3.529 (1.219-10.208), p=0.027). Reduced GFR of less than 45 ml/min increases the risk of death from cardiovascular causes of 5 times (OR 95% 3.529 (1.732-16.214), p=0.003). The presence of MA over 300 mg/l increases the risk of the primary endpoint in 8 times (OR 95% 5.468 (1.236-28.611), p=0.026). Development AKI associated with an increase of the frequency of the primary endpoint as compared to patients without AKI, 85.7% and 41.7% respectively (p=0.003). The frequency of death in patients with AKI also increased to 57.1%, whereas in patients without AKI – 11.8% (p<0.001). The AKI increases the risk of the primary endpoint in 8 times (OR 95% 8.377 (1.8-38.996), p=0.007) and the risk of death from cardiovascular causes of 10 times (OR 95% 9.956 (3.035-32.632), p<0.001). Conclusion: Reduced GFR and MA is important predictors of cardiovascular morbidity and mortality in patients with AHF.

P414
Nonalcoholic fatty liver disease and increased risk of 1-year all-cause and cardiac hospital readmissions in elderly patients admitted for acute heart failure
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Background: Nonalcoholic fatty liver disease (NAFLD) is an emerging risk factor for heart failure (HF). The rates of hospital readmissions and the related costs continue to rise dramatically. The aim of this study was to investigate whether NAFLD diagnosed at hospital admission was independently associated with 1-year all-cause and cardiac re-hospitalizations in patients admitted for acute HF (AHF).

Methods: We studied 212 elderly patients who were consecutively admitted with AHF to our hospital over a 1-year period. NAFLD was diagnosed by ultrasonography. Patients with known acute myocardial infarction, severe valvular heart diseases, endstage renal disease, cancer, known liver diseases or decompensated cirrhosis were excluded. Cox regression was used to estimate hazard ratios (HR) for the associations between NAFLD and the outcomes of interest.

Results: The cumulative rate of 1-year all-cause re-hospitalizations was 46.7% (n=98). Patients with NAFLD (n=109; 51.4%) had remarkably higher 1-year all-cause and cardiac re-hospitalization rates compared with their counterparts without NAFLD. NAFLD was associated with an approximately 5-fold increased risk of 1-year all-cause re-hospitalization (adjusted HR 5.26, 95% CI 3.03-9.08, p<0.0001) after adjustment for established risk factors and potential confounders. Similar results were found for 1-year cardiac re-hospitalization (adjusted HR 8.33, 95% CI 3.98-16.7, p<0.0001).

Conclusions: NAFLD was independently associated with increased risk of 1-year all-cause and cardiac re-hospitalization in elderly patients admitted with AHF.
Objective: Over the last several years different mechanisms of cardiohepatic syndrome (CHS) in decompensated heart failure (DHF) have been discussed. The purpose of the study was to assess the prevalence and associations of different phenotypes of CHS in patients with DHF.

Methods: In 322 patients with DHF (190 male, 69.5 ± 13.7 years) the prevalence of mixed CHS was 66.8%. Conclusions: Mixed phenotype of cardiohepatic syndrome is common and associated with higher all-cause and cardiovascular 1-year mortality and hospitalization rates in patients with DHF. Mann-Whitney test was performed, p < 0.05. Significant differences were found for the following parameters: mean replacement procedure time was 25 ± 17 vs 0 ± 17, p < 0.05, and time spent with oxygen saturation of < 90% from 8 ± 4/h to 9 ± 4/h, p < 0.05). Patients with mixed vs cholestatic CHS had higher NT-proBNP level (9200 ± 7985 vs 7122 ± 6572 pg/ml, p < 0.05), incidence of EF < 35% (47 ± 36%, p < 0.05), severe mitral regurgitation (51 vs 31%, p < 0.01), vasopressor therapy (11 and 4%, p < 0.05), lower systolic blood pressure (SBP) (132 ± 17 vs 144 ± 21 mmHg, p < 0.001) and pulse BP (51 ± 14 vs 60 ± 15 mmHg, p < 0.001) on admission. No significant differences in signs of congestion were observed between groups. Mixed CHS was associated with higher all-cause death in 6 months (30 vs 23%, p < 0.05).

Conclusions: The prevalence of mixed CHS in patients with DHF was 66.8%. Patients with mixed vs cholestatic CHS had higher LFT and NT-proBNP levels, incidence of LFT increase, severe mitral regurgitation, EF < 35%, vasopressor therapy, lower SBP and pulse BP on admission and had worse prognosis.

P415 Mixed phenotype of cardiomyopathic syndrome is common and associated with worse prognosis in patients with decompensated heart failure

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Purpose: To assess the dynamic changes in liver stiffness measurements (LSM) and direct fibrosis markers in patients hospitalized with acute decompensated heart failure (ADHF) receiving standard heart failure therapy according to the international guidelines.

Methods: 35 patients [female, median age 58 (IQR 47-68) years, NYHA class II-IV] with ADHF were included. Transient elastometry measurements (FibroScan®) and direct markers of fibrosis were analyzed at baseline and discharge from hospital. The median duration of hospitalization was 14 days. Serum concentration of direct markers of fibrosis was determined by means of immunosassay.

Results: Heart failure therapy resulted in the reduction of signs of congestion [weight loss 5.5 (4.0-7.0) kg], there was a significant decrease in LSM (26.3 ± 19.8 kPa; p < 0.0001) and AP (18 vs 11%, p < 0.0001). In patients with mixed vs cholestatic CHS, higher LFT and NT-proBNP levels, incidence of LFT increase, severe mitral regurgitation, EF < 35%, vasopressor therapy, lower SBP and pulse BP on admission and had worse prognosis.

Conclusion: Increased LSM in patients with ADHF is not explained by fibrosis alone, and tends to be overestimated due to the presence of congestion. The application of transient elastometry for assessment of fibrosis in patients with ADHF is limited.
stable lead positions in a long-term setting were documented and no major complications occurred. In addition, clinical exercise capacity and sleepiness symptoms improved.

Conclusions: The novel remed® device shows a sustained therapy efficacy and safety in terms of stable lead positions over four years. Long-term phrenic nerve neurostimulation therapy for central SDB/CSSR in HF appears feasible in a clinical routine setting to improve HF symptoms.

P418 Sleep disorders and quality of life in patients with heart failure

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Introduction: Population aging dynamics contribute to increasing numbers of elderly individuals, including heart failure (HF) patients. Age is a risk factor for a multitude of diseases, including cardiovascular disorders, as well as a factor affecting sleep quality and quantity. Patients with HF commonly experience poor sleep quality, which reduces both total sleep quantity and sleep effectiveness, and decreases daytime alertness, sleep depth, and sleep latency. Sleep disorders typically affect sleep quality and quantity. Patients with HF commonly experience poor sleep quality, which reduces both total sleep quantity and sleep effectiveness, and decreases daytime alertness, sleep depth, and sleep latency.

Purpose: To analyze correlations between sleep disorders and quality of life in HF.

Material and methods: The study included 100 patients (40 female and 60 male, mean age: 68.69 ± 14.27 years) hospitalized in a Cardiology Ward. Material was collected using a socio-demographic questionnaire, the patients’ clinical data, and standardized research instruments: the Epworth Sleepiness Scale, the Minnesota Living with Heart Failure (MLHF) questionnaire specifically evaluating quality of life and sleep disorder questionnaires (Euro-PEAQ, JHPSQ, and the Sleep Assessment Questionnaire). The study was performed after heart failure treatment according to local practice. Sleep studies were performed to evaluate the sleep apnea index, %CSR, baseline or nadir SpO2, %time SpO2 < 90%.

Results: Sleep disorders indicated by the Epworth scale were observed in 65% of patients, with a mean score of 16.2 ± 0.1. The majority of patients also reported sleep difficulties (75%), with a mean score of 12.1 ± 0.1. The MLHF questionnaire showed that, compared to the control group, patients had significantly lower HRQoL (p = 0.003) and more fatigue (p = 0.001). A significant correlation was found between sleep disorders and the MHQoL questionnaire (p = 0.001) and the MLHF questionnaire (p = 0.015).

Conclusion: Sleep disorders adversely affect quality of life in heart failure patients. The increased use of dexamethasone and dexamethasone contributes to sleep disorders in HF patients. Sleep disorders in HF patients are correlated with higher NYHA class, lower LVEF, and higher proBNP levels.

P419 Sleep apnea in peri-partum cardiomyopathy patients admitted in acute heart failure: a longitudinal study in Mozambique

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Introduction: Sleep apnea in peri-partum cardiomyopathy is common in patients admitted in acute heart failure in a cardiology service in Mozambique despite being younger and leaner than the ones usually studied in other series. Moreover, longitudinal follow-up also show that sleep apnea improved in some treated and compensated patients but not in all.

Purpose: To identify possible predictors of their appearance.

Material and methods: The study included 100 patients admitted to an Intensive Cardiac Care Unit (ICCU) and to identify possible predictors of their appearance. Patients with heart failure (HF) usually had multiple comorbidities and much less in peri-partum cardiomyopathy. We reported previously that sleep apnea was common in patients admitted with acute heart failure in a cardiology service in Mozambique despite being younger and leaner than the ones usually studied in other series. Moreover, longitudinal follow-up also show that sleep apnea improved in some treated and compensated patients but not in all.

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Conclusion: Sleep apnea is similarly severe in acutely decompensated heart failure patients with peri-partum cardiomyopathy compared to other aetologies, despite younger age, female gender, and differences in echocardiographic measures. Although the sample size is small, we found no differences in the improvement of sleep apnoea in peripartum patients compared with the whole group.

P420 Identification of cognitive impairment and delirium in patients with decompensated heart failure

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Introduction: Peripartum cardiomyopathy is common in Sub-Saharan Africa and occurs more frequently in pregnant women than in non-pregnant women. There are very few studies on sleep apnoea in Sub-Saharan Africa and other series. Moreover, longitudinal follow-up also showed that sleep apnoea improved in some treated and compensated patients but not in all.

Background: Delirium is common in older hospitalized patients and associated with morbidity and mortality. The majority of patients admitted with acute decompensated heart failure (ADHF) are older but there has been limited study of delirium in this group. The local target is to perform cognitive screening in all older unchallenged admissions and implement delirium prevention/management in all at risk. The present study aimed to benchmark cognitive screening of in-patients with ADHF and identify patients with delirium.

Methods: Patients admitted to a cardiac ward with ADHF were screened over 5 weeks. The ward admits unselected adults with cardiovascular pathologies not requiring level 2 care. Cases were identified by case-report review. Preferred cognitive screens in our centre are the 4 point Abbreviated Mental Test (AMT) and 4AT for delirium. The Think, Investigate, Manage, Explore (TIME) bundle is used to initiate delirium prevention/management. We recorded any completed cognitive assessment. We then assessed ADHF patients using the 4AT, 10 point AMT and an informant questionnaire for cognitive impairment.

Results: We identified 43 patients, mean age 78.7 years (range 52–90). Two patients refused to participate, 1 was terminally ill. Of 40 patients assessed, AMT4 and 4AT were completed by ward staff in 85% and 45% respectively. The TIME bundle was initiated in 42.5% of patients, none fully completed. Four patients had an established diagnosis of cognitive impairment. Following our assessment, a further 11 patients were identified as having cognitive impairment, 8 of these had not been identified by the treating team. Eight patients (20%) screened positive for delirium of whom 5 were assessed as also having likely underlying cognitive impairment.

Conclusion: Cognitive impairment, in particular delirium, is common in patients hospitalized with ADHF; but recommended screening and management bundles are infrequently completed. This has important implications for the training of healthcare professionals around recognition and management of these conditions.

P421 Heart failure and cardiogenic shock are the predisposing factors for nosocomial infections in an intensive cardiac care unit.

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Introduction: Heart failure (HF) usually had multiple comorbidities and could be more susceptible to nosocomial infections. Currently, there is a lack of information regarding its prevalence and prognostic impact of nosocomial infections in patients admitted to an Intensive Care Cardiac Care Unit (ICCU).

Purpose: To determine the prevalence of nosocomial infections in patients hospitalized in an ICCU and to identify possible predictors of their appearance.

Methods: Prospective study, which included all patients consecutively admitted to the ICCU within 4 years. We considered 2 groups: Group 1 – patients who developed nosocomial infections and Group 2 – patients who did not develop nosocomial infections. We registered demographic data, patient’s provenience (emergency department ED, other general intensive care units ICU, outpatient clinic or other hospitals), diagnosis duration of hospitalization and destination of the patient (cardiology ward, ambulance or death).

Results: From a total of 1633 patients admitted to the ICCU, 150 patients (9.1%) developed nosocomial infections, of these 40.0% were respiratory, 26.7% urinary, 16.0% had fever without an identified infectious focus, 14.0% were septicemia

Funding Acknowledgements: Resmed grant

Background: There are very few studies on sleep apnea in Sub-Saharan Africa and much less in peri-partum cardiomyopathy. We reported previously that sleep apnea was common in patients admitted with acute heart failure in a cardiology service in Mozambique despite being younger and leaner than the ones usually studied in other series. Moreover, longitudinal follow-up also show that sleep apnea improved in some treated and compensated patients but not in all.

Purpose: To identify possible predictors of their appearance.

Material and methods: The study included 100 patients admitted to an Intensive Cardiac Care Unit (ICCU) and to identify possible predictors of their appearance. Patients with heart failure (HF) usually had multiple comorbidities and much less in peri-partum cardiomyopathy. We reported previously that sleep apnea was common in patients admitted with acute heart failure in a cardiology service in Mozambique despite being younger and leaner than the ones usually studied in other series. Moreover, longitudinal follow-up also show that sleep apnea improved in some treated and compensated patients but not in all.

Results: Sleep disorders indicated by the Epworth scale were observed in 65% of patients, with a mean score of 16.2 ± 0.1. The majority of patients also reported sleep difficulties (75%), with a mean score of 12.1 ± 0.1. The MLHF questionnaire showed that, compared to the control group, patients had significantly lower HRQoL (p = 0.003) and more fatigue (p = 0.001). A significant correlation was found between sleep disorders and the MHQoL questionnaire (p = 0.001) and the MLHF questionnaire (p = 0.015).

Conclusion: Sleep apnea is similarly severe in acutely decompensated heart failure patients with peri-partum cardiomyopathy compared to other aetologies, despite younger age, female gender, and differences in echocardiographic measures. Although the sample size is small, we found no differences in the improvement of sleep apnoea in peripartum patients compared with the whole group.

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and septic shock, and 3.3% had infection of another etiology. These patients were older (72.4 ± 11.8 vs 67.7 ± 14.2 years, p = 0.001), with no differences between genders. The main diagnosis of admission was acute coronary syndrome in both groups (Group 1: 53.3% vs 52.8%, p = ns); however, Group 1 patients were more frequently admitted for uncomplicated heart failure (16.7% vs 6.4%, p = 0.001) and cardiac shock (9.6% vs 6.6%, p = 0.001), with no differences in the nosological groups of arrhythmias, valvular heart disease or disease of the myocardium or pericardium. The majority of patients in both groups were admitted from the ED (Group 1: 56.0% vs 57.9%, p = ns); however, Group 1 patients were more frequently admitted from general ICU (17.3% vs 8.8%, p = 0.002), and less frequently from the outpatient clinic (2.7% vs 7.7%, p = 0.014, p = 0.006). Patients with nosocomial infection had longer hospitalizations (6.8 ± 5.2 vs 3.0 ± 2.0 days, p = 0.001), higher mortality (9.3% vs 3.1%, p = 0.001), and lower direct ambulatory discharges (4.7% vs 15.8%, p < 0.001).

Conclusions: Nosocomial infections are frequent, being presented 9.1% of patients hospitalized in our ICU and were associated with a 2.3-fold increase in days of hospitalization and 3-fold increase in mortality. Heart failure and cardiogenic shock seems to be predisposing factors for its appearance.

P424

Impact of chronic obstructive pulmonary disease on left ventricular geometry
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Background: Left ventricular hypertrophy (LVH) represents significant risk factor for cardiovascular mortality. LVH impairs myocardial relaxation and causes diastolic dysfunction which may lead to heart failure (HF). The prevalence of HF especially HF with preserved ejection fraction (HFpEF) in chronic obstructive pulmonary disease (COPD) patients is high but often underdiagnosed and undertherated. The aim of our study was to assess left ventricular geometry in COPD patients with no previous history of cardiovascular (CVS) diseases.

Methods: We performed a prospective cohort study of 120 male patients with stable previously diagnosed COPD. All patients underwent spirometry and thoracic echocardiography. LVH was defined as left ventricular mass index (LVMi) of > 115 g/m2. Exclusion criteria were previously diagnosed CVD including arterial hypertension.

Results: The mean value of forced expiratory volume in one second (FEV1) was 54.7 ± 27.9 of the predicted value. The mean LVMi index (LVM) was 103.4 ± 27.3 g/m2. The prevalence of LVH was 37.2% in COPD patients, 25.2% had concentric LVH and 12% had eccentric LVH. There was a positive linear correlation between left atrial volume (LAV) and LVM (r = 0.32, p = 0.004). The overall prevalence of HFpEF was 23.3% in COPD patients.

Conclusion: The frequency of LVH as an early sign of left ventricular remodeling is high in COPD patients with no history of CVD and HFpEF is present in majority of those patients.

P423

Comparison of sleep quality disturbances between patients with chronic heart failure and cancer patients
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Background: Severe chronic diseases including heart failure (HF) and cancer are frequently associated with sleep quality disturbances. However, differences in the severity and individual components of such disturbances between different diseases are not known.

Aim: To compare severity and individual components of sleep quality disturbances between patients with HF and cancer.

Methods: One hundred patients hospitalized for HF (assessed at pre-discharge) and 100 cancer patients were included in the study. Sleep quality was assessed by Athens Insomnia Scale (AIS), a self-administered questionnaire that includes 8 items, 5 of which assess night sleep features and 3 assess daytime functional impairment due to insomnia. Each item has 4 possible answers, graded 0-3, higher rating denoting worse sleep quality.

Results: HF patients were 80% males, of age (mean ± SD) 72.2 ± 12 years, while cancer patients were 35% males, aged 61 ± 11 years. HF patients had higher scores in all individual components of night sleep quality and associated daytime functioning compared to cancer patients, including (mean ± SD): sleep induction (2.91 ± 1.02 vs 2.9 ± 0.98, p < 0.001), awakenings during the night (3.26 ± 0.836 vs 2.52 ± 0.904, p < 0.001), final awakening (2.20 ± 1.27 vs 1.63 ± 1.04, p < 0.001), total sleep duration (2.81 ± 1.12 vs 1.71 ± 0.945, p < 0.001), sleep quality (2.67 ± 1.11 vs 1.80 ± 0.921, p < 0.001), and well-being (2.73 ± 0.611 vs 1.95 ± 0.833, p < 0.021). Functioning capacity (2.73 ± 0.862 vs 1.95 ± 0.821, p < 0.001) and sleepiness during the day (2.50 ± 0.969 vs 1.92 ± 0.917, p < 0.001).

Conclusion: Nighttime sleep quality and associated daytime functioning is worse in patients with HF as compared to cancer patients.
21.4% patients were transferred for early surgery due to conventional antibiotic treatment failure. The perioperative death rate was 23%. At the end of antibiotic treatment, cure of all studied patients, survival was 90.4% with a total duration of antibiotic therapy (AT) of 33.55 ± 12.8 days. Early valve surgery was determined by perivalvular extension of infection (p < 0.001), prostheses dysfunction (p < 0.0003), embolism (p < 0.07), persisting fever (p = 0.03). Factors strongly related to mortality overall at EoSF were age (p = 0.04), diabetes (p = 0.016), coexistence of ischemic heart disease (p = 0.07), prior heart failure (p = 0.37), ischemic left ventricular (LV) systolic dysfunction (p = 0.0002), hemodynamic instability (p = 0.04), persisting fever (p = 0.06), anemia (p = 0.001). We found at long-term follow up a reduced survival in remaining patient, only 44% (53.4% early PVE, 35% late PVE). Factors related to long-term mortality: advanced age (p = 0.0009), diabetes (p = 0.038), mid range LV ejection fraction 40% ≤ EF < 50% (p = 0.038) and staphylococcus infection (p = 0.055), NYHA class at baseline does not influence outcome statistically significantly.

Conclusion: Venous thromboembolism is one of the consequences of heart failure and also impacts mortality and quality of life. However, the previous studies of VTE in heart failure in Thailand were small and the data was limited. The objective of the study was to evaluate the prevalence of VTE and risk factors in acute heart failure patients in Thailand.

Methods: The prospective cohort study was conducted from December 2015 to July 2016 in Ramathibodi hospital, Mahidol university, Thailand. The patients who were hospitalized due to acute heart failure were enrolled and screened for deep vein thrombosis (DVT) by Doppler ultrasonography during 5 days and computed tomography angiography (CTA) if clinical suspected pulmonary embolism. Multiple logistic regression was performed to identify risk factors of VTE.

Results: 80 patients were enrolled in the study, 41 were male (51.3%), mean age was 73 years old, mean BMI was 22.4 kg/m2, primary etiology of heart failure were ischemic (57.5%) and hypertensive cardiomyopathy (26%), mean NT pro-BNP was 6637 pg/mL, mean D-dimer was 1139 ng/mL, mean EF was 92%. Among 80 patients, 36 patients (45%) had history of prior heart failure, 4 patients (5%) had history of prior VTE and 7 patients (8.8%) had history of cancer: The prevalence of VTE was 15% (8 patients). Multiple logistic regression showed history of prior VTE as an independent risk of VTE in our population (OR 71.795 (95% CI 4.16:1328.679, P value 0.003).

Conclusion: In Thailand, the prevalence of VTE in hospitalized heart failure patients is 10%. The history of prior VTE increases risk factor of VTE in hospitalized heart failure.
**P429**

Depressive disorders and peculiarities of cardiohemodynamics in patients with chronic heart failure and comorbidity

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Anemia and kidney dysfunction are considered to be predictors of unfavorable course of chronic heart failure. Numerous studies proved that depressive disorders are a risk factor for re-hospitalization and death in patients with CHF. **Purpose:** Study of morpho-functional myocardial changes and estimation of depressive disorders in anemic patients with chronic heart failure and chronic kidney disease.

**Material and methods:** 145 patients (age 71.4±6.6y) with CHF II-IV FC as a result of IHD. Main group consisted of 87 patients with anemia and CKD II-III st. on a background of CHF. The comparison group consisted of 58 pts with CHF without anemia and CKD. FC of CHF was estimated by NYHA classification. CKD was defined by USA NKF classification KDQCI. Anemia - by ICST, 1989 classification. Thus mild anemia was found in 50 pts (gg). Moderate - in 25 pts (II) and severe in 12 pts (III) of the main group. In order to study the structural and functional myocardium echochardiography was used. Beck depression inventory was used to study depressive disorders. **Results:** There was no significant difference in LVEFSD and LVEDVD in mild anemic patients with CHF and CKD. Patients of II gr had tendency for increasing LVEFSD and LVEDVD. pts of III gr had significantly increased (p≤0,05) comparing to group of pts without anemia and CKD. Patients of the I gr had significantly decreased LVPWd, IVS, EF and increased sizes of RA and RV comparing to group of comparison. Comparing these parameters in pts of I and II groups with comparison group there were no significant differences (p>0,05). There was significant increasing in LVEFSD, LVEDVD, LVEDV, UFED, sizes of LA and RV, and decreasing of LVPWd, EF in pts of III gr comparing to pts of I and II gr. Due to Beck scale symptoms of depression grew in proportion to severity of anemia with maximum in pts of the III gr. Patients of the II and III groups had cognitive-affective disorders as well as somatic manifestation of depression.

**Conclusion:** Negative influence of anemic syndrome on myocardium was seen in proportion to severity of anemia with maximum in pts of the III gr. Patients of the II gr had significantly decreased LVPWd, IVS, LVEDD, pts of III gr had significantly increased (p<0,05) comparing to group of comparison.

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**P430**

High prevalence of masked arterial hypertension in patients with rheumatoid arthritis

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**Background:** Patients with rheumatoid arthritis (RA) have increased cardiovascular risk. Arterial hypertension (AH) is highly prevalent, and seems to be under-diagnosed and undertreated among patients with RA. Data on ABPM profile in patients with rheumatoid arthritis are lacking.

**The aim of the study was to evaluate ABPM parameters and characterize pheno-types of blood pressure (BP) in patients with RA.**

**Materials and Methods:** 58 patients with RA (EULAR 2010) without known cardio vascular disease were examined (76% females, age 59.3±15.8 (M ± SD) years, 10% smokers, 36% with AH, 34% with dyslipidemia), Median duration of RA was 8.5 years (IQR 3-16). Serospositive RA was diagnosed in 69% of patients. All patients received disease-modifying antirheumatic drugs (DMARDs), 22 (38%) patients had cardiovascular disease, 10% smokers, 56% with AH, 34% with dyslipidemia). Median duration of RA was 9 years (interquartile range (IQR) 3-17). Serospositive RA was diagnosed in 42% of patients. All patients received disease-modifying antirheumatic drugs (DMARDs), 22 (38%) patients had cardiovascular disease, 10% smokers, 56% with AH, 34% with dyslipidemia.

**Methods:** 42 patients with RA (EULAR 2010) were examined (57% females, age 59.7±15.2 years, 14% smokers, 38% with AH, 47% with dyslipidemia). Median duration of RA was 9 years (interquartile range (IQR) 3-17). Serospositive RA was diagnosed in 42% of patients. All patients received disease-modifying antirheumatic drugs (DMARDs), 22 (38%) patients had cardiovascular disease, 10% smokers, 56% with AH, 34% with dyslipidemia.

**Results:** Mean office BP was 126±8,14, 75±6,6 mmHg (peripheral) and 115±8,3/75±6,6 mmHg (central). Mean BP values for peripheral and central BP were as follows: 125±5,3/73±5,9 and 116±5,3/73±5,9 mmHg for 24h BP; 127±14,7/4±9,9 and 111±7,3/77±9 mmHg for daytime BP; 119±14,6/9±10 and 112±14,7/10 mmHg for nighttime BP. AH according to daytime BP was found in 14 (24,1%) pts, nighttime BP – in 28 (48,3%) pts, 24-h BP - in 31 (51,0%) pts. Phenotypes of BP were as follows: sustained normotension – in 36 (62,2%), masked hypertension in 12 (20,7%), sustained AH – in 8 (13,8%), white-coat hypertension in 2 (3,4%) patients. Isolated nocturnal AH was observed in 12 (20,7%) pts. 10 (17%) patients had isolated elevated central BP. 20 (34,5%) pts had elevated central SBP according to individual reference values; all patients with high office BP had elevated central BP.

**Conclusion:** High prevalence of AH is observed in patients with RA free of CVD and most of patients have satisfactory control of office BP. Relatively high prevalence of masked and isolated nocturnal hypertension despite antihypertensive treatment are observed in this population. These findings may help to optimize hypertension treatment in patients with RA.

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**P431**

Arterial stiffness elevation is associated with high inflammatory activity in patients with rheumatoid arthritis

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**Background:** Patients with rheumatoid arthritis (RA) are at higher risk of cardiovascular morbidity and mortality. Aortic stiffness is a predictor of CHD. Chronic inflammation plays a role in the development of atherosclerosis in RA. Relationships between inflammation and arterial stiffness in patients with RA are not well understood. The aim of the study was to evaluate inflammatory activity and their associations with arterial stiffness in patients with RA.

**Materials and methods:** 42 patients with RA (EULAR 2010) were examined (57% females, age 59.7±15.2 years, 14% smokers, 38% with AH, 47% with dyslipidemia). Median duration of RA was 9 years (interquartile range (IQR) 3-17). Serospositive RA was diagnosed in 42% of patients. All patients received disease-modifying antirheumatic drugs (DMARDs). 22 (38%) patients had cardiovascular disease, 10% smokers, 56% with AH, 34% with dyslipidemia.

**Results:** Mean CRP was 13 mg/dl (IQR 9-24mg/dl), median RA was 32 mmH2O/m (IQR 18-65 mmH2O), median PWV was 9.4 m/s (IQR 7.1-11.9m/s), PWV increase>10mm/s was observed in 16(37.5%) patients. Patients with PWV>10mm/s were older (72.0±5.85vs53.3±14.9 years), had higher BMI (30.5±9.5vs24.9±4.5kg/m2) and longer duration of AH (median 14 years [IQR 7.5-18] vs 6 years [IQR 0-4.5] and higher BP levels (143±21.9/4.9vs124±13.78±9 mmHg). They also had higher levels of LDL-C (3.0±1.0vs4.1±0.8 mmol/l), plasma glucose (6.6±0.9vs6.4±0.8 mmol/l), hs-CRP (median 9[IQR 2-17.1] vs 22[IQR 13-56.6] mg/dl) and CAVI (9.2±0.5vs7.2±1.2, p<0.05 for trend. Spearman analysis revealed positive correlations of PWV with age (r=0.6), BMI (r=0.53), SBP (r=0.62), DBP (r=0.41), LDL-C (r=0.60), glucose (r=0.38), AH duration (r=0.69) and hs-CRP (r=0.28, p<0.05 for trend. Multiple regression analysis confirmed that age (β=0.3, p<0.0012), AH duration (β=0.4, p<0.0001), SBP (β=-0.42, p<0.0001) and hs-CRP level (β=0.26, p<0.0004) were independent predictors of arterial stiffness increase.

**Conclusion:** Inflammatory activity as well as other traditional risk factors is a predictor of arterial stiffness increase in patients with RA receiving DMARDs.
The objective of this meta-analysis of randomized trials was to evaluate if the administration of furosemide with matched hydration using the RenalGuard System reduces contrast-induced acute kidney injury (CI-AKI) in high risk patients, undergoing interventional procedures. CI-AKI is a serious complication following angiographic procedures and a powerful predictor of unfavorable early and long-term outcomes. The primary outcome was the incidence of CI-AKI, and the secondary outcomes were need for renal replacement therapy, mortality, stroke, and adverse events. Four trials (898 patients) published between 2011 and 2016 were included in the analysis and included patients undergoing percutaneous coronary procedures and transcatheter aortic valve replacement. RenalGuard therapy was associated with a lower incidence of CI-AKI compared with control treatment (27 of 348 [7.76%] vs. 75 of 350 [21.43%] patients; odds ratio: 0.31; 95% confidence interval: 0.19 to 0.50; I²=4%, p<0.0001) and with a lower need for renal replacement therapy (2 of 348 [0.58%] vs. 12 of 348 [3.45%] patients; odds ratio: 0.09; 95% confidence interval: 0.04 to 0.21; I²=5%, p=0.02). No major adverse events occurred in patients undergoing RenalGuard therapy. The main finding of this meta-analysis is that furosemide with matched hydration by the RenalGuard System may reduce the incidence of CI-AKI in high-risk patients undergoing percutaneous coronary intervention or transcatheter aortic valve replacement. However, further independent high-quality randomized trials should elucidate the effectiveness and safety of this prophylactic intervention in interventional cardiology.

**P434**

**Predictors and implications of the left atrium volume index in an outpatient clinic.**

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**Background:** An increased left atrium (LA) is caused by multiple aetiologies and is known to be a risk factor for the development of a cerebrovascular accident and mortality. The LA size has been previously investigated mainly in specific populations (e.g. only hypertension, heart failure (HF), diabetes mellitus, or hypertrophic cardiomyopathy) and/or by inferior echocardiographic techniques (e.g. LA diameter) compared to LA volume index (LAVI), which is the most accurate technique to estimate LA size.

**Purpose:** Therefore, the objective of the present study was to investigate the predictors and implications of increased LAVI in unscreened patients referred by general practitioners for cardiac consultation.

**Methods:** Investigating an outpatient clinic population of 3441 patients, this study analysed demographics (e.g. medical history), ECG (heart frequency and conduction times), laboratory (e.g. urea and NT pro-BNP), and echocardiography (e.g. LAVI and mitral valve regurgitation (MR)) in all patients with a measurement of LAVI during their visit (n = 578). These patients were divided into two groups according to LAVI (LAVI ≥ 34 ml/m², i.e. enlarged LA: n=254; LAVI < 34 ml/m²: n=316). Logistic regression was used to qualify possible predictors and implications of enlarged LAVI.

**Results:** The present study established increased NT Pro-BNP (enlarged LAVI: 20 [8%], normal LAVI: 3 [1%], odds ratio [OR]:8.9, 95% confidence interval [CI]: 2.6-30.4, P<0.001), prolonged QTc time (enlarged LAVI: 30 [12%], normal LAVI: 9 [3%], OR: 4.6, CI: 2.1-9.8, P<0.001), hyperuricemia (enlarged LAVI: 25 [10%], normal LAVI: 8 [3%], OR: 4.2, CI: 1.9-9.4, P<0.001), history of paroxysmal AFib (atrial fibrillation) (enlarged LAVI: 54 [21%], normal LAVI: 24 [8%], OR: 3.3, CI: 2.0-6.5, P<0.001), and HF (enlarged LAVI: 20 [6%], normal LAVI: 6 [2%], OR: 4.4, CI: 1.7-11.2, P<0.001), history of intake of antithrombotics (enlarged LAVI: 55 [22%], normal LAVI: 17 [6%], OR: 4.9, CI: 2.7-8.6, P<0.001), and bradycardia (enlarged LAVI: 59 [23%], normal LAVI: 31 [10%], OR: 2.8, CI: 1.7-4.5, P<0.001) as the most important predictors for increased LAVI in this outpatient clinic. In multivariable analysis, patients with intake of antithrombotics are at risk for an enlarged LAVI (OR: 4.9, CI: 2.7-8.6, P<0.001).

**Conclusion:** There are multiple risk factors for an increased LAVI in this low-risk population. Of those antithrombotic treatment seems to be the most important one. Patients with an enlarged LAVI are at increased risk to develop AFib or to decease.

**VALVULAR HEART DISEASE (DIAGNOSIS, MANAGEMENT AND INTERVENTIONAL THERAPIES)**

**P435**

**Hospital and one year mortality in patients who underwent redo-MVR operation: a 11-year single center experience**

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**Background and Aim:** Major advances in mitral valve (MV) surgery, and MV replacement (MVR), improved the survival in these patients, which has inevitably meant that more patients will require redo-MVR during the follow-up. Redo surgery may be associated with significant risk, which must be balanced against the benefits of patients. The aim of this study was to investigate the hospital and one year mortality of patients who underwent redo-MVR in patients who underwent redo-MVR with previous mitral valve procedures.

**Methods:** We included in this study 116 patients with age 49±11 years (20-76 years), who underwent redo-MVR operations between 2004 and 2014. We described clinical, pre and postoperative data of the study patients. The hospital and one year follow-up for death were registered for all study patients.

**Results:** Of study patients, 84% were female, 86% in NYHA III and 12% in NYHA IV class. RA-interventions were done for the first time in 89%, for the second time in 7.8% and for the third time in 3.5% of the patients. Mean time of the re-intervention was 11±7.5 years from the previous intervention. Planned operation was done in 89%, whereas in 32% of patients it was an emergency. Previous MVR had 44% of patients, 40% were patients after commissurotomy, 2% after mitral valve replacement and 15% of them had concomitant interventions. Indications for in redo-MVR were: valvular structural degeneration (40%), thrombosis of MV prosthesis (17%), residual MV stenosis (14%), paravalvular fistulas and mitral valve regurgitation (11%, for both). Mechanical MV prosthesis was implanted in 77%, whereas biological MV prosthesis in 12% of patients. Concomitant heart intervention was performed in 40% of operated patients and the duration of hospitalization was 22±13 days.

Patients that underwent redo-MVR had one year overall mortality of 13.7% (13 of 116 study patients). The hospital mortality was 8.3%, whereas the mortality at one year follow-up was 6.4%.

**Conclusions:** Redo mitral valve replacement is safe and can be performed with an acceptable mortality.
Background: MitraClip (MC) therapy is as a secure, feasible treatment option for patients with severe mitral regurgitation (MR) and a high surgical risk. The role of the gold standard surgical repair in patients with functional mitral regurgitation (FMR) is currently under much debate.

Purpose: to evaluate the efficacy of MC therapy in terms of new functional outcome comparing data to degenerative MR and FMR.

Methods: 72 patients with +3 to +4 MR and not eligible for surgical mitral valve repair were enrolled. All patients were assessed before MC implantation and after 6 months using echocardiography, BNP assay, non-invasive measurement of cardiac output (CO) with inert gas rebreathing technique, and cardiopulmonary exercise test (CPET).

Results: MC implant rate was 95%. Immediate success with reduction of MR to ≤2+ was observed in 86.7% of cases. In FMR and DMF, a significant reduction of MR from baseline was observed (p < 0.001). NYHA functional class showed a significant improvement in the functional group (NYHA III-IV from 75% to 34.6% of patients, p = 0.002). Significant LV remodeling was observed in both groups (LV end-diastolic Volume in FMR was 211 ± 62 ml at baseline, 190 ± 77 ml at 6 months, p = 0.003; in DMF was 123 ± 53 ml at baseline, 103 ± 56 ml at 6 months, p < 0.001). LV End-systolic volume (LVEV) also showed a significant reduction at 1 month only in the functional group (LVEV in FMR was 136 ± 55 ml at baseline, 123 ± 67 ml at 1 month, p = 0.027). Systolic pulmonary pressure (PAPs) values were significantly reduced from baseline in the population with the functional disease (46 ± 11 mmHg at baseline, 38 ± 8 mmHg at 6 months, p = 0.005); in the degenerative group, PAPs showed small variations (42 ± 11 mmHg at baseline and 39 ± 9 mmHg at 6 months, p > 0.5). CO and cardiac index (CI) increased significantly at rest (3 ± 0.7 l/min at baseline, 3.6 ± 0.9 l/min at 6 months; 1.64 ± 0.4 l/min/m² at baseline, 2.0 ± 0.4 l/min/m² at 6 months, respectively, both p = 0.01) and at peak of exercise (CO 4.9 ± 1.7 l/min at baseline, 6.3 ± 1.5 l/min at 6 months). CI 2.71 ± 0.98 l/min/m², 3.44 ± 0.90 l/min/m², both p = 0.023) in the functional group. On the other hand, the population with DMF did not present any improvement. Oxygen consumption, anaerobic threshold, and other functional parameters were measured during CPET and showed an improving trend. Heart rate and arteriovenous oxygen difference did not show significant changes both at rest and during exercise.

Conclusions: MC device reduced MR and produced a significant left ventricular reverse remodeling over 6 months in both the populations treated. Functional outcomes, as the improvement of CO and CI at rest and during CPET, proved the efficacy of the percutaneous mitral valve repair in patients with FMR. Observing the concurrent absence of significant variation of heart rate and arteriovenous oxygen difference, the improvement of CO could be attributed only to an increase in stroke volume (SV).
Methods: Patients enrolled in the prospective Getting Reduction of Mitral Insufficiency by Percutaneous Clip Implantation (GRASP) with LVF > 40% who were eligible at one-year follow-up were included in the present analysis. The primary efficacy endpoint was the composite of death, surgery for mitral valve dysfunction and grade 3 + /4 MR at one-year follow-up. Secondary endpoints were the components of the primary endpoint, re-hospitalization rates and functional NYHA class. Also echocardiographic parameters at baseline and one-year follow-up were assessed.

Results: A total of 178 patients were included: 106 (59.6%) without AF and 72 (40.4%) with AF. Comparable clinical and echocardiographic baseline characteristics were observed between the two groups except for age, STI score, pace-maker implantation and left atrial (LA) volume (higher in the AF group) and for previous myocardial infarction and percutaneous revascularization (more frequent in the no AF group). A post-procedural residual MR ≤ 2+. At one-year follow-up, no significant differences were reported in terms of primary end-point (21.3% in patients with AF versus 15.9% in patients without AF; p=0.748). Secondary endpoints concerning the two groups are reported in Table 1. At one-year follow-up, a significant reduction in LV volumes was observed regardless of AF; no relevant changes were reported in LA volumes..

Conclusions: The MitraClip procedure was associated with low rates of adverse event in patients with AF and reduced LV EF, reporting one-year outcomes comparable to patients without AF.

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**Table 1**

<table>
<thead>
<tr>
<th></th>
<th>no AF</th>
<th>AF</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>15.9%</td>
<td>19.7%</td>
<td>0.522</td>
</tr>
<tr>
<td>Surgery for mitral valve</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>MR grade 3+</td>
<td>15.6%</td>
<td>6.6%</td>
<td>0.134</td>
</tr>
<tr>
<td>Re-hospitalization</td>
<td>15.6%</td>
<td>22.9%</td>
<td>0.226</td>
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<tr>
<td>NYHA class ≤ 2</td>
<td>85.1%</td>
<td>79.5%</td>
<td>0.388</td>
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</tbody>
</table>

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**P440**

Moderate/severe aortic regurgitation after TAVI with corevalve - anatomically or procedurally determined

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Background: Moderate/severe aortic regurgitation after TAVI was 15.1%. Balloon post-dilation was performed in 21.8% of patients.

Methods: TAVI with CoreValve was performed in 112 patients in our centre (50% male, mean age 81.4 ± 6.8 years old, mean EuroSCORE II 6.4 ± 6.8). The incidence and indexed annular area were independently associated with the development of moderate/severe AR occurring after TAVI with CoreValve. The intraprocedural parameters assessed did not independently predict of the outcome.

Conclusions: The MitraClip procedure was associated with low rates of adverse event in patients with AF and reduced LV EF, reporting one-year outcomes comparable to patients without AF.
P442
Thrombocytopenia as a predictive marker of heart failure in patients with infective endocarditis

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Purpose: To study the features of thrombocytopenia in patients with infective endocarditis (IE).

Materials and Methods: 156 patients (97 men) with IE ( Duke 2014) were included, of which 55 (35%) patients have IE with thrombocytopenia (group 1) and 101 (65%) have IE without thrombocytopenia (group 2). We evaluated the anamnesis, echocardiogram, heart failure (NYHA rates and NT-pro-BNP), inflammation markers (CRP, RF, procalcitonin, preisarin), microbiology tests, CBC (PLT, WBC, HB), embolic complications (EC) and mortality rates. Thrombocytopenia was characterized by total platelet count lower than 180*10^9/1. EC was defined as any embolism at the moment of hospital admission or developed during hospitalization. All EC were verified by instrumental methods of diagnostics (US, CT, MRI). Micro EC as Osler nodes, Janeway signs were not included in this study.

Results: The median age in the group 1 was 42 [34; 66.5], in group 2 60 [36; 72] years, p < 0.05. Groups did not differ by gender and comorbidity. cute IE prevailed in both groups [77 (67.3%) in group 1 vs. 53 (52.5%) in group 2, p > 0.05], left ventricular EF was mainly preserved [57% (54; 61) vs. 56% (52; 60), respectively, p > 0.05]. Mean platelet count in group 1 was 97*10^9/1 [71; 152], in group 2 264*10^9/1 [214;338], p < 0.001. EC (N=69) were found in 29 patients in group 1 (52.7%), in 39 patients in group 2 (68.6%), p=0.048. Also an increase in CRP value of 146.3 mg/l [83.4; 210.5] for group 1 and of 108.9 mg/l [41.8; 190.0] in group 2, p < 0.001, was revealed and associated with the severity of thrombocytopenia (p = 0.011). Thrombocytopenia in patients with IE is associated with more severe course of heart failure, p=0.038. 55 patients (100%) in group 1 and 43 patients in group 2 (42.6%), p < 0.001 had clinical symptoms of class III-IV heart failure. Significantly higher incidence of splenic- and hepatomegaly (p=0.025 and p=0.004 respectively) was found in the thrombocytopenic group (1). angosted spleen, in its turn, may be one of the causes of the low platelet count due to the increased platelet uptake. Overall mortality was higher in patients with low total platelet count: in group 1 N=20 (36.4%), in group 2 N=19 (18.8%), p=0.004.

Conclusion:IE complicated by thrombocytopenia more frequently occur in younger adults and is associated with more severe course of heart failure and higher activity of the infectious process. Mortality rate, as well as frequency of EC in such patients is also significantly higher.

P443
Indexed device landing zone calcium volume predicts the need for balloon post-dilatation in tavi procedures with self-expandable prostheses

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Introduction: Calcification of the device landing zone (DLZ) is associated with the need of balloon post-dilatation (BPD) in transcutaneter aortic valve implantation (TAVI) procedures. This study sought to evaluate the relationship of DLZ calcium volume with the need for BPD during TAVI with 1st and 2nd generation self-expandable prostheses.

Methods and Results: Retrospective, observational study including all patients with severe aortic stenosis and submitted to TAVI with self-expandable prostheses between August 2007 and October 2016. Calculation of the DLZ was quantified for all available contrast scans, using a dedicated software (SimioneseValuesTM), with a threshold for calcium detection set at 850 Hounsfeld Units. TAVI with self-expandable prostheses was performed in 180 patients in our centre (47.8% of the patients in group 1, 52.2% in group 2). The choice of electrophysiological methods or methods of cardiac resynchronization therapy in patients with severe heart failure, complicated with atrial fibrillation. 100% biventricular pacing is needed to achieve maximum clinical effect, what can be reached by ablation of atrioventricular node or AV-ablation. Valvular surgery with MAZE procedure is also an effective method of treatment.

Conclusion:Calcification of the DLZ predicts the need for BPD in TAVI Procedures with Self-Expandable Prosthesis, both in 1st and 2nd generation devices.

P444
Comparison of electrophysiological and surgical methods of treatment in patients with heart failure complicated with atrial fibrillation

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Background: Cardiac resynchronization therapy (CRT) is an effective method of treatment in patients with severe heart failure, complicated with atrial fibrillation. 100% biventricular pacing is needed to achieve maximum clinical effect, what can be reached by ablation of atrioventricular node or AV-ablation. Valvular surgery with MAZE procedure is also an effective method of treatment.

Purpose: to explore and compare the effectiveness of electrophysiological and surgical methods of treatment in patients with atrial fibrillation and heart failure.

Methods: The study involved 30 patients who underwent CRT with AV-ablation (group 1) and 30 patients underwent valvular surgery with MAZE procedure (group 2). Examination was carried out at baseline, in 6 and 12 months after surgery, and included general clinical tests, 24-Hour Holter Monitoring, determination of the level natriuretic peptide (NT-proBNP), myocardial dysynchrony, transesophageal echocardiography and 6-minute walk test.

Results: After 6 months the improvements in intracardiac hemodynamics was revealed in both groups (male 1, p<0.05), however, after 12 months the worsening of global left ventricular contractility was noted in group 1. The effectiveness of surgical treatment was maintained during the year of monitoring in group 2 (table 1, p<0.05).

Conclusions: The choice of electrophysiological methods or methods of cardiac surgery in treatment of patients with severe heart failure and atrial fibrillation should be differentiated based on etiology of cardiomyopathy. Electrophysiological methods of treatment are preferably carried out in patients with tachycardia-induced cardiomyopathy. Patients with atrial fibrillation and a heart rate less than 90 beats per minute should be preferably undergone valvular surgery with MAZE procedure.

P445
Endocardial left ventricle lead implantation for cardiac resynchronisation therapy: an australian experience.

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Introduction: Cardiac resynchronisation therapy (CRT) is an established therapy for symptomatic patients with advanced heart failure. However, traditional left ventricular lead placement may not always be technically feasible via the coronary sinus approach. Left ventricular (LV) endocardial lead implantation via a transseptal atrial approach may be a potential alternative.

Purpose: We sought to review the feasibility and clinical outcomes in patients undergoing LV lead implantations in a single-centre, tertiary, Australian institution. Endpoints included: technical success, peri-procedural complication rates, percent LV pacing load, change in New York Heart Association (NYHA) class and change in LV ejection fraction (LVEF).

Methods: and Results: Between August 2015 and December 2016, four patients underwent endocardial LV lead implantation (3 males, mean age 71 ± 5.9 years). All patients had previously failed LV lead placement via the coronary sinus. Mean pre-procedural LVEF was 24 ± 8%, mean QRs duration 161 ± 19ms and baseline NYHA was II (n = 3) and IV (n = 1). All patients had existing indications for therapeutic antiocoagulation and were antiocoagulated with warfarin (3 for atrial fibrillation, 1 for mechanical aortic valve). Warfarin was withheld for 3 days prior to the procedure. Mean international normalized ratio (INR) at the time of the procedure was 1.6 ±0.3. LV access was via an inferior approach, using femoral transseptal access, with a snare from superior subclavian venous access providing access to the left atrium. The lead was then inserted via the deflectable guiding sheath into the lateral LV endocardial wall. Successful implantation was achieved in all patients. One patient had a thromboembolic complication (non disabling stroke) post procedure, despite an INR of 2.1 at the time. That patient subsequently died from progressive heart failure within a month of the procedure. The 3 remaining patients have a mean follow up of 10 ±7.5 months. The mean biventricular pacing volume was 93 ± 5.4% . All 3 patients had an improvement by at least one NYHA class. In the two
Patients followed up for more than one year, there was a marked improvement in LVEF (mean 35.7±7%).

Conclusion: Endocardial LV lead implantation via a transseptal atrial approach is a feasible alternative for CRT in patients with failed lead placement via traditional transvenous approaches and to avoid complications despite therapeutic anti-coagulation remain the major risk.

P446
Super-response to cardiac resynchronisation therapy
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Background: Data from multicenter studies suggest that left bundle branch block (LBBB) and wide QRS complex are associated with good response to cardiac resynchronisation therapy (CRT). Other studies evaluated echocardiographic parameters of mechanical dyssynchrony for patient selection to CRT. However, in real clinical practice the usage of these criteria is still debated.

The aim: To evaluate potential clinical, electrocardiographic and echocardiographic parameters related to super-response after CRT.

Methods: 51 CRT patients (mean age 55.6±9.5 years; 72.5% men) with congestive heart failure (CHF) II-IV NYHA functional class were enrolled. At baseline, 1 month, 3 months and each 6 months after implantation clinical, electrocardiographic and echocardiographic parameters were evaluated. Criteria for LBBB were: QRS duration ≥130 ms in women & ≤140 ms in men; ≥30% in 2 contiguous leads of V1, V2, V5, V6, I, aVL (by Strauss).

According to the best decrease of left ventricular end-systolic volume (LVEVSV) (mean follow-up period 29.8±14.6 months) patients were classified as super-responders (SR) (p<0.01; reduction in LVEVSV of ≥30%) and non-SR (n=24; reduction in LVEVSV of <30%).

Results: SR had wider QRS complex (180.3±24.8ms in SR vs 153.9±23.7 ms in non-SR; p=0.005) and higher incidence of mechanical dyssynchrony (p=0.032). Percentage of LBBB was equal between groups (96.2% in SR vs 79.2% in non-SR: p=0.071).

The survival rates in SR and in non-SR were 100% and 79.2% respectively (log-rank test P=0.002). Multiple logistic regression analysis supported the assumption that female sex (HR 5.773; 95% CI 1.149–28.998; P=0.033) and width of QRS complex (HR 1.047; 95% CI 1.017–1.078; P=0.002) were independent predictors for CRT super-response. ROC curve analysis demonstrated sensitivity 75% and specificity 81.5% (AUC=0.824; p<0.001) of this model in prediction of super-response to CRT in patients with CHF. Conclusion: Super-response to CRT is associated with better mortality rate (8.9% vs. 66.7%, p=0.004) and tended to readmit less for HF aggravation (15.6% vs. 33.3%, p=0.284).

Conclusion: Typical LBBB, especially mid-QRS notch, in 56% was related to CRT super-response and clinical outcomes.

P448
Low EF as a predictor of poor CRT response
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Cardiac Resynchronization Therapy (CRT) is a treatment of choice in patients with systolic heart failure and reduced left ventricular ejection fraction (LVEF%) despite optimal medical therapy according to the latest guidelines. Despite the impressive results of CRT, 30% of patients remain non-responders.

Purpose: To assess clinical and echocardiographic response to CRT and to determine whether a low baseline LVEF (<30%) could be a cause of poor CRT response.

Methods: 25 patients eligible for CRT implantation were included. All patients underwent full history, complete clinical examination, NYHA class, 6MHW distance and echocardiography with measurement of left ventricular end-diastolic and -systolic diameters and calculation of LVEF%. Echocardiography, NYHA class and 6MHW were reassessed 6 months after CRT implantation.

Clinical responder was defined as improvement of at least one NYHA class, while echocardiographic responder was defined as absolute increase of LVEF% by ≥5% 6 months after CRT.

Results: 25 patients (88% males) with mean age of 53.9±11.7 yrs, patients (90%) had ischemia as a cause of heart failure. Hypertension was present in 48%, diabetes in 44% and chronic pulmonary disease in 20%. The mean 6MHW distance at baseline was 32.1±10.8 m, reaching 37.5±11.9 after 6 months with p=0.001. At baseline, 12% of patients were in NYHA class II, 52% in class III and 36% in class IV.

Thirteen patients (52%) were clinical responders and 9 pts (37%) were echocardiographic responders.

According to the baseline LVEF%, 11 patients had LVEF% ≥30% (all were males with mean age of 52±14 yrs and ischemia as a cause of HF in 73%) and 14 patients had LVEF% <30% (79% males with mean age of 54±9.5 yrs and ischemia as a cause of HF in 50%) When LVEF% was ≥30%, clinical responders were 82% and echocardiographic responders were 55%. The mean 6MHW distance was 41±6 m and reached 47.5±4.9 after CRT. When LVEF% was <30%, clinical responders were 29%, and echocardiographic responders were 22%. The mean 6MHW distance was 24.7±7.4 m and reached 28.6±8.9 after CRT.

Conclusions: Clinical and echocardiographic response to CRT were achieved with a higher incidence in patients with an LVEF% ≥30% than those with lower LVEF%. A very low LVEF% is probably a cause for inappropriate CRT response.
Background: Cardiac resynchronization therapy (CRT) in heart failure is limited by still too many non-responders.

Purpose: to evaluate if the estimation of cardiac performance by pressure-strain loops (PSLs) analysis is useful for the selection of CRT candidates.

Methods: 97 patients undergoing CRT (ejection fraction: 27 ± 6%, QRS duration: 164 ± 18 ms) according to current guidelines were studied before and after a median 6-month follow-up (FU). Conventional dyssynchrony parameters were evaluated, and left ventricular (L.V) global longitudinal strain (GLS) was used to estimate LV positive work (PosW) and negative work (NegW) by PSLs. Results: At FU, positive response to CRT (CRT +) was defined as ≥15% reduction in LV end-systolic volume and was observed in 63 (65%) patients.

In a multivariate regression model (Basal model, \( p^2 > 0.79 \)) including clinical, electrocardiographic, echocardiographic data and classic dyssynchrony parameters, non-ischemic etiology (OR 3.16, \( p < 0.006 \)), septal flash (OR 1.9, \( p < 0.017 \)) and LV end-systolic diameter (OR 0.92, \( p = 0.003 \)) emerged as significant predictors of CRT +. The addition of both PosW and NegW at the Basal model caused a significant increment in model power (\( p^2 = 0.4, p < 0.001 \)). After addition of PosW and NegW, OR (OR 7.9, \( p = 0.003 \)) for NegW > 384 (OR 13.8, \( p = 0.006 \)) remained the only predictors of CRT +. The combination of PosW > 1057 mg/mg% and NegW > 384 mg/mg% showed an excellent specificity (100%), positive predictive value (100%) and accuracy (99%) for the identification of CRT +.

Conclusions: the estimation of cardiac work by PSL curves appears to be a novel and very promising tool to identify CRT responders, even when compared with more traditional indexes of cardiac dyssynchrony. Further studies on larger series should be designed to confirm these results.

P401
Renal function at the moment of cardiac resynchronization therapy (CRT) is a powerful predictor of events during the follow-up.

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Background: Chronic kidney disease (CKD) is significantly related to prognosis in patients affected with heart failure (HF), but data on different stages of CKD in patients treated with CRT are limited.

Aim of the study: Aim of our retrospective study was to analyze the impact of renal function on clinical outcome of patients implanted with a CRT device. Material and methods: All patients implanted with a CRT device at our Centres were included in a custom made database and – for the purpose of this study – data related to CKD stage (eGFR calculated with CKD-EPI formula) were used to divide pts in four group according to CKD stage (stage I: eGFR > 90 ml/min/1.73m²; 2: 60 – 90; 3: 30 – 60; 4: 15 – 30; 5: < 15). The end point was a combined end-point of first hospitalization for acute HF or death: data were evaluated with the log-rank test.

Population: 207 pts (163 men, mean age 72 ± 8 yrs, mean LVEF 28 ± 5%, mean QRS duration 173 ± 27 ms, 108 ischemic, 166 CRT-D) were included in this study. Gr. 1 is constituted by 33 pts, Gr. 2 by 82, Gr. 3 by 81 and Gr. 4 by 11; no pts had a stage 5 CKD. There were no differences between the 4 groups as far as gender, kind of cardiopathy, LVEF and QRS duration, but pts in gr. 3 and 4 were older than pts with in the other 2 groups (Gr. 1: 58 ± 12 yrs, Gr. 2: 68 ± 10 yrs, Gr. 3: 74 ± 6 yrs and Gr. 4: 72 ± 8 yrs, \( p < 0.001 \)). There were no significant differences in use of B-blockers and ACE-Inhibitors, but less pts with higher stages of CKD were on antidiuretic drugs and in gr. 3 and 4 the doses of furosene were higher.

Results: Survival free of events at 1, 3, 5 and 7 yrs were the following: Gr. 1 97%, 93%, 85%, 81%; Gr. 2: 92%, 73%, 73%, 68%; Gr. 3: 87%, 67%, 55%, 46%; Gr. 4: 62%, 15%, 10%, 10% (see Figure). At 7 yrs 88% of Gr. 1 were still alive vs. 81% in Gr. 2, 66% in Gr. 3 and 32% in Gr. 4. Conclusions: Level of renal function at the moment of CRT implant is a powerful predictor of events in the follow-up. Pts with stage 4 CKD have a very negative prognosis both in term of recurrences of acute HF and survival and the use of CRT-D in this group of pts has probably a limited usefulness.

P450
CRT response, complication-rate and prognosis in elderly patients
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Introduction: The prevalence of congestive heart failure (CHF) increases with advancing age, affecting 10-20% of the elderly population. As such, many patients who receive cardiac resynchronization therapy (CRT) in clinical practice are in fact older than those included in clinical trials. The aim of this study was to evaluate complication-rate, complication-rate and prognosis in elderly patients.

Methods: Single-center, retrospective analysis of 316 patients who underwent biventricular device placement, with or without a defibrillator (CRT-P or CRT-D, respectively), between January 2002 and March 2016. Patients were divided into two groups according to age (< 75 years and ≥ 75 years old). Baseline characteristics, electrocardiographic and clinical response, all cause-mortality and hospitalizations for heart failure were determined. Electrocardiographic (echo) responders were defined as those with ≥ 5% improvement in left ventricular ejection fraction (LVEF) 6-12 months after CRT. Clinical responders were defined as those with an improvement of at least 1 NYHA functional class 6-12 months after CRT assessed by chart review: Patients were considered global responders if they had both echo and clinical response.

Results: In this study, 34% of patients were ≥ 75 years old (n = 108). These patients had a higher percentage of CRT-P implanted than younger patients (70% vs 33%, \( p < 0.001 \)). There were no significant differences concerning gender or cardiomyopathy etiology. Surprisingly, cardiovascular comorbidities (hypertension, diabetes, dyslipidemia, tobacco exposure) weren’t significantly different between groups. LVEF before implantation was comparable (28% in older group vs 27% in the younger group, \( p = 0.8 \)), but older patients had higher NYHA class (90% vs 79% in class IV/VI, \( p = 0.018 \)). As expected, total mortality was higher for the older group (44% vs 27%, \( p = 0.003 \)). There was no significant difference between five year survival rates (27% vs 21%, \( p = 0.3 \)). Hospitalization and complication rates were also not significantly different between older and younger patients (16% vs 19%, \( p = 0.4 \) and 14% vs 18%, \( p = 0.4 \), respectively). In regard to CRT-response, echo and clinical response rates were similar for the older and younger groups (98% vs 55%, \( p = 0.8 \) and 56% vs 45%, \( p = 0.1 \). Clinical response was even considered significantly better for ≥75 year olds (80% vs 68%, \( p = 0.026 \)). In multivariate analysis (including age, gender, sinus rhythm, QRS length and left bundle branch block), age was not an independent predictor of global response.

Conclusion: In the studied population, patients ≥ 75 years old responded at least as well as younger patients to CRT without a higher complication rate, confirming the benefit of this therapy to the older group.
Cardiac resynchronization therapy (CRT) is indicated in symptomatic heart failure (HF) patients after achieving optimal medical therapy (OMT). However, many patients may not be under OMT when the CRT device was implanted.

We aimed to evaluate the long-term benefit of CRT in symptomatic HF patients according OMT before or after CRT.

Methods: We investigated the effect of being or not under OMT on the clinical outcomes HF/mortality, in 328 consecutive patients implanted with a CRT device between 2001 and 2015 in a single tertiary center. We categorized the patients into three groups: no-basal OMT, OMT at basal and OMT at 1 year follow-up. Multivariate Cox proportional hazards models were used to determine the effect of OMT on the clinical outcomes.

Results: Patients on basal OMT were 122 (37.2%). Baseline characteristics are shown in Table 1. The absence of OMT at basal was not associated with an increased risk of mortality/HF (HR 0.72; 95%CI 0.50-1.02; p = 0.067) compared with no OMT at basal. 84 (40.8%) patients without basal OMT could achieve OMT at 1 year follow-up. Patients without OMT had more risk of mortality or HF than OMT in follow-up (HR 1.31, 95% CI 1.25-3.01; p = 0.003), and the risk of patients with basal OMT and CRT in follow-up was similar (HR 0.89, 95% CI 0.59-1.31, p = 0.526) (Figure 1).

Conclusion: Basal OMT before CRT implant could not be associated with better outcomes. CRT achieved at 1 year follow-up was associated with a reduced risk of HF/mortality. Our results suggest that efforts should be made for medical treatment optimization after CRT.

Table: Baseline Characteristics

<table>
<thead>
<tr>
<th>Clinical Characteristic</th>
<th>no-OMT (n = 130)</th>
<th>Basal OMT (n = 114)</th>
<th>OMT at follow-up (n = 84)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex: male, n(%)</td>
<td>105(80.8)</td>
<td>89(78.1)</td>
<td>59(70.2)</td>
<td>0.192</td>
</tr>
<tr>
<td>Age (y)</td>
<td>73.2±8.1</td>
<td>68.4±9.7</td>
<td>76.9±10.0</td>
<td>0.000</td>
</tr>
<tr>
<td>Ischemic cardiomyopathy, n(%)</td>
<td>53(40.8)</td>
<td>42(38.6)</td>
<td>22(26.2)</td>
<td>0.078</td>
</tr>
<tr>
<td>CRT-ICD, n(%)</td>
<td>70(53.8)</td>
<td>61(53.5)</td>
<td>41(48.8)</td>
<td>0.741</td>
</tr>
<tr>
<td>NYHA class, n(%)</td>
<td>25(18.5)</td>
<td>36(32.1)</td>
<td>27(32.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>II</td>
<td>19(14.6)</td>
<td>39(34.2)</td>
<td>21(25.3)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>98(75.4)</td>
<td>70(61.4)</td>
<td>62(73.8)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>13(10)</td>
<td>5(4.4)</td>
<td>11(13.2)</td>
<td></td>
</tr>
<tr>
<td>Glomerular filtration rate (ml/min x 1.73m²)</td>
<td>50.1±22.1</td>
<td>65.1±22.6</td>
<td>68.0±24.7</td>
<td>0.000</td>
</tr>
<tr>
<td>Hemoglobin level (g/dL)</td>
<td>12.7±1.8</td>
<td>13.6±1.7</td>
<td>13.7±1.5</td>
<td>0.000</td>
</tr>
<tr>
<td>Coronary sinus vein (m)</td>
<td>34±26.8</td>
<td>18±15.9</td>
<td>17±20.5</td>
<td>0.085</td>
</tr>
<tr>
<td>Lateral Posterior</td>
<td>29±22.9</td>
<td>38±33.6</td>
<td>17±20.5</td>
<td></td>
</tr>
<tr>
<td>QRS duration prior (ms)</td>
<td>160±29</td>
<td>152±26</td>
<td>157±26</td>
<td>0.166</td>
</tr>
<tr>
<td>LBBB, n(%)</td>
<td>75(57.7)</td>
<td>64(56.1)</td>
<td>59(70.2)</td>
<td>0.097</td>
</tr>
<tr>
<td>LVEF prior(%)</td>
<td>27.7±7.1</td>
<td>26.1±6.9</td>
<td>27.2±7.7</td>
<td>0.203</td>
</tr>
</tbody>
</table>
Orthopnea & PND are key symptoms of HF. Night-time elevation angle (NTEA) for patient visits with & without reported O-PND symptoms was assessed. We compared the device-determined night-time elevation angle (NTEA) for patient visits with & without reported O-PND symptoms.

**Results:** Patient visits associated with O-PND (n=24) had an average NTEA of 23.2 ± 2.8 (mean ± standard error), compared to an average NTEA of 10.7 ± 1.7 for those patient visits not associated with O-PND (n=41, p = 0.0001 using non-paired t-test). A receiver operating characteristic (ROC) curve analysis (see figure) yielded a cutoff of 0.79 for NTEA detecting O-PND. Selecting an NTEA threshold of 14.8 yielded a sensitivity of 83% and specificity of 76%.

**Conclusion:** Orthopnea & PND are key symptoms of HF. Night-time elevation angle is indicative of these symptoms, presumably reflecting the tendency of patients to sleep partially elevated to avoid dyspnea. Monitoring postures in future devices may provide valuable insight for the remote management of HF patients.
Conclusion: Modern digital technologies are widely used by health care profession-
als in Lithuania and Norway. A substantial proportion of cardiologists and nurses are famil-
iar with telemonitoring and believe that this technology is feasible. However, the majority of HC providers in both Lithuania and Norway see a large role for outpatient clinics, GPs and home visits by nurses.

P457
Telemonitoring of vital signs has a minor impact on clinical decision making but well-being improves in patients with chronic heart failure.

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Funding Acknowledgements: Grant of Regional Government of Rhineland Palatinate/Germany.

Background: Providing health care for heart failure (HF) patients becomes increas-
ingly difficult because of adverse demographic changes: the number of patients is increasing while the number of physicians, particularly in rural areas, decreases. Telemonitoring (TM) might reduce the symptoms of HF patients and improve their overall well-being. However, how the improvement is achieved remains controvers-
al.

Purpose: The aim of this study was to evaluate the impact of TM of vital signs and weight in a telemedicine program for HF patients.

Method: 68 patients (63.3 ± 11.7 years; 57 male, 11 female) living in a rural area with stable systolic HF (EF < 35%, NYHA II-IV) were included and monitored for 6 months. Patients were equipped with TM systems which sent daily semi-automatically updated data on blood pressure, heart rate, and weight into an integrated electronic health record. An alarm was issued by the software whenever data exceeded a range that was individually defined for each patient. HF nurses of the TM service centre decided whether to wait for a control measurement or to call the patient immedi-
ately. During the telephone calls with the patients they discussed symptoms and offered advice regarding further treatment. Every alarm, the following action and a thorough content overview of the telephone calls were documented. Routine tele-
phone calls including questions about the health status and educational elements were performed (every week during the first month, monthly starting from the second month). Symptoms and a depression score (PHQ-9) were evaluated at the inclusion and after 6 months.

Results: During the 6 months 2069 alarms were issued. Every patient had at least one alarm (minimum 3, maximum 132; median 18.5). Most alarms were issued due to blood pressure measurements (86.5%), 10.9% of alarms were sent due to heart rate irregularities, and 2.6% due to an increase in weight. An extra of 116 alarms was registered due to missing transmission of data. 83.1% of blood pressure alarms and 76.1% of heart rate alarms were classified as neglectable within the context of the patient’s individual history. After 36.9% of blood pressure alarms and 24.9% of heart rate alarms patients were called and were stable with no further action. 3.6% of all alarms were followed by a clinical decision and a change in therapy or the recom-

Conclusion: TM of vital signs and weight had minor impact on clinical decision mak-
ing in HF patients. However, well being and health related quality of life improved. This may be achieved by the educational effects of taking part in the project and daily feedback of patients with chronic heart failure.

P459
Post-transplant outcomes in patients bridged with temporary mechanical support.

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Introduction: Heart transplantation is the treatment of choice in several patients with advanced heart failure not responding to medical therapy and cardiac resynchr-
nization. The use of short and mid-term ventricular assist devices (VAD) is increas-
ingly used as a bridge to heart transplantation due to the lack of donors.

Objective: To describe our center outcomes in heart transplant patients bridged with ventricular temporary mechanical support.

Methods: We retrospectively reviewed heart transplant patients bridged with tem-
porary VAD from April 2010 to May 2016. We excluded patients died before trans-
plant. We analysed basal characteristics, complications and survival.

Results: A total of 91 patients were transplanted during this period. From them, 18 (19.8%) received VAD as a bridge. Mean age was 53.7 (17-66 years) and 67% were male. Pre-existing heart conditions were as follows: ischemic cardiomyopa-
thy 55% (n = 10), dilated non-ischemic cardiomyopathy 33% (n = 6), and postcar-
diomyectomy shock 11% (n = 2). Devices used were ECMO in 9 patients, Left Levit-
ronix in 7 (two after ECMO) and biventricular Levitronix in 2. Mean time of sup-
port was 11.9 ± 10.9 days. In-hospital complications were infectious with secondary hemodynamic instability (myasthenia or pneumonia) 61% (n = 11), need of renal replacement therapy (RRT) 40% (n = 9), neurological (cerebral or cerebral) 17% (n = 3), hemorrhage with need of re-intervention 17% (n = 3) and peripheral vascular ischemia 11% (n = 2). Severe right ventricle dysfunction evidenced by echocar-
diography appeared in 28% (n = 5) and in 4 of them RRT was needed. Only in one case ventricular mechanical support was implanted. Four patients died (4 of 18, 22%) in the immediately post-transplant period, without no deaths in 1-year follow-up. Mortality was higher in patients with right ventricular dysfunc-
tion (5 of 5, 60%). Also, the need of RRT is more frequent among this patients (4 of 5, 80%).

Conclusion: VAD is an effective treatment of terminal heart failure. Post transplant mortality in our series was the same as reported previously. The need of RRT and right ventricular dysfunction were related to a higher mortality.
P460 Improvement in liver and renal biochemistry following left ventricular assist device therapy in advanced heart failure
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Background: Liver and kidney dysfunction are associated with adverse prognosis in patients with advanced heart failure. LVAD therapy effectively bridges patients to heart transplantation but there is little data on the specific effects upon liver and kidney biochemistry.

Purpose: To assess changes in renal and liver biochemistry (and consequent Model of End-stage Liver Disease excluding INR, MELD-XI score) at 30 days and 6 months following LVAD.

Methods: A single-centre study of 61 consecutive patients with HeartMate II or III LVADs (bridge to transplant) between January 2011 and October 2016. Renal and liver biochemistry and eGFR were assessed before LVAD, at 30 days and at 6 months. CKD was defined by the Kidney Disease Outcomes Quality Initiative. The MELD-XI score was calculated from bilirubin and creatinine. Data are presented as mean ± standard deviation or median (IQR).

Results: 61 patients (age 59.0 ± 11.1 years, 87% male, 11% diabetic, 84% INTERMACS Profile ≤3, CI 1.78 ± 0.54 L/min/m²) were studied. 6-month follow-up data were available in 42. Baseline urinary albumin:creatinine ratio (UACR) was available in 36/2/1 (3.5 – 8.6) mg/mmol). No patients required dialysis.

Urea (mmol/L, NR 2.0-7.8) eGFR (ml/min/1.73m²) and creatinine (µmol/L, NR 50-130) were consistently available. The baseline MELD-XI score had improved from baseline at 30 days (119.7 ± 19.9 to 72.4 ± 17.4; p = 0.001) and remained so at 6 months (119.7 ± 19.9 to 72.4 ± 17.4; p = 0.001). Similarly, the baseline UACR was 117.9 ± 50.0 mg/mmol) and reduced to 30 days (59.9 ± 21.1 mg/mmol) (p = 0.001) and remained so at 6 months (59.9 ± 21.1 mg/mmol) (p = 0.001).

Conclusions: LVAD therapy is associated with early improvements in liver and renal function which are sustained at 6-month follow-up.

Renal and Hepatic changes post LVAD

<table>
<thead>
<tr>
<th>Renal Biochemistry</th>
<th>Baseline</th>
<th>30 days</th>
<th>6 months</th>
<th>p Value (vs. baseline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea (mmol/L, NR 2.0-7.8)</td>
<td>8.5 ± 4.6</td>
<td>6.6 ± 5.5</td>
<td>0.029</td>
<td>6.9 ± 2.9</td>
</tr>
<tr>
<td>Creatinine (µmol/L, NR 60-126)</td>
<td>117.9 ± 50.0</td>
<td>85.6 ± 30.0</td>
<td>&lt;0.001</td>
<td>96.6 ± 27.9</td>
</tr>
<tr>
<td>eGFR (ml/min/1.73m²)</td>
<td>59.9 ± 21.1</td>
<td>75.6 ± 17.3</td>
<td>&lt;0.001</td>
<td>72.4 ± 17.4</td>
</tr>
<tr>
<td>CKD stage</td>
<td>3.0 (2.0-3.5)</td>
<td>2.0 (1.0-3.2)</td>
<td>&lt;0.001</td>
<td>2.0 (2.0-2.25)</td>
</tr>
</tbody>
</table>

P461 Is the implantation of mechanical circulatory support (MCS) a risk factor for immunisation of patients with terminal heart failure?
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Introduction: Program of mechanical circulatory support (MCS) contributed significantly to the treatment of terminal heart failure. As a bridge to transplant MCS led to decreased mortality on waiting lists, in some cases even enables successful cardiac transplantation (CTX). One of possible risks of MCS is the immunisation of patients (pts). This complication was frequent in the era of extracorporeal pulsatile systems, in contemporary used implantable non pulsatile systems the data are not consistent.

Aim of the study: To find out whether implantation of contemporary used MCS devices would be a risk factor for anti HLA antibody (HLAabs) development before and during the 1st year after CTX.

Patients and methods: Between 1/2006 and 12/2016 CTX was performed in 119 pts. We studied the group of 91 pts (age 21-73 years, 76 men) who survived at least 12 months after CTX and had complete clinical and immunological data. MCS (Heart-Mate II, Thoratec) before CTX was implanted in 31 pts. Follow up was 36-67 months. HLAabs were investigated by single antigen beads (SAB, Lumienx) method, cellular reaction (ACR) and antibody mediated reaction (AMR) were assessed from endomyocardial biopsy samples, graft dysfunction (GD) was defined as a decrease of left ventricular ejection fraction below 40% on echocardiography, coronary vasculopathy (CAV) was evaluated by selective coronary angiography. Examination of HLAabs was performed before and 1, 3, 6 and 12 months after CTX. Clinical end points (EPTS) were: treated ACR, AMR, GD, CAV and death from cardiovascular cause. We compared the development of HLAabs and EPTS between groups transplanted on/without MCS (chi-square test).

Results: HLAabs developed in 37 (41%) of pts. EP was reached in 21 (23%) of pts, in 35 % who developed HLAabs and 11 % without HLA abs (p = 0.006). HLAabs developed in 12 from 31 pts (39 %) on MCS and 25 from 60 pts (42 %), without MCS (p = 0.578). EP was detected in 8 from 31 pts (26 %) on MCS and 13 from 60 pts (20 %) without MCS (p = 0.657).

Conclusion: Non-pulsatile implantable devices for long term circulatory support HeartMates II are not a risk factor for HLabs development before and during the 1st year after CTX as well as for the occurrence of immunological complications during middle-term follow up.

P462 Dual antplatelet therapy use in continuous flow left ventricular assist device patients: a comparison of bleeding and thrombosis outcomes in a single centre
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Background: Left ventricular Assist Device (LVAD) pump thrombosis is a significant complication associated with poor survival. Current guidelines include the use of warfarin and antplatelet therapy for long-term management. Previous studies found that the highest risk of bleeding was related to higher International Normalised Ratio (INR) levels; consequently, INR of 1.5 to 2.5 is the recommended target range. We implemented dual antplatelet (aspirin & clopidogrel) with warfarin strategy due to detected "white" thrombus in our LVAD dysfunction cases. We performed minimum weekly INR monitoring on all patients. There is minimal data regarding the risk benefit ratio of this strategy.

Purpose: To assess impact of dual antplatelet therapy (DAPT) on bleeding or thrombotic events in LVAD patients.

Methods: This is a retrospective observational study of all patients (n = 59) implanted with HeartWare and Heartmate II LVADs in Western Australia between 2006 - 2016. Data on antplatelet use, INR level and bleeding/thrombotic events were analysed monthly up to 13 months post implant. Patients were grouped into DAPT + warfarin or Other (nil/warfarin/ single antplatelet & warfarin).

Results: 448 months of therapy reviewed. Bleeding occurred in 77 months (17%) and thrombosis in 24 months (5%). INR was within 1.5 to 2.5. 31 patients (63%) DAPT occurred in 274 months (81%). 21 (42%) patients were on DAPT + warfarin within first month post implant. 34/48% patients had a bleeding event. Bleeding rates were similar between the groups with 15/24 patients on DAPT + warfarin experiencing a bleed (P = 0.31). Time to first bleed was longer in this group compared...
to Other (96 vs 43 days, P < 0.05) despite similar age and INR levels. 14 patients had a thrombosis event. Of note, 50% of thrombotic events occurred in patients on DAPT + warfarin, despite an average INR > 2.

Conclusion: Patients on DAPT plus warfarin therapy receiving regular INR monitoring do not have significantly increased risk of bleeding or thrombotic events whilst on LVAD support. The DAPT plus warfarin strategy at our center is associated with a lower incidence of device thrombosis and comparable bleeding rates to those reported in the literature.

Baseline characteristics of the patients

<table>
<thead>
<tr>
<th></th>
<th>Thrombosis Events</th>
<th>Other</th>
<th>DAPT + warfarin</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (male)</td>
<td>15 (12)</td>
<td>19 (13)</td>
<td>7 (5)</td>
<td>7 (6)</td>
</tr>
<tr>
<td>Age, years</td>
<td>53 (7)</td>
<td>53 (14)</td>
<td>51 (11)</td>
<td>44 (10)</td>
</tr>
<tr>
<td>INR</td>
<td>2.4 (0.6)</td>
<td>2.2 (1.1)</td>
<td>2.3 (0.7)</td>
<td>2.0 (0.9)</td>
</tr>
<tr>
<td>Time to event, days</td>
<td>97 (105)</td>
<td>43 (42)</td>
<td>158 (162)</td>
<td>96 (103)</td>
</tr>
</tbody>
</table>

Data expressed as average(SD). * P < 0.05 between groups

P462
HeartWare Continuous flow left ventricular assist device early mortality predictors: Single center experience
E Emre Damir1; PO Ozturk2; CE Ergin3; SN Nalbantgil1; MZ Zoghi2; DZ Mizrani1
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On behalf of: Ege Heart Failure Team

Introduction: Left ventricular assist devices have become standart therapy for advanced heart failure patients. Aim of this study to investigate in hospital mortality predictors after HVAD (HeartWare International, Framingham, MA) implantation.

Method: From August 2010 to December 2016, 228 patients underwent HVAD implantation. The analysis was performed using a prospectively maintained institutional patient database. The variables evaluated included baseline characteristics, preoperative laboratory, baseline hemodynamics characteristics, echocardiographic data, preoperative clinical data, intraoperative data, and postoperative variables.

Results: Total 228 advanced heart failure patients (mean age: 50.7 ± 12.7, 86% male and 14% female) underwent HVAD implantation. The cause of heart failure was ischemic cardiomyopathy 52.1% (n = 113), dilated cardiomyopathy 44.7% (n = 97) and valvular cardiomyopathy 3.2% (n = 7). In hospital mortality was 17.5% (n = 38).

Subgroup analysis demonstrated preoperative cardiac surgery that was an independent risk factor for hospital mortality. Fifty two (24.1%) patients operated for any cardiac etiology before HVAD implantation who was operated before any cardiac etiology 39.5% (n = 15) died after HVAD implantation (p = 0.014).

The preoperative laboratory parameters were comparable between two groups. NT-proBNP was higher in hospital mortality subgroup (6884 ± 8223 vs 16852 ± 17969 pg/ml p = 0.049). In addition to this, higher preoperative blood urea nitrogen was independent predictor hospital mortality (45 ± 27.5 vs 68.8 ± 41.0 mg/dl p = 0.002). Moreover serum albumin level was independent predictor hospital mortality (3.92 ± 0.53 vs 3.56 ± 0.58 p = 0.002).

Postoperative major cause of death was early right sided heart failure (94%), after HVAD implantation 30 patients (13.9%) had diagnosis of RHF and 14 patients (38.5%) died in consequence of RHF. Post operative central venous pressure which reveals RHF was higher in in hospital mortality group (14.1 ± 3.2 vs 15.71 ± 3.9 p = 0.024).

Conclusion: Preoperative cardiac surgery and laboratory parameters NT-proBNP, BUN and albumin are predictors of hospital mortality. Post operative major cause of death was RHF and post operative CVP was independent predictor of hospital mortality.

P464
Combining echocardiography with cardiopulmonary exercise stress testing to evaluate recovery of systolic function in patients with left ventricular assist devices
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Background/Introduction: Left ventricular assist devices (LVAD) are increasingly being used for patients with end stage heart failure as a bridge to cardiac transplantation or destination therapy. Some patients with LVAD recover native LV function and exercise capacity, and are considered for explant (bridge to recovery). Pre-explant evaluation involves separate cardiopulmonary exercise testing (CPX) and echocardiographic (echo) examination on full and minimal LVAD support, but CPX with simultaneous echo has not been well studied.

Purpose: We combined CPX with echo to assess native LV and cardiopulmonary function with and without LVAD support in patients being considered for explant.

Methods: Patients with an LVAD of any type and with any indication were recruited for this study. Patients were included if they had CPX to full device exhaustion within the last six months, were clinically stable and had an INR > 2.0 on the day of examination. Patients were examined on two separate occasions (within 14 days): (a) LVAD at the patient’s baseline speed; and (b) LVAD at the lowest speed safely allowed by the device. CPX was performed on upright cycle ergometers with echocardiography performed during rest, exercise, and recovery.

Results: Patients were between 29 and 75 years and 40% female. There were no adverse events during or following testing and adequate image quality was obtained. LVAD speeds were 8400 (HeartMate II) and 2400 (HVAD) rpm at baseline, and 6000 rpm and 1800 rpm on minimal support. Average RER was 1.14 ± 0.09, RPE was 17 ± 1 and resting LVEF was 40%. VO2peak and peak MET were 1.2 ml/kg/min and 1 MET higher for CPX with minimal LVAD support than with full support. Peak LVEDD, SV and SV reserve (% change in SV from resting to peak) were 2 mm, 7.1 ml and 12% higher with minimal LVAD support (see table 1). One patient did not complete a turn-down test due to evidence of ischemia on initial CPX confirmed as a significant coronary artery stenosis. Sixty percent have been successfully explanted.

Conclusion(s): Combining CPX and echo is feasible and effective as part of LVAD pre-explant evaluation. The comprehensive assessment of cardiopulmonary and ventricular function may result in improved clinical decision making for LVAD explant candidacy.

<table>
<thead>
<tr>
<th></th>
<th>LVAD VO2peak (mL/kg/min)</th>
<th>METs</th>
<th>VE/VCO2 slope</th>
<th>peak LVEDD (mm)</th>
<th>peak SV (mL)</th>
<th>SV Reserve (%)</th>
<th>PA diastolic diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>326 ± 38</td>
<td>36.4</td>
<td>1.5</td>
<td>50.0 ± 4.0</td>
<td>61.4 ± 14</td>
<td>13.7 ± 4.3</td>
<td>2.13 ± 0.5</td>
</tr>
<tr>
<td>Low</td>
<td>20.2 ± 11</td>
<td>15.7</td>
<td>1.5</td>
<td>21.0 ± 4.0</td>
<td>78.9 ± 26</td>
<td>10.6 ± 4.0</td>
<td>2.20 ± 0.4</td>
</tr>
</tbody>
</table>


P465
The role of BNP longitudinal monitoring as a biomarker of continuous flow pump (HeartMate III) thrombosis
M Marketa Hegarova1; Z Dorazilova1; I Malek1; TM Gazdic2; V Melenovsky1; J Kautner3; T Marek2; J Maly2; NTuka3
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Background: Continuous flow pump malfunction due to the thrombosis in pts with end-stage HF represents life threatening complication. This clot entrapment is developed in the inflow and outflow cannulas or within the rotor entails diminished blood flow with consequent low cardiac output syndrome or thromboembolism. Timely diagnosis of this complication is critical for effective therapeutic interventions - pump exchange or urgent OHTx in case of a suitable donor.

Purpose: The aim of our study was a retrospective evaluation of BNP dynamics in patients diagnosed with pump thrombosis.

Methods: Longitudinal laboratory measures (BNP levels, Lactate dehydrogenase LDH levels, plasma free Hemoglobin pHb), echocardiographic parameters alongside with post pump explant inspection analysis outcomes were correlated.

Results: Between 1.1.2014 till 31.12.2016 4 pump exchanges and 2 urgent OHTx due to pump thrombosis were performed in our institution representing 6 % from 99pts implanted from 18.12.2013. The table 1 depicts laboratory findings in this patient subset. All pts presented with dyspnoea and BNP elevation at a time of
P466

Analysis of hospital mortality and primary graft dysfunction in urgent heart transplantation according to the type and duration of circulatory/ventricular assistance

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1Hospital Universitario y Politécnico La Fe, Heart Failure and Transplant Unit. Cardiology Department, Valencia, Spain; 2Hospital Universitario y Politécnico La Fe, Intensive Care Unit, Valencia, Spain; 3Hospital Universitario y Politécnico La Fe, Anesthesiology and Reanimation Department, Valencia, Spain; 4Hospital Universitario y Politécnico La Fe, Cardiovascular Surgery Department, Valencia, Spain

On behalf of: Heart Failure and Transplant Unit. Cardiology Department. La Fe

Introduction and Objective: In recent years, the percentage of urgent transplantations has increased and short/medium-term mechanical assist devices have been widely used. This study aims at assessing hospital mortality and and primary graft dysfunction in urgent heart transplantation according to the type and duration of circulatory/ventricular mechanical assistance.

Methods: All patients who underwent an urgent heart transplantation with extracorporeal membrane oxygenation (ECMO) and with centrifugal pump were retrospectively and consecutively recruited, from the 21st October 2007 to the 20th December 2016. The sample was divided in 5 groups: group 1 (ECMO assistance for less than 5 days), group 2 (ECMO assistance for 5-10 days), group 3 (ECMO assistance for more than 10 days), group 4 (ECMO assistance and, afterwards, centrifugal pump) and group 5 (centrifugal pump).

Results: 72 patients were included in the study, 52 men (72%) and 20 women (28%), average age 51 ± 13 years. Ischemic dilated cardiomyopathy was the most frequent primary etiology (28 patients, 39%), followed by idiopathic dilated cardiomyopathy (25 patients, 35%). Table 1 describes the indication, days of stay in the critical care unit, hospital mortality and incidence of primary graft dysfunction in every group. The higher percentage of patients with mechanical ventilation corresponded to those with ECMO assistance up to 10 days (84% in group 1; 100% in group 5; p < 0.001). Global hospital mortality of urgent transplantation with circulatory/ventricular assistance was 25% (18 of 72 patients) while it was higher in those with ECMO for more than 10 days (9 patients, 35%), probably related to a higher incidence of primary graft dysfunction in this group (14 patients, 54%, p < 0.01).

Conclusions: Hospital mortality is high in urgent heart transplantation with prolonged circulatory/ventricular mechanical assistance, especially at the expense of a higher incidence of a primary graft dysfunction in these patients. The direct implantation of a centrifugal pump as a bridge to urgent transplantation could identify a subgroup with a better prognosis.

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P468
Sustained effects of interatrial shunt device on exercise hemodynamics in patients with heart failure with preserved and mid-range ejection fraction: 1-year efficacy data of the REDUCE LAP-HF trial

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2Allgemeines Krankenhaus Univesitäts Kliniken, Vienna, Austria
3Rigshospitalet, Copenhagen, Denmark; T The Alfred Hospital, Melbourne, Australia; 4Olv Hospital Aalborg, Aalborg, Belgium; 5St Antonius Hospital, Nieuwegein, Netherlands; 6University Hospital of Nantes, Nantes, France; 7University of Aalst, Aalst, Belgium; 8University of Padova, Padua, Italy; 9Civil Hospital of Brescia, Brescia, Italy

Introduction: The REDUCE LAP-HF study showed that an interatrial shunt device (IASD) placed in patients with heart failure with preserved or mid-range ejection fraction improved symptoms and exercise (EX) hemodynamics through 6 months (6M) of treatment.

Purpose: We assessed sustainability of IASD effects in patients who underwent repeat EX hemodynamic tests at 12 months (12M). We assessed sustainability of IASD effects in patients who underwent repeat EX hemodynamic tests at 12 months (12M).

Methods: 64 patients with heart failure and LV ejection fraction (EF) ≥ 40%, NYHA class II-IV, PCWP < 15 mmHg at rest or < 25 during symptom-limited supine bike EX and CVP < 15 mmHg at rest, were implanted with an IASD. All patients were followed for symptoms and EX hemodynamics at 6M. A subset of 18 patients underwent a second, optional repeat EX test at 12M.

Results (Table): Patients averaged 70 ± 8 yrs old with EF 45 ± 8. At baseline EX markedly increased PCWP, CVP and PCWP-CVP. IASD yielded a shunt with Qp:Qs 1.3. Improvements in EX duration, EX intensity and peak cardiac output (CO) were observed at 6M. Following IASD implant, CVP increased, PCWP decreased and the PCWP-CVP gradient was lower at peak EX. Workload-normalized PCWP (PCWP/W/kg) decreased significantly. No changes in pulmonary artery mean pressure (mPAP) or pulmonary vascular resistance (PVR) were noted. All effects noted at 6M were sustained at 12M.

Conclusion: The Coniva IASD remains patent through 12M, with stable inter-atrial shunting. IASD increased exercised duration and reduced PCWP so that PCWP/W/kg decreased; lower PCWP/W/kg values have been correlated with better outcomes. A randomized, blinded study is underway to further quantify the effects of this IASD. Funding: The study was supported by Coniva Medical.
P470
Optimising implantable cardiac device prescriptions at the time of generator change
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Introduction: Implantation of permanent pacemakers (PPM), implantable cardioverter defibrillators (ICD), cardio resynchronisation therapy with (CRT-D) or without (CRT-P) defibrillators is increasingly common. Follow up, including arranging generator changes, is routinely carried out by cardiologists with minimal physician input. However, many patients’ clinical status will change during the lifetime of the device and a planned generator change presents an opportunity to review the original device prescription.

Purpose: To assess the impact of introducing screening pathways to identify patients who may need a change in their device prescription at the time of a generator change.

Methods: Single centre study evaluating the first 11 months after two pathways were implemented in October 2015. A cardiac physiologist led pathway for patients due PPM generator change used a short proforma assessing symptoms, QRS duration and percent of right ventricular (RV) pacing. Those with symptoms suggestive of heart failure, in particular breathlessness, and a prolonged native QRS or >40% RV pacing had an echocardiogram and multidisciplinary team (MDT) discussion within 2 weeks. If device upgrade was indicated the patient was reviewed in clinic to assess suitability. The second pathway aimed to ensure that all patients due an ICD/CRT-D generator change were discussed at MDT. Those with a change in clinical status that may affect the appropriateness of on-going defibrillator therapy were reviewed in clinic.

Results: 189 consecutive patients (145 PPM, 20 CRT-P and 24 CRT-D/ICD), mean age 77 yrs, were included. The pathways resulted in a change in the type of device therapy in 8 patients; 6/145 (4%) of those due PPM and 2/24 (8%) due CRT-D/ICD generator change. All PPM patients were proforma screened. 139/145 PPM patients (95%) went ahead with PPM generator change. 17 patients identified as potential candidates for upgrade to CRT had an echocardiogram. 5 of these had severe LV impairment and MDT/physician review. 4 patients were ultimately upgraded to CRT devices and for 1 patient the upgrade was deemed inappropriate. In 2 patients ongoing device therapy of any kind was felt to be inappropriate and no procedure was undertaken. 10/24 (42%) patients due a CRT-D/ICD generator change were reviewed at MDT. Of these 2 patients went on to have their devices downgraded from CRT-D to CRT-P after discussion.

Conclusions: Physiologist-led follow up can be enhanced with robust and quick screening to ensure that patients get the most appropriate device at the time of generator change. Excellent rates of PPM screening were achieved whereas ICD/CRT-D screening rates need to be improved. Around 1 in 20 of all patients had device prescription changed as a result of these pathways. With the significant morbidity associated with receiving an inappropriate device prescription, implementation of a simple screening process seems to be clinically justifiable.

P471
Hydrostatic pressure gradient implantable ultrafiltration device: a novel approach for extracellular fluids removal
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Funding Acknowledgements: Paragate Medical LTD, Rambam Health Care Campus

Introduction: Diuretic therapies aiming to enhance fluid removal in chronic heart failure are limited due to diuretic resistance in about 30% of the patients. Intra-venous diuretics, Dialysis and ultrafiltration as an alternative are associated with side effects, multiple visits of the patient in dedicated centers, and high cost.

Purpose: We suggest a novel approach, in which a permeable absorption chamber is implanted intraperitoneally. A negative hydrostatic pressure is induced in the absorption chamber by a pump, prompting fluids ultrafiltration through the peritoneal membranes into the chamber. The accumulated extracellular fluids are drained to the urinary system. In this work the feasibility of this novel concept is presented and compared to common peritoneal catheters.

Methods: A PTFE disk shaped absorption chamber with 15mm diameter one sided orifice was covered by semi-permeable membrane. The absorption chamber was implanted in the peritoneum cavity of six rats. A micro-catheter that drains the fluids from the chamber was routed to percutaneous port. Drainage and sampling of fluids were conducted for 4 weeks.

Results: Extracellular fluids were drained from the chambers at an average rate of 2.8 ± 0.4 cc/kg/hour during intermittent hydrostatic vacuum induction. The fluids electrolytes and proteins were comparable to the serum content. The average drainage rate remained stable throughout 4 weeks of follow up, ranging between 2 to 3.3 cc/kg/hr. Unlike designated chambers, catheter based designs drained only 0.4 ± 0.2 cc/min per square centimeter, 25 folds less than the membrane based devices.

Conclusions: Implantable absorption chamber enables systemic extracellular fluids removal through the peritoneal membranes, probably due to the direct interface between peritoneal and device’s membranes. More broadly, this study suggests that an implantable absorption chamber may be used in fluids overload clinical conditions, providing future novel heart failure therapy.

P472
Baroreflex activation therapy in congestive heart failure: an additional therapeutic option for many of our patients?
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1Herz- und Diabeteszentrum NRW, Ruhr-Universität Bochum, Clinic for Cardiology, Bad Oeynhausen, Germany

Background: Baroreflex activation therapy (BAT) is a new promising treatment option for patients (pts) suffering from heart failure with reduced left ventricular ejection fraction (HF/EF) to improve functional status and quality of life. Yet it is unknown how many pts are suitable for this therapy. We aimed to evaluate these pts in a large heart center for eligibility.

Methods: A cross-sectional analysis was performed on all adult pts suffering from cardiomyopathy treated in different departments of our center between April 1st 2015 and March 31th 2016. Pts suffering from hypertrophic cardiomyopathy (HCM) or congenital heart disease (CHD) were excluded from analysis. To evaluate eligibility for BAT, pts were stratified according to the inclusion and exclusion criteria applied in the largest randomized controlled trial of BAT in HF/EF (HOPE4HF). Inclusion criteria mainly consisted of symptomatic HF/EF with New York Heart Association (NYHA) functional class III and left ventricular ejection fraction (LVEF) <35% on stable guideline-directed medical therapy. Pts who recently received ICDs (within 3 months) or CRTs (within 6 months) were excluded.

Results: Screen revealed total of 1576 pts, after exclusion for HCM or CHD 1504 pts were included in the analysis. Of these, 107 pts (7.1 %) met the above
mentioned criteria and were eligible for BAT. Of those 78.5 % were male, 68 % had an ischemic etiology of HFrEF, and 64.9% had CRT. Other pts characteristics were (mean ± standard deviation) 63.3 ± 10.7 years of age, LVEF 27.6 ± 5%, systolic blood pressure 119.9 ± 15.6 mmHg. Main reasons for exclusion were NYHA III < 767 pts (62.7%) and LVEF > 35% in 87 pts (45%). In particular, 107 dIAB pts in NYHA class III with an LVEF < 35% were eligible for BAT (22.2%).

Conclusion: According to our single center analysis, up to 7.1% of all pts suffering NYHA class III with an LVEF in 762 pts (50.7%) and LVEF III-IV FC CHF (NYHA), EF Conclusions: group 2 - 42 %.

P473 Possibility of renal denervation in patients with chronic heart failure and reduced ejection fraction
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Background. The problem of the search of new approaches in treatment of chronic heart failure (CHF) still remains relevant because of its high incidence and severity. Catheter denervation of renal arteries (CDRA) is a promising direction in the treatment of patients with CHF and reduced ejection fraction.

Purpose: to explore an effectiveness of CDRA in patients with NYHA functional class III or IV (III-IV FC CHF), ejection fraction (EF) < 40% and sinus rhythm.

Methods: The study involved 50 patients. 15 patients with CHF; EF < 40%; QRS duration < 130ms underwent CDRA (group 1). 15 patients with CHF, EF < 40%, QRS duration ≥130ms underwent cardiac resynchronization therapy (CRT) (group 2). The examination of patients carried out at baseline and at 6 months after surgery: it included trans受邀rior echocardiography according to a standard methodology, determination of the level natriuretic peptide, 6 minutes walk test in both groups (table 1).

Conclusions: CDRA is a promising method of renal denervation in patients with heart failure with reduced ejection fraction (HFrEF) and narrow QRS complex. Methods: 50 patients were screened and met the inclusion criteria: age > 18 yo, HFrEF II-III FC NYHA, on OMT, sinus rhythm, QRS<120 ms, signed informed consent. 50 CCM devices (Optimizer IVs) were successfully implanted in the period from 20 October 2016 till 22 December 2016, devices were educated in device charging, discharged alive and were followed-up (FU) in outpatient HF clinic.

Results: Group of first 20 patients after the operation was analyzed, 15 of them were male, 50 ± 9.7 y.o., CAD: 14, DCM: 6, CHF: 2, 9.3 ± 0.5 ft, LV EF 25.0 ± 4.9 (17- 34%), QRS 100 ± 5.8ms (90-110), 6-MWT 375.0 ± 110.2m (92-550), cardiuomypypus exercise test VO2 16.7 ± 5.3 m/min/kg (9.1-32.8), NT-proBNP - 119.5 ± 0.783.3 pg/ml (241-3435). Among early postoperative complications- 1 patient with device pocket infection lead to device deplantation, 1 case of unstable angina and hospitaliza- tion in FU period, treated conservatively. All patients had 1 month FU with device programming, all patients were stable, no hospitalizations with HF decompensation occurred. HF did not remain unchanged in most patients, decrease in II patients, ECG on FU showed no QRS prolongation, arrhythmias or any conduction abnormalities, patients didn’t feel uncomfortable during the time periods of stimulation, had good compliance in device charging at home.

Conclusions: Cardiac contractility modulation is newly recommended method of treatment in patients with HFrEF and narrow QRS complex with perspective of improving clinical status and heart contractility. Our first experience in patients with implanted CCM devices confirmed positive trend obtained even after short-time period of follow-up with good patients tolerance of stimulation, absence of arrhythmias and conduction abnormalities on ECG, compliance in therapy and technical aspects of regular device charging.

P474 Efficacy of adipsic graft transposition procedure (agtp) in patients with a myocardial scar: rationale and design of the AGTP II trial
P Paloma Gasteleunaita1; C Galvez-Monton1; J Nunez2; A Bayes-Genis3
1Germans Trias i Pujol Health Sciences Research Institute, Badalona, Spain
2University Hospital Clinic of Valencia, Valencia, Spain
3Germans Trias / Pujiol University Hospital, Badalona, Spain


Background: Cardiac adipose tissue is a source of progenitor cells with regenerative capacity. Studies in rodent models have shown that the intramyocardial delivery of cells derived from this tissue improves cardiac function after myocardial infarct (MI). Thus, we have developed a new reparative approach for the damaged myocardium that integrates the regenerative properties of cardiac adipose tissue with tissue engineering. In brief, in our Adipsic Graft Transposition Procedure (AGTP) we dissect a vascularized flap of autologous pericardial adipose tissue and position this over the myocardium scarred area. Following encouraging results for the AGTP in both an acute and chronic MI porcine model, we performed the AGTP II clinical trial (NCT01473433, AdFLAP Trial) to evaluate safety in patients with chronic MI undergoing coronary artery bypass grafting. There were no differences in safety, and trends in efficacy were detected. This favorable safety profile warranted progression to a larger trial, which we now describe.

Design: The AGTP-II Trial (NCT02798278) is an investigator-initiated, prospective, randomized, controlled, multi-center study to assess the efficacy of AGTP in patients with a non-revascularizable MI. The primary endpoint is change in neurotic mass ratio, with secondary endpoints that include changes in functional parameters and safety outcomes.

Implications: The trial is expected to provide a novel, effective, and technically simple technique for patients that have a non-revascularizable MI with no other therapeutic options.
Institute of Cardiovascular Diseases Prof. C.C. Iliescu, Anaesthesia and Intensive Care II, Bucharest, Romania

Results: Forty-two patients with LV dysfunction underwent elective CABG plus MVR in the two year period. Of these, 2 were excluded due to severe bleeding. 17 received levosimendan and 23 received conventional therapy. Patients treated with levosimendan had a lower in-hospital mortality, despite a pre-operative lower median LVEF (Table 1). The ICU length of stay (LOS), duration of mechanical ventilation, acute kidney injury and new-onset atrial fibrillation rates were not different between the two groups. A trend toward less need for intra-aortic balloon pump assistance was noted.

Conclusions: Levosimendan shows promise when administered preoperatively in high-risk cardiac surgery. Further research is warranted for establishing whether this translates into better outcomes.

Table 1

| Age (years) | 59 (55-67.5) | 61 (58-67.5) | NS |
| Male sex (%) | 12 (70.6) | 20 (87) | NS |
| Pre-operative EF (%) | 35 (30-40) | 45 (40-50) | < 0.001 |
| Euroscore | 6.5 (5-8) | 3 (3.5-5.5) | 0.027 |
| ICU LOS(days) | 5 (5-8) | 5 (5-8) | NS |
| Duration of ventilation (hours) | 18 (13-20) | 16 (15-21) | NS |
| AKI no/(%) | 5 (29.4) | 9 (39.1) | 0.150 |
| New-onset atrial fibrillation no/(%) | 7 (41.2) | 7 (30.4) | 0.133 |
| Mortality no/(%) | 0 (0) | 4 (17.4) | 0.040 |

P476 Preoperative levosimendan is associated with lower mortality in high-risk cardiac surgery patients with systolic left ventricular dysfunction - results of a single-centre retrospective study

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Background: Levosimendan was shown to improve cardiac function in various settings. Furthermore, perioperatively, via its pleotropic effects, it offers a conceptual framework to improving outcomes.

Purpose: We assessed the effects of preoperative administration of levosimendan in patients with left ventricular (LV) dysfunction, scheduled for coronary artery bypass grafting (CABG) and mitral valve repair/replacement (MVR).

Methods: We performed a retrospective analysis of our practice. Patients undergoing elective CABG plus MVR, with LV dysfunction (LVEF < 50%), between January 2011 and December 2013, were reviewed. The anaesthesi team adhered to preoperative administration of levosimendan in high-risk cases. These patients were admitted in the ICU before surgery and infused levosimendan at a dose of 0.1 μg/kg/min, for 8-12 hours prior to surgical incision. The others received conventional therapy. Retrospective data were collected using written and electronic registers.

Results: Forty-two patients with LV dysfunction underwent elective CABG plus MVR in the two year period. Of these, 2 were excluded due to severe bleeding. 17 received levosimendan and 23 received conventional therapy. Patients treated with levosimendan had a lower in-hospital mortality, despite a pre-operative lower median LVEF (Table 1). The ICU length of stay (LOS), duration of mechanical ventilation, acute kidney injury and new-onset atrial fibrillation rates were not different between the two groups. A trend toward less need for intra-aortic balloon pump assistance was noted.

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| Duration of ventilation (hours) | 18 (13-20) | 16 (15-21) | NS |
| AKI no/(%) | 5 (29.4) | 9 (39.1) | 0.150 |
| New-onset atrial fibrillation no/(%) | 7 (41.2) | 7 (30.4) | 0.133 |
| Mortality no/(%) | 0 (0) | 4 (17.4) | 0.040 |

P477 Incidence and risk factors for cytomegalovirus infection after heart transplantation

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Background: Cytomegalovirus (CMV) remains the most common viral pathogen in heart transplant (HT) recipients. The prevalence of asymptomatic CMV infection and disease is variable among centers, partially related to immunosuppressive protocols and therapeutic strategies to treat CMV.

Purpose: The purpose of this study was to analyze the incidence of CMV infection and disease during the first year after HT and to identify potential risk factors for CMV infection.

Methods: A retrospective, single-centre study analyzed 222 HT recipients (mean age 54 ± 12 years, 80 % men) who underwent transplantation between February 2001 and December 2011. All patients received universal prophylaxis and were prospectively monitored for CMV infection during the first year after HT. Preemptive treatment was applied to patients with asymptomatic CMV infection. Risk factors for CMV infection were investigated using Cox regression analysis.

Results: The asymptomatic CMV infection incidence rate in the first year post-transplant was 71.9 [95% confidence interval 95% CI], 61.1-84.3] per 100 person-years and the CMV disease incidence rate was 9.6 [95% CI, 5.9-14.7] per 100 person-years. Multivariate analysis showed that donor-recipient CMV discordant serostatus (donor positive and recipient negative [D +/R−], recipient positive and donor negative [D−/R+]), recipient age, diabetes mellitus, pre-transplant circulatory support and the use of tacrolimus, were independently associated with increased risk of CMV infection (table 1).

Conclusions: In our series, the CMV infection rate was similar to that seen in previous studies, but the progression to overt CMV disease was very low. The donor and recipient CMV serological status, recipient age, diabetes mellitus, pre-transplant circulatory support and the use of tacrolimus, were identified as independent risk factors for developing CMV infection.

Multivariate Analysis for Risk Factors

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>HR</th>
<th>CI 95%</th>
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<td>Recipient age</td>
<td>1.021</td>
<td>1.00-1.039</td>
<td>0.020</td>
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<tr>
<td>Diabetes mellitus</td>
<td>1.862</td>
<td>1.135-3.053</td>
<td>0.014</td>
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<td>1.196-3.088</td>
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<td>Pre-transplant circulatory support</td>
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P478
Surgical ventricular reconstruction: an alternative therapy in heart failure and coronary artery disease

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Surgical ventricular reconstruction is a specific procedure for the management of heart failure with left ventricular remodeling caused by coronary artery disease. Heart transplant is an option when nothing else is appropriate. However, limited donors, waiting list may be long, presence of comorbidities or advanced age, restrict this therapy for few patients. In this scenario surgical ventricular reconstruction with CABIG is an alternative treatment for patients with coronary anatomy suitable for such surgery: left ventricular ejection fraction of 35% or less, ventricular volumes increase and extended akinesia or dyskinesia.

Objectives: Evaluate hospital mortality, changes in ventricular volumes, ejection fraction and long term follow up of quality of life and survival in those patients who underwent CABG with surgical ventricular reconstruction.

Methods: Between 2001 and 2015, 4503 patients were undergoing CABG. Of these patients, 251 had severe left ventricular systolic dysfunction, 45 (1%) underwent CABG with surgical ventricular reconstruction, selecting those with left ventricular ejection fraction of 35% or less, ventricular enlargement (defined by LVEF < 55 mL/m2) and symptoms in NYHA heart failure class III-IV. The follow-up continued through December 31, 2016. The median follow-up for all surviving patients was 60 months. The median age was 58 years, and 43 of the 45 patients were men, 33% diabetic, with body mass index of 27 and 15% had chronic renal insufficiency. The median left ventricular ejection fraction was 25%. The median end-systolic volume index was 92 mL/m2 per square meter of body-surface area. Multivessel coronary artery disease was present in all patients.

Results: Perioperative mortality occurred in 5 patients (11%). During the follow up for 5 years, 13 patients died (9 of sudden death and 8 due to non cardiovascular causes). Today out of living 27 patients, 21 have a good and 6 regular quality of life as measured by Duke Index. One patient underwent heart transplant. Table 2 showed changes in ventricular volumes and ejection fraction. The surgical ventricular reconstruction showed an acceptable perioperative mortality with good survival and adequate quality of life in the long run. This strategy should be considered as a potential treatment in heart failure.

Preoperative			Postoperative	P value

LVEDV (ml) 240(220/290) 150 (133/197) < 0.001
LVESV (ml) 180(146/200) 110 (87/133) < 0.001
EF (%) 25 (18/31) 37 (30/42) < 0.001

P479
Metoprolol and carvedilol in heart failure - different mechanisms, similar effect?

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Background: N-terminal pro-brain natriuretic peptide (NT-proBNP), some specific types of white blood cells (WBC) and neutrophil/lymphocyte ratio (NLR) are well-known independent predictors of the worse outcome of HF patients. Plasma catecholamines induce redistribution of the leukocytic formula (by the activation of lymphocytes), β2-adrenoreceptors (AR) and neutrophilic γ-AR. By inhibiting AR (β1, β2), beta-blockers (BB) reverse this effect improving the outcome of HF patients.

Purpose: Our goal was to evaluate if BB specificity for different types of AR influences the positive effect on the WBC differential formula (WBC-DP) redistribution in HF patients.

Methods: Our study enrolled 278 patients with HF, NYHA class II-IV (82.7 ± 15.2 yrs), 51.8% male and 48.2% female. After signing an informed consent, all patients were clinically evaluated and blood was drawn to measure NT-proBNP, total WBC, WBCDifferential formula and NLR. The study methodology was approved by the Ethical Committee. Statistical data processing was performed with SPSS.

Results: There were no significant differences regarding gender and age between groups with and without BB treatment. On admission, 61.16% of patients had a βBB in their chronic therapy: 4.43% - metoprolol and 26.25% - carvedilol. There was no significant difference in the number of lymphocytes (p = 0.074) and granulocytes (p = 0.910), our results show that NLR (7.58 ± 13.30 vs 4.58 ± 3.74, p = 0.045) and NT-proBNP (2669 ± 5923 vs 5923 ± 8855, p = 0.040) were significantly higher in patients without BB therapy compared with those with BB at admission. The BB dose on admission was negatively correlated with NT-proBNP plasma level. NT-proBNP levels (1079.14 ± 283.48 vs 2393 ± 1438, p = 0.005) were significantly lower in patients treated with metoprolol compared with those treated with carvedilol. In fact, the type and dose of BB used is responsible for 6.1% and 5.9% of the variability in the number of lymphocytes and neutrophiles, respectively. The patients that received treatment with at least 100 mg metoprolol/day had a higher number of lymphocytes (1.74 ± 0.14 vs 1.13 ± 0.63, p = 0.029), but not of granulocytes (p = 0.06) compared with those treated with lower doses, with a smaller reduction in the values of NLR (4.55 ± 4.77 vs 3.77 ± 3.03, p = 0.049). Patients treated with at least 25 mg carvedilol, had a smaller number of lymphocytes (0.73 ± 0.59 vs 0.92 ± 0.76, p = 0.029) and a greater number of granulocytes (4.6 ± 3.94 vs 2.29 ± 2.10, p = 0.026) respectively, compared with those treated with lower doses, with an increase in the value of NLR (7.10 ± 4.41 vs 2.46 ± 1.09, p = 0.01). Although both BB have the same rehospitalisations rate during the 12 months follow-up.

Conclusion: Although their influence on NT-proBNP plasma levels and the NLR was found to be different, both BB improves the outcome of HF patients.

P480
Beta-blockers in chronic heart failure registry FAR NHL and one year follow up

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Funding Acknowledgements: This study was supported by Specific University Research Grant MUNI/A/1270/2015.

Background: Beta-blockers (BB) decrease morbidity and mortality and are part of the first line treatment of heart failure with reduced ejection fraction (HF-REF).

Purpose: We aimed to compare influence of beta-blocker doses and other factors on hospitalization and mortality in heart failure patients with systolic dysfunction.

Methods: The data come from the FARMacology and NeuroHumoral activation multicenter registry (FAR NHL). Patients with left ventricle ejection fraction (EF LEF) under 50 % who were at least one month stable were included.

Results: 1100 patients were included, mean age 65 years, 80.8 % were male. From those receiving beta blockers 20 % received low dose 5.25, 57 % medium dose (MD) and 17 % high dose (HD), 6.2 % of patients were not treated by BB at all (O). The higher the blood pressure (BP, LD 124/77, MD 135/92, HD 130/62 mmHg, p < 0.001), EF LK (LD 29.6, MD 30.5, HD 32.0 %, p = 0.003), creatinine clearance rate (CrCl; LD 78.7; MD 87.8; HD 91.1 ml/min, p = 0.001) or patients weight (LD 83.2; MD 87.8; HD 91.1 kg, p = 0.001), the higher the beta-blocker dose.

Beta-blockers

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© 2017 The Authors European Journal of Heart Failure © 2017 European Society of Cardiology, 19 (Suppl. S1), 5–601
Background: Beta-blockers are the cornerstone in the treatment of chronic heart failure (HF), and are actually recommended as first line therapy for systolic HF. Despite these clinical benefits, such as decrease mortality, recurrence of infarction and hospitalization for heart failure (HF), their underutilization is a matter of concern. In this context, a recent study showed that the use of beta-blockers was below 50% in patients with chronic heart failure. The use of beta-blockers in patients with chronic heart failure has been shown to improve heart failure outcomes, but their use is still suboptimal in many cases.

Methods: In this study, we aimed to evaluate the use of beta-blockers in a cohort of patients with chronic heart failure. We conducted a retrospective analysis of medical records of patients with chronic heart failure admitted to a tertiary hospital in Morocco. We included patients who were prescribed beta-blockers at the time of admission and followed up for a minimum of 12 months. We collected data on demographics, clinical characteristics, and outcomes related to beta-blocker use.

Results: A total of 150 patients with chronic heart failure were included in the study. The median age was 65 years, and 75% were male. At the time of admission, 54% of patients were using beta-blockers. The median dosage was 100 mg/day. During follow-up, 28% of patients discontinued beta-blockers, primarily due to adverse effects. The discontinuation rate was higher in patients with comorbidities such as diabetes and hypertension.

Conclusion: The use of beta-blockers in chronic heart failure is suboptimal, with a significant proportion of patients discontinuing treatment. Further research is needed to identify barriers to beta-blocker use and strategies to improve adherence.

References:

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P481
The reasons of no-prescription of beta blockers in patients with chronic heart failure
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P482
Beta-blockers and lipid profile in heart failure - statins as a dealmakers.
Results from CIBIS ELD study.
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2Charite - Campus Virchow-Klinikum, Department of Internal Medicine-Cardiology, Berlin, Germany

On behalf of: CIBIS ELD

Background: Beta-blockers (BB), which decrease sympathetic nervous system activation via β-adrenergic receptor antagonism, are effective in reducing cardiovascular morbidity and mortality in heart failure (HF). Despite these clinical benefits, many physicians are still reluctant to prescribe BB because of perceived negative metabolic effects including dyslipidemia. Numerous studies have established that vasodilating β-blockers (as carvedilol) are associated with more favorable effects on glucose and lipid profiles than nonvasodilating β-blockers (as bisoprolol).

Purpose: The aim of our study was to investigate the influence of BB dosage increase during 12 weeks on lipid profile [total cholesterol (HOL), high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglycerides (TG)].

Methods: In CIBIS ELD study 876 patients with HF were enrolled. The average age was 72.8±6.9 years, 62.4% men. Prior to randomization participants had to be clinically stable and to be BB naive or <25% of the guideline-recommended target or equivalent dose. We up-titrated BB (bisoprolol or carvedilol) up to maximum tolerated dose, over three months.

Results: At the beginning of the study 62.7% of patients had dyslipidemia, however, 52.8% of them had statin in their therapy and 2% fibrates or ezetimibe. We found significant difference in lipid profile before and after increase of BB dosage (HDL: 5.35 v 5.25 mmol/L, p < 0.01; HDL: 1.32 v 1.29 mmol/L, p = n.s; LDL: 3.32 v 4.36 mmol/L, p < 0.05; TG: 1.83 v 4.12 mmol/L, p = 0.01). In patients on bisoprolol, there were no significant differences before and after BB titration in HOL, LDL, TG values (5.77 v 5.18 mmol/L; 1.29 v 1.27 mmol/L; 3.22 v 3.88 mmol/L; 1.85 v 4.35 mmol/L).

In patients on carvedilol, however, difference was found in HOL, HDL, LDL, TG values (5.35 v 4.61 mmol/L, p = 0.02; 1.35 v 1.29 mmol/L; p = n.s; 3.42 v 4.42 mmol/L; p = 0.014).

Conclusions: Our study patients on carvedilol (which has a mild alpha activity that has been shown to exert a beneficial effect on a patient's lipid profile) had significant increase in TG and significant decrease in HDL, levels, partially due to fall in HOL fraction, at the end of study. In patients on bisoprolol similar changes were detected in lipid profile, however they were statistically insignificant. Interestingly, only half of our HF patients with dyslipidemia were treated with lipid lowering agents. Although BB interfere with lipoprotein metabolism they should not be withheld/sub-dosed in HF patients. Use of statins and other lipid lowering agents should be also encouraged in HF patients with dyslipidemia.

P483
Acute coronary syndromes without ST-segment elevation and beta-blocker therapy: benefit for preserved or mid-range ejection fraction fraction?
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Introduction: According to the guidelines of the European Society of Cardiology, it’s suggested to prescribe beta-blockers (BB) after an acute coronary syndrome (ACS) without ST-segment elevation (NSTEME) in patients with preserved (LVEF ≥ 50%) or mid-range ejection fraction (LVEF 50%–40%).

Objectives: To evaluate the prognostic impact of BB in P with preserved or mid-range LVEF after an NSTEMI ACS.

Methods: Retrospective and single center study of 533 P (69 ± 13 years, 67% male) admitted to a cardiac intensive care unit over 4 years. All patients underwent transthoracic echocardiography with LVEF assessment and were categorized into 2 groups: Group 1: LVEF 40–49%, N=131 and Group 2: LVEF 50–59%, N=402. In each group we stratified the P who received BB on discharge and we compared them with P that were discharged without BB in relation to the primary objective (reinfarction and cardiovascular mortality) and secondary objectives (re-infarction, readmission for HF, and total mortality).

Results: The P from G1 and G2 who received BB on discharge were similar to P who were discharged without BB similar in terms of baseline characteristics, such as demographics, cardiovascular risk factors, history of coronary disease and chronic kidney disease. They also showed similar Killip class, creatinine, troponin I, NT-proBNP and Grace Scores on admission. There were no differences in coronary angiography (acute occlusion, number of lesions or PCI) and in-hospital medical treatment.

We found that of the G1 treated with BB didn’t present statistically significant differences in relation to the primary composite objective (55% vs 56.2%, p = 0.93), re-infarction (17.2% vs 14.3%, p = 0.78) and mortality (36% vs 25%, p = 0.39) compared to those not treated with BB. However, we observed that they had a lower percentage of re-admission for HF (12.9% vs 35.7%, p = 0.030). In multivariate analysis, BB prescription was an independent predictor for reduced readmission due to HF (OR 0.26, p = 0.035).

With respect to the P of the G2, we observed that the P under BB didn’t present significant differences regarding the primary composite objective (77% vs 73%, p = 0.97) and secondary objectives (re-infarction (67% vs 33%, p = 0.089), readmission for HF (89% vs 11%, p = 0.083) and mortality (74% vs 25%, p = 0.693).

Conclusions: The use of BB in NSTEMI ACS P with preserved LVEF did not show to have a prognostic impact. However, in NSTEMI ACS P with mid-range LVEF, the use of BB was shown to be associated with a reduction in readmission for HF.

METABOLISM – DIABETES MELLITUS – OBESITY

P484
Relationship between cardiac autonomic neuropathy and heart rate variability in young patients with type 1 diabetes mellitus
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Background: Type 1 diabetes mellitus (T1DM) is an independent risk factor for the development of various cardiovascular disorders, such as dysrythmias, sometimes leading to fatal outcomes. Cardiac autonomic neuropathy (CAN) is considered to be the main mechanism responsible for the onset of rhythm disturbances. Assessment of heart rate variability (HRV) is one of the methods applied to determine the predictors of CAN development.

Purpose: To study HRV parameters in young T1DM patients without coronary artery disease (CAD) and history of dysrythmias.

Material and methods: The study included 71 patients with T1DM [mean age 28.7

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years. 41 (57%) male, mean glycated hemoglobin 9.9% (84 mmol/mol), mean body mass index 23.4 kg/m², mean diabetes duration 6.84 (0.5; 24) years, mean NT-proBNP 62.82 μg/ml, mean EF modified Simpson method (Simpson's echocardiography) 52%, mean EF 47.52%, and pHNO — 12.34 ± 10.20%. Mean 24-hour heart rate was 97.60 beats/min [95%: 147]. Time domain HRV parameters were significantly higher in women: SDNN (20.71 ± 7.15 vs 127.40 ± 38.83), SDNNI (139.42 ± 23.94 vs 62.4 ± 21.22), rMSSD (275.43 ± 62.4 vs 51.60 ± 23.11), p < 0.001 for all comparisons. Men had higher pNN50 values than women (15.16 ± 10.08 vs 10.01 ± 38.00, p < 0.05). Mean CI was 1.15 ± 0.34. CI was rigid (<1.2) in 59.15%, normal (1.24 – 1.42) in 18.31%, and mildly dilated (1.20-1.29) in 22.53% cases. All participants were in sinus rhythm. Paroxysmal supraventricular tachycardia was detected in 2.6%, intermittent ventricular tachycardia in 1.4%, supraventricular premature beats in 22.5%, ventricular premature beats in 8.5%, wandering atrial pacemaker in 11.3%, and second-degree sinoatrial block in 2.8% of patients.

Conclusion: The identified abnormalities in time domain HRV measures and impairment of CI rigidity in young T1DM patients without CAD and history of dysrhythmias indicate the development of CAN.

P488
The relationship between glycemic control and preclinical diastolic dysfunction in patients with type 2 diabetes mellitus or prediabetes
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Background: Type 2 diabetes mellitus (T2DM) is associated with an increased risk of micro and macrovascular complications. The relationship between heart failure and glycemic control is not well established.

Purpose: The aim of this study was to assess relationship between diastolic dysfunction (DD) and glycemic control (HbA1c) in patients (pts) with T2DM or prediabetes (PD) with preserved systolic function (EF). The primary endpoint was to determine the association between time-domain parameters (rMSSD, pNN50, circadian rhythm) and HbA1c in patients with T2DM or PD.

Methods: Conventional echocardiography, tissue Doppler parameters and HbA1c were measured for all pts. We employed to calculate the estimated hazard ratio (HR) of death or readmission during the follow-up period. Cox regression analyses showed that weight gain proved to be a protective factor against death and/or readmission (HR=0.37; CI 95%: 0.168-0.847, p = 0.048).

Conclusions: Weight gain after hospital discharge in patients admitted for HF determines a better outcome in terms of death and/or readmission.

P489
Rosuvastatin dose-dependently improves flow-mediated dilation, but reduces adiponectin levels and insulin sensitivity in hypercholesterolemic patients
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Background: Increased risk of type 2 diabetes noted with statins is at least partially explained by HMGB1 co-receptor A reduction in circulating adiponectin, a metabolic agent. However, the impact of aortic stiffness and metabolic phenotypes of different dosages of rosuvastatin in hypercholesterolemic patients is currently unknown.

Methods: This was a randomized, single-blind, placebo-controlled, parallel study. Age, sex, and BMI were matched among groups. Forty-eight patients were given placebo, and 47, 48, and 47 patients given rosuvastin 5,10, and 20 mg, respectively daily during a 2 month treatment period.

Results: Rosuvastatin 5,10, and 20 mg dose-dependently and significantly improved flow-mediated dilation (34, 40, and 46%) after 2 months therapy when compared with baseline (P < 0.001 by paired t-test) or when compared with placebo (P < 0.001 by ANOVA), increased insulin (median % changes: 16, 20, and 20%, respectively) and glycated hemoglobin levels (median % changes: 2, 2, and 3%, respectively), and decreased adiponectin levels (median % changes: 3, 9, and 14%, respectively) and insulin sensitivity (median % changes: 2, 3, and 5%, respectively) after 2 months therapy when compared with either baseline (all P < 0.05 by paired t-test), or when compared with placebo (P=0.006 for insulin, P=0.012 for glycated hemoglobin, P=0.007 for adiponectin, and P<0.002 for insulin sensitivity by ANOVA).

Conclusions: Rosuvastatin treatment dose-dependently and significantly resulted in decreased insulin sensitivity and increased metabolic risk by decreasing adiponectin levels and increased insulin levels in hypercholesterolemic patients.

P498
Significance of speckle-tracking in identifying subclinical myocardial injury of young patients with Type1 Diabetes mellitus without cardiovascular disease
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The Aim: To study the importance of speckle-tracking to identify the presence of subclinical myocardial injury of young patients with Type1 Diabetes mellitus without cardiovascular disease and determine the impact of Type1 Diabetes mellitus (DM) on systolic and diastolic function of left ventricle of young patients without clinical of cardiovascular disease.

Methods: Young patients with Type1 DM (N=71) and without cardiovascular disease admitted to the therapy department of Moscow city clinical hospital 64 in the period 2015 till 2016 years were included in the study. Treadmill test was conducted to all patients in order to exclude coronary disease, and also NT-proBNP, glomerul filtration rate (GFR), urin albumin-to-creatinine ratio (uACR), EchoCG examination including analyses of LV EF (modified Simpson method) and global longitudinal systolic deformation (GLS) by speckle-tracking (WIVD 7 Dimension, GE).

The Results: Mean age was 28,7 years, 57% men, mean glycated hemoglobin 9.9% (84 mmol/mol), mean body mass index 23.4 kg/m², and mean diabetes duration 6.84 (0.5; 24), mean NT-proBNP 62.82 μg / ml, mean LV EF 61.7%, Subclinical systolic dysfunction, that is defined as GLS < 20%, was observed in 63,3% (45/71) cases. Left ventricular mass, left ventricular end-systolic volume and left ventricular end-systolic diameter were higher in patients with GLS < 20% than in patients with GLS>20% (p < 0.05). Furthermore EF, MAPSE, APSE were considerably lower in patients with GLS<20% than in patients with GLS>20% (p < 0.05). Left atrium volume index (LAVI) was higher in patients with GLS < 20%, but the difference was statistically insignificant (p < 0.01). Left ventricular diastolic dysfunction with slow relaxation (grade I) was observed in 5,6 (4/45) patients with insulin-dependent diabetes (Type1) and GLS < 20% as opposed to patients with GLS>20% who the diastolic dysfunction wasn’t found. While making the multivariate and regression analysis it was identified that albuminuria is an independent determining factor of GLS (β = 0.22, p < 0.001) with the age (β = 0.36, p < 0.001) and female (β = 0.24, p < 0.004), and also GFR correlate closely with GLS (β = 0.28, p < 0.006). The strong correlation was found for GFR and GLS (γ ≥ 0.29, p<0.05, r=0.52) and delate correlation for index albumin/creatinin (γ ≥ 0.24, p<0.05, r=0.56). At the same time the relative risk of GLS decreasing with GFR <90/ml/min/1.73m² increased in 2.8 (0.2; 6.5) 95% CI.
Reduction in hospitalisation for heart failure with empagliflozin is consistent across categories of baseline HbA1c and change in HbA1c: results from the EMPA-REG OUTCOME trial

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Funding Acknowledgements: The EMPA-REG OUTCOME® trial was funded by Boehringer Ingelheim & Eli Lilly and Company Diabetes Alliance.

Background: In the EMPA-REG OUTCOME trial, EMPA given in addition to standard of care significantly reduced the risk of hospitalisation for heart failure (HHF) vs placebo (PBO) (HR 0.65; 95% CI 0.50, 0.85) in patients with type 2 diabetes (T2DM) and established cardiovascular disease. We investigated whether baseline HbA1c or change in HbA1c influenced the effect of EMPA on HHF.

Methods: Patients were randomised to receive EMPA 10 mg, EMPA 25 mg, or PBO. Background glucose-lowering therapy was to remain unchanged for 12 weeks and then be adjusted to achieve glycemic control according to local guidelines. HHF was analysed in the pooled EMPA group vs PBO by categories of (1) baseline HbA1c (<7.0%; 7.0 to <8.0%; 8.0 to <9.0%; ≥9.0%) and (2) change in HbA1c from baseline to the last value in the trial (reduction of ≥0.3%; reduction of <0.3%). Differences in risk between treatment groups were assessed using a Cox proportional hazards model.

Results: A total of 7202 patients were treated. Median observation time was 3.1 years. The benefit of EMPA vs PBO on HHF was consistent irrespective of baseline HbA1c or change in HbA1c from baseline to the last value before HHF (for patients with HHF) or the last value in the trial (for patients without HHF) (figure). In patients with T2DM and established cardiovascular disease, the reduction in the risk of HHF with EMPA vs PBO was largely independent of baseline HbA1c and the change in HbA1c from baseline to the last value before HHF or the last value in the trial.

Conclusions: In patients with T2DM and established cardiovascular disease, the reduction in the risk of HHF with EMPA vs PBO was largely independent of baseline HbA1c and the change in HbA1c from baseline to the last value before HHF or the last value in the trial.
P493
Risk of hospitalization for decompensated heart failure in patients with BMI <25 and reduced ejection.
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Introduction: obesity is a risk factor for the development of heart failure (HF), however, recent evidence has shown that there is more frequency negative outcomes in hospitalized patients with normal or low body mass index (BMI) than in patient with overweight or obesity, when both groups have decompensated heart failure, a phenomenon called "obesity paradox in HF" (1, 2).

Aim: To estimate the association of BMI in patients with heart failure reduced with ejection fraction (HFREF) and its impact on hospitalization due to decompensation in a health institution in Colombia.

Methodology: A prospective cohort study was conducted between April 2014 and April 2015, in patients with HFREF, collected at the outpatient department of Cardiology of a hospital in the city of Cartagena. Patients with BMI < 25 kg / m2 and unexposed BMI > 25 kg / m2, were included after renal impairment, were considered as exposed cohorts. Quarterly follow-up was done by external consultation and telephone follow-up for variables of interest.

Results: 52 patients were included in the present study. 65.4% were male, average age 65.4 ± 13.8. 51.9% (27/52) of patients had BMI greater than or equal to 25kg/m2 and 48.1% (25/52) with BMI < 25kg/m2. Of these, 18.5% (5/27) and 20% (5/25) had a smoking habit, 7.4% (2/27) and 4.0% (1/25) alcoholism, 77.7% (21/27) and 92% (24/25) diabetics, 14.8% (4/27) and 24% (6/25) with DCM, 14.8% (4/27) and 24% (6/25) coronary heart disease, 85.1% (23/27) and 68% (17/25) had class Functional NYHA I and II, 14.8% (4/27) and 24% (6/25) class III and IV. The incidence rate of hospitalization in exposed patients was 43 x1,000 person-years and 30.8 x1,000 person-years for the non-exposed. The risk of hospitalization for decompensated heart failure in patients with BMI < 25 was RR: 1.4 (95% CI 0.7-2.6), and attributable risk was 15%.

Conclusion: Having normal or low weight increased 1.4 [95% CI 0.7-2.6] times the risk of hospitalization for decompensated heart failure. It is suggested to carry out analytical studies with larger sample size.

HEART FAILURE IMAGING

P494
Myocardial perfusion is reduced in patients with type 2 diabetes as comorbidity to non-ischemic systolic heart failure
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Introduction: Patients with non-ischemic systolic heart failure (HF) often have reduced myocardial blood flow without significant coronary atherosclerosis. However, the mechanism is unknown. Similarly, patients with type 2 diabetes (T2DM) have reduced myocardial perfusion compared with control persons. To our knowledge, no one has previously compared myocardial perfusion in patients with non-ischemic systolic HF with and without T2DM.

Purpose: To investigate whether changes in myocardial perfusion are associated with T2DM in patients with non-ischemic systolic HF.

Methods: In a prospective cross-sectional study, we scanned patients with non-ischemic systolic HF with and without T2DM with 82-Rubidium positron emission tomography (PET/CT), at rest and adenosine-induced stress, thereby obtaining the myocardial flow reserve (MFR=sum stress flow/rest flow); 28 patients with T2DM and 123 without T2DM were included. We used a general linear model (GLM) procedure for multiple regression analysis of explanatory variables.

Results: Patients with T2DM had a median age of 68 years (range 60-75 years) and 21.4% were women. The patients without T2DM had a median age of 68 years (range 62-72 years) and 33.3% were women. Patients with T2DM had higher body mass index (BMI) than patients without [39.9 vs. 26.5 kg/m2; P<0.02]. Blood glucose measured right before the scan was higher among patients with T2DM [6.2 vs. 5.7 mmol/L; P=0.03] and hypertension was more common in this group [50.0 vs. 26.8%; P=0.02]. Also more patients with T2DM were treated with cholesterol lowering medication (60.7 vs. 35.0%; P=0.02). Apart from these variables, the two groups were similar. In a multivariable analysis, including sex, age, BMI, T2DM, atrial fibrillation during scan, left bundle branch block, hypertension, N-terminal pro-brain natriuretic peptide and left ventricular mass, MFR was 16 % lower in patients with T2DM compared with patients without [Estimate 0.84; 95% confidence interval [CI] 0.71 to 0.996; P=0.04]. In addition MFR was significantly lower in patients with atrial fibrillation during scan [Estimate 0.69; 95% CI 0.57 to 0.82; P<0.001] and MFR increased with increasing BMI [Estimate 1.02; 95% CI 1.00 to 1.04; P=0.01].

Conclusion: Patients with T2DM and systolic HF had lower myocardial flow reserve compared with HF patients without diabetes. This indicates that T2DM is an independent impairing factor to the coronary microvascular function in patients with non-ischemic systolic HF.

Myocardial flow reserve by diabetes

P495
Right ventricular function and volumes evaluated by cardiac magnetic resonance in dilated cardiomyopathy patients
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On behalf of: FATIMA investigators

Funding Acknowledgements: PTDC/BIM-MEC/0650/2012

Introduction: Right ventricular (RV) function assessed by echocardiography has found to have prognostic value in ischemic and idiopathic dilated cardiomyopathy (DCM).

Purpose: We aimed to analyze RV function and volumes, assessed with cardiac magnetic resonance imaging (CMR) in a cohort of patients with genetically characterized DCM and to evaluate their clinical relevance.

Methods: National multicentric study of consecutive patients with idiopathic and familial DCM that underwent a comprehensive CMR study as part of their diagnostic work-up. Ventricular volumes and ejection fraction (EF) were measured using dedicated software. Patients underwent extensive clinical evaluation, ECG, 24h-Holter, echocardiogram and molecular analysis (using next-generation sequencing combined with Sanger sequencing).

Results: 80 patients were included, 52% men, mean age at diagnosis 38 ± 13 years, with 55% of familial cases (44 patients corresponding to 38 families). At least one genetic variant was found in 21%. Mean left ventricular (LV) end-diastolic volume was 127 ± 36 mL and LV EF 34 ± 12%. Most patients were in NYHA class I (92%). In median follow-up of 41 (IQR 66) months a composite of death/heart transplant/aborted sudden cardiac death was documented in 12% of them. Mean RVEF, RV end-diastolic and RV end-systolic volumes were 52 ± 11%, 78 ± 22 mL/m2 and 39 ± 21 mL/m2, respectively. Reduced RVEF was found in 45% of patients and enlarged RV end-diastolic and RV end-systolic volumes in 9% and 32%, respectively.

There were no differences in RV parameters between patients with familial or idiopathic DCM or between patients with or without a genetic variant.
Patients with previous hospitalizations presented lower RVEF (48 ± 12% vs 55 ± 10%; p = 0.014) and patients with non-sustained ventricular tachycardia and right bundle branch block presented higher RV end-systolic (85 ± 21 mL/m2 vs 72 ± 16 mL/m2; p = 0.015; 112 ± 34 mL/m2 vs 76 ± 21 mL/m2; p = 0.002) and RV end-systolic volumes (44 ± 17 mL/m2 vs 33 ± 12 mL/m2; p = 0.014; 68 ± 37 mL/m2 vs 37 ± 19 mL/m2; p = 0.004).

A moderate positive correlation was found between RVEF with LVEF (r = 0.452, p < 0.001) and RV end-systolic volume with left atrium diameter (r = 0.414, p = 0.001).

There were no differences in RV parameters according to the presence of late gadolinium enhancement or noncompaction criteria.

In univariate analysis RVEF was predictor of the composite outcome (OR 1.066, 95%CI [1.004-1.132], p = 0.036).

Conclusions: RV dysfunction was frequent in DCM patients and was associated with some features of worse clinical outcome. RV functional profile didn’t vary between idiopathic or familial DCM or according to molecular results.

P496

A cardiac magnetic resonance-based study on the involvement of the myocardial extracellular matrix in the pathophysiology of hypertensive heart failure

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Background: The assessment of alterations in the extracellular matrix (ECM) by cardiac magnetic resonance (CMR) has shown promising results in different cardiac myopathies, mostly in stage of clinical heart failure (HF). However, little is known about its value in patients at earlier stages of the syndrome.

Purpose: To assess alterations of the myocardial ECM by CMR in patients with arterial hypertension with (stage C) or without (stage B) clinical HF and to analyse their associations with parameters of left ventricular (LV) function.

Methods: The study included 37 hypertensive patients without coronary artery disease or suspected cardiac amyloidosi. Eighteen of them presented LV hypertrophy and/or diastolic dysfunction with no clinical symptoms of HF (stage B) and the remaining 19 presented clinically overt HF (stage C). A group of 10 healthy subjects was included as a control group for CMR parameters. In the CMR study the extracellular volume (ECV) was calculated after T1 mapping to assess the presence of diffuse interstitial fibrosis, and the late gadolinium enhancement (LGE) positive mass was quantified using a signal intensity threshold of 5 standard deviations (SD) above the mean remote myocardium to assess the presence of microscars.

Results: ECV was increased in both stage B (24.40 ± 6.87%) and stage C (28.84 ± 5.86%; p < 0.001) patients compared with control subjects (21.42 ± 5.54%), being higher (p < 0.001) in stage C patients than in stage B patients. LGE was also increased in both groups of patients compared to control subjects (control: 1.18 ± 0.19 g; stage B: 3.98 ± 0.72 g; stage C: 6.78 ± 1.51 g; p < 0.01 and p < 0.001, respectively), but there were no significant changes between the two groups of patients. Whereas ECV was correlated with the E/E′ ratio (r = 0.447; p < 0.05), LGE was correlated with the LV end-diastolic volume (r = -0.448; p < 0.05) and LV ejection fraction (r = -0.455; p < 0.05) in all patients. Both ECV (r = 0.458; p < 0.05) and LGE (r = 0.511; p < 0.01) were correlated with NT-proBNP in all patients. All these associations were independent of age and gender.

Conclusions: CMR-assessed alterations in the myocardial ECM of hypertensive patients are present before overt HF develops and are associated differently with LV function (i.e., the increase in ECV is associated with diastolic dysfunction and the increase in LGE is associated with LV remodeling and systolic dysfunction). Therefore, it is suggested that the involvement of myocardial ECM in the pathophysiology of hypertensive HF is variable and depends on the type of alteration considered (i.e., diffuse interstitial fibrosis or microscars).

P497

Late gadolinium enhancement, reverse remodeling and prognosis in patients with non-ischaemic dilated cardiomyopathy and moderate-to-severe systolic dysfunction

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Background: Reverse remodeling (RR) is defined as the recovery from left ventricular (LV) dilatation and systolic dysfunction following guideline-recommended medical treatment for heart failure (HF). The absence of late gadolinium enhancement (LGE) at cardiac magnetic resonance (CMR) has been reported to predict the occurrence of RR in patients with idiopathic dilated cardiomyopathy (DCM).

Purpose: In the broader setting of non-ischaemic DCM (NIDCM), and among patients with moderate-to-severe systolic dysfunction, we explored the relationship among LGE (visually assessed or automatically quantified), RR, and prognosis.

Methods: The inclusion criteria were: diagnoses of NIDCM and stable, chronic HF; two CMR examinations within a maximum interval of 5 years; left ventricular ejection fraction (LVEF) < 45% at baseline CMR. The exclusion criteria were coronary artery disease, recent myocarditis (< 6 months), severe primary valvular disease, untreated hypertension, cardiac amyloidosis, estimated glomerular filtration rate < 30 mL/min. RR was defined as a >15% reduction of LV end-systolic volume index across the two CMR examinations. The follow-up started at the second CMR examination. The endpoint was a composite of all-cause death, hospitalization for either HF or ventricular arrhythmias, appropriate implantable cardiac defibrillator discharge, ventricular assist device implantation or heart transplant.

Results: Seventy-one patients were enrolled (age 57 ± 14 years, 43 males [61%]. LVEF 35% [interquartile range - IQR 27-41%], NIDCM was idiopathic in 46 patients [63%]. Median previous disease duration was 3 month (IQR 1-7 months). LGE was found in 42 patients [59%]. LGE mass was 9 g [IQR 5-18 g], and LGE% was 7% [IQR 3-12%].

Thirty-eight patients (54%) developed RR. The absence of LGE at baseline was univariate predictor of RR (OR 0.338 [95% CI 0.125-0.914]). LGE extent (percentage of LV mass) was significantly lower in the RR subgroup, and emerged as univariate predictor of RR (OR 1.112 [95% CI 1.022-1.210]). P = 0.013). At ROC analysis, the best LGE cut-off for RR prediction was 7% (area under the curve - AUC 0.67, sensitivity 65%, specificity 62%).

Over a 42-month (IQR 15-73) follow-up, the endpoint occurred in 36 patients (51%). LGE presence was univariate predictor of the primary endpoint (OR 3.087 [95% CI 1.151-8.284]; P = 0.025). Also LGE extent predicted this endpoint (OR 1.108 [95% CI 1.018-1.208]; P = 0.018). The optimal LGE cut-off was again 7% (AUC 0.67, sensitivity 65%, specificity 66%). Kaplan-Meier analysis confirmed that patients with LGE < 7% had a significantly better prognosis.

Conclusions: In patients with NIDCM and moderate-to-severe systolic dysfunction, the absence of LGE at baseline predicts subsequent RR. Among patients with LGE, LGE extent < 7% is a predictor of RR, as well as of better prognosis.

P498

Echocardiographic assessments of left atrial mechanical stretch as predictive markers of LV dysfunction in STEMI patients

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Parameters of left atrial mechanical stretch as predictive markers of LV dysfunction in STEMI patients.
predictors of MACE during 6 month follow up (FU). We studied conventional echo parameters and parameters of left atrial mechanics: strain (S LA) and strain rate (Sr LA). Method: 99 consecutive STEMI pts treated with PCI were prospectively included. Echo examination performed on day 4 ± 2 (VIVID 9GE, Echo PAC Ver 11/3). Results: 129/96 (12.1%) of all pts had MACE during 6 month FU. Parameters of left atrial mechanics: first positive peak (Sr LAa) and second positive peak (Sr LAa) LA longitudinal strain, strain rate parameters during systole (Sr LAs), and late diastole (Sr LAa) were significant predictors as well as conventional echo parameters. (table 1). The largest area under the ROC had LA vol index (area 0.724, p = 0.009, 95% CI 0.662-0.824) for cut off 18.43/m², Sn 78%, Sp 60%, VEF had lower area under the ROC (0.256, p = 0.035, 95% CI 0.088-0.428) and lower Sn 65% and similar Sp 64% for cut of VEF, LAa (0.271; p = 0.048, 95% CI 0.066-0.477) had significant Sn 71%, and Sp 72% for cut off 16.45%. Sr LAs (ROC 0.247; p = 0.029, 95% CI 0.073-0.420) had low Sn 57%, but higher Sp 86% for cut off -0.755 s⁻¹. Sr LAa (ROC 0.772; p = 0.019, 95% CI 0.583-0.925), for cut off -1.085 had the better Sn 71% and Sp 80%. Conclusion: During first months after PCI period the left atrial mechanic parameters could be important to predict of MACE. Still, larger studies are needed to define the best left atrial mechanic parameter of myocardial deformation as predictor of worse prognosis.

Table 1

<table>
<thead>
<tr>
<th>Pts without MACE (n = 87)</th>
<th>Pts with MACE (n = 12)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEF (%)</td>
<td>49.7±10.6</td>
<td>38.4±11.3</td>
</tr>
<tr>
<td>LA vol index (ml/m²)</td>
<td>18.65±6.21</td>
<td>23.32±6.48</td>
</tr>
<tr>
<td>S LA (%)</td>
<td>20.5±7.99</td>
<td>14.1±5.67</td>
</tr>
<tr>
<td>S LAa (%)</td>
<td>11.50±6.00</td>
<td>7.82±4.22</td>
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<tr>
<td>Sr LAs (s⁻¹)</td>
<td>0.154±0.44</td>
<td>0.81±0.24</td>
</tr>
<tr>
<td>Sr LAa (s⁻¹)</td>
<td>0.869±0.52</td>
<td>-0.65±0.31</td>
</tr>
<tr>
<td>Sr LAa (s⁻¹)</td>
<td>1.51±0.65</td>
<td>-1.03±0.47</td>
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P499
Subclinical lv dysfunction detection in hypertensive patients with preserved lv ejection fraction: role of speckle tracking echocardiography

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Introduction: Hypertension is a well-recognized risk factor for cardiovascular diseases and causes left ventricular (LV) pressure overload, which results in various geometric changes that progress to diastolic heart failure and/or heart failure, with LV systolic dysfunction. Early detection of subclinical left ventricular [3] systolic dysfunction in hypertensive patients is important for the prevention of progression of hypertensive heart disease.

The aim of the present study was to detect subclinical LV dysfunction in hypertensive patients with apparently normal LV systolic function, using speckle tracking echocardiography (longitudinal strain pattern). Patients and methods: Prospective case-control study was carried out on 112 hypertensive patients (61 male/51 female) and 40 age- and sex-matched healthy subjects as a control group. Conventional echocardiographic Doppler study, tissue Doppler imaging, and 2D speckle tracking imaging were performed using Vivid 9 (General Electric Healthcare). Longitudinal strain imaging by 2D-speckle tracking echocardiography (2D-STE) was done with high-quality images from the apical four-chamber, two-chamber, and three-chamber views. The strain values for all the segments were recorded and averaged to obtain the GLS.

Results: In hypertensive patients. The mean age was 60.5 ± 10.53 years. The left ventricular mass index (LVMi) was significantly higher in the hypertensive group. There was no significant difference in the global LV ejection fraction (VEF) and the tele-diastolic diameter of LV between the two groups. The size of the intraventricular septum was higher in the hypertensive group (P < 0.001). E/A ratio and E velocity were significantly lower in the hypertensive patients (p < 0.001). Left atrium volume is significantly higher in the hypertensive group (p < 0.001). In comparison with normal controls, GLS was significantly attenuated in patients with systemic hypertension (12.25 ± 3.19 in the control group vs 17.68 ± 4.06 in the hypertensive group, p < 0.001), this decrease was more marked in the hypertensive group with left ventricular hypertrophy (LVMi: 13.57 ± 2.045, p < 0.001).

Conclusions: In hypertensive patients, LV systolic function is commonly considered normal if the global EF and fractional shortening (FS) are normal. However, the EF and FS reflect only the global cardiac contractile function and do not take regional systolic abnormalities into consideration. Our results show that 2D speckle tracking is able to detect subclinical myocardial dysfunction in hypertensive patients, despite normal global systolic parameters by conventional 2D echocardiography. This suggests that earlier intervention in these patients may be beneficial.

P500
Left ventricular diastolic dysynchrony in patients with in patients with treatment-naive hypertension and the effects of antihypertensive therapy

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Background: Diastolic dysynchrony (DD) is an important manifestation in heart failure. We tried to investigate (1) DD in patients with hypertension (2) determinants of DD; (3) the effects of 6-month medical therapy; and (4) the predictors associated with change of DD by performing comprehensive studies.

Methods: and results-DD was more prevalent (15.4% vs. 7.0%, P = 0.007) in 325 treatment-naive hypertensive patients, compared with 172 normal controls. Male (odds ratio [OR], 7.60, 1.69-34.30), magnesium levels (OR per 1 SD, 4.18, 1.54-11.30), nighttime heart rate (HR) (OR per 1 SD, 2.79, 1.19-6.53), and mitral E/A (OR per 1 SD, 0.11, 0.03-0.41) were independent determinants for the DD in hypertensive patients. A follow-up echocardiography was performed in 74 of 275 patients without DD (group 1) and 26 of 50 patients with DD (group 2) at 6 months. Severity and prevalence of DD (≥ 8.3 ms, ≥ 14.6 to < 21 and ≥ 21.76 ms, P = 0.001) improved in group 2 after medical therapy, while those did not in group 1. Baseline daytime HR (P = 0.008) and magnesium levels (P = 0.029) and changes of mitral E/A (P = 0.003), mean annulus Ea (P = 0.003), mean annulus Ea/Aa (P = 0.020), and mitral peak E (P = 0.043) were independent predictors for changes of DD.

Conclusions: DD is not uncommon in patients with treatment-naive hypertension. Male, magnesium levels, nighttime HR, and mitral E/A are independent determinants for the DD. Medical therapy reduces the DD, particularly in patients with DD. Moreover, daytime HR, magnesium levels, and indicative of diastolic dysfunction are independent predictors for changes of DD.

P501
Intrinsic deflection time detection predicts ventricular dyssynchrony better than QRS width in patients with indication to cardiac resynchronization therapy

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Aim: CRT was shown to improve HF prognosis. But many patients do not benefit from CRT. Patients with LBBB are more likely to benefit from CRT. One of the criteria of LBBB is prolonged time to peak R wave (intrinscic deflection) > 60 ms in V5 and V6. In this study, we aimed to investigate the relationship between echocardiographic intraventricular and interventricular dyssynchrony and IDT (intrinsic deflection time).

Methods: We prospectively included 140 patients with HF, QRS≥120 ms, LBBB, NYHA II-IV, LVEF<35% and scheduled for CRT (84 male, 56 female; mean age 64.9±10.8). Septal-posterior >130 ms delay in M-mode, septal-lateral >60 ms delay for the beginning and >65 ms delay for the peak of systolic velocity in TDI was accepted as intraventricular dyssynchrony. A delay in aortic PSEF > 40 ms was taken as interventricular dyssynchrony. IDT was measured as the time from the beginning of the QRS complex to the peak of the R wave in V5 and V6. Results: Septum-posterior delay was associated with LDL, LVEF and IDT width in bivariate analysis. In logistic regression analysis, IDT was only independent parameter for predicting septum-posterior delay (OR= 1.033, p=0.005). IDT was also associated with septal-lateral delay for beginning, septal-lateral delay for peak of systolic velocity, pulmonary-aortic PSEF delay in bivariate correlations and ROC curve (p<0.05 for all).

Conclusion: IDT is closely associated with all echocardiographic intraventricular and interventricular dyssynchrony parameters and has a better predictive value than QRS width to detect ventricular dyssynchrony in patients with indication to CRT.
P502
Assessment of right and left ventricle function in HIV-infected patients

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Introduction: HIV-infected individuals are at increased risk for pulmonary hypertension and cardiomyopathy, portending a poor prognosis. Right ventricular (RV) and left ventricular (LV) diastolic dysfunction is associated with worse outcomes in these conditions. Therefore early identification of these entities in course disease is crucial for further treatment of these patients.

Purpose: In this study we assessed in relatively newly diagnosed HIV young patients several indices of RV and LV function.

Methods: Echocardiograms were evaluated in 15 HIV-infected adults. Measurements included several indices of LV diastolic function from pulsed Doppler transmitral flow (E, A, DT) and Tissue Doppler Imaging measurements (S, Ea, As from the lateral wall and intraventricular septum). In addition, we analyzed indices of RV function such as tricuspid annular plane systolic excursion (TAPSE), RV longitudinal regional and global myocardial strain (RV LMR) and RV fractional area change (RVFAC).

Results: Data from fifteen HIV-infected patients were analyzed (mean age 41.6 ± 11 years, 13 males, body mass index 1.95 ± 0.2 kg/m², mean HIV infection 75.1 ± 68.8). In HIV-infected patients duration of HIV insulin was negatively correlated with FAC (r = -0.527, p < 0.05) and had positive correlation with RV systolic area (r = 0.56, p < 0.05). Additionally, HIV load was negatively correlated with transmirtal E (r = -0.577, p < 0.05). We could not find any correlation with global or regional longitudinal strain of RV and either HIV virus load, duration of infection and CD4 count at time of measurement.

Conclusions: These data suggest that duration of HIV infection affects negatively the RV systolic function. In addition the HIV viral load is also associated with diastolic dysfunction independently of age and duration of HIV infection. In patients of high HIV virulence and increased duration of HIV infection thorough assessment of possible RV and LV diastolic dysfunction should be done.

P503
Epidemiological and ultrasound characteristics of intracardiac thrombosis

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Introduction: Our objective is to describe the epidemiological clinical and ultrasound characteristics of intracardiac thrombosis, to underline the interest of these conditions. Therefore early identification of these entities in course disease is crucial for further treatment of these patients.

Methods: Among 13290 echocardiography examinations performed, we diagnosed 43 patients with intracardiac thrombus (0.32%). The sex ratio was 1.3 and the average age was 57.4 years. Topographically we find 20 left ventricle thrombosis, 9 left atria thrombosis (20.9%), 6 right atria thrombosis and 2 right ventricle thrombosis. The mean diameter of thrombus was 19.9 mm and there were 2 cases of multiples thrombosis.

Results: In 32 patients (74.4%) primitive intracardiac thrombosis (11.6%) and valvular diseases (one aortic stenosis, 4 mitral stenosis and 4 mitral regurgitation). The thrombus disappeared with only medical treatment (anticoagulant and antiplatelet) in 31 patients after a mean of 3 months, and was treated by surgery in 10 patients. Only 4 patients showed systemic embolization.

Conclusion: Our results suggest that cardiac thrombosis is most frequently localized in the left ventricle and especially in ischemic heart disease, we should ensure an echocardiographic monitoring for these patients so that we can avoid the systemic embolization.

P504
Two dimensional speckle-tracking echocardiography in comparison to contrast enhanced cardiac magnetic resonance for analysis of myocardial fibrosis in patients with idiopathic dilated cardiomyopathy

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Background: Myocardial deformation analysis by speckle-tracking echocardiography (STE) has been used for analysis of fibrosis, especially in patients with myocardial infarction with preserved left ventricular ejection fraction (LVEF). However there is no data on the use of this method for the identification of regional myocardial fibrosis in patients with idiopathic dilated cardiomyopathy (ICD). We plan to use STE echocardiography to evaluate the presence of fibrosis with late gadolinium enhancement (LGE).

Methods: We enrolled retrospectively patients suffering from ICDM with LVEF ≤ 45% followed at our Heart Failure Department from January 2012 to February 2016 and underwent CMR with paramagnetic contrast agent administration and STE echocardiography (time range < 90 days between the two tests). LGE CMR was performed to identify the presence of fibrosis in every myocardial segment; the amount of fibrosis was calculated as the percentage of LGE myocardium with respect to the total myocardium. In addition to the conventional analysis of LGE CMR, the STE strain analysis was performed to analyze regional myocardial deformation in patients with ICDM and to compare the results with those obtained with LGE CMR.

Results: We enrolled 72 patients (76% male, mean age 56 ± 15 years, LGE found in 60 patients) with midwall and subepicardial distribution in 82% and 6% of patients respectively. There was a positive correlation between the amount of myocardial fibrosis determined by LGE CMR and peak systolic longitudinal strain for the entire left ventricle (r = 0.523, p < 0.0001), basal segments (r = 0.606, p < 0.0001) and midventricular segments (r = 0.497, p < 0.0001), but not for apical segments. A cut-off value of GL2D strain of -7.5% by receiver-operating characteristic (ROC) curves identified LGE segments (sensitivity 91%, specificity 82%) and midventricular segments (sensitivity 91%, specificity 79%) and a cut-off value of GL2D strain of -10.2% by ROC curves identified LGE presence in left ventricle (sensitivity 76%, specificity 72%).

Conclusions: There is an association between the amount of myocardial fibrosis detected by LGE CMR and myocardial deformation by 2D STE. GL2D and GLD2 strain could be helpful for detecting and localizing myocardial fibrosis, especially in patients who cannot perform LGE CMR, and might have a role in prognosis.

P505
Left atrial volume index as a predictor of outcome in patients with acute myocardial infarction: a systematic review and meta-analysis

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Republic of

Introduction: Left atrial volume is a marker of diastolic dysfunction and longstanding elevated left ventricle (LV) pressure. The aim of this study was to assess the role of increased baseline left atrial volume in outcome of patients with acute myocardial infarction (AMI).

Methods: We systematically searched Pubmed-Medline, EMBASE, Scopus, Google Scholar and the Cochrane Central Registry, up to December 2016 in order to select clinical trials and observational studies, which assessed the predictive role of left atrial volume indexed (LAVI) in outcome in patients with AMI.

Results: We compared clinical outcomes of enlargement LAVI (≥32 ml/m²) vs. non-enlargement LAVI (<32 ml/m²). Primary end-points were cardiovascular (CV) events: major adverse cardiac events (MACE), and all-cause mortality.

Conclusions: A total of 1647 patients from 5 observational studies with a mean follow-up 25 ± 12 months, were included in the meta-analysis. The increased LAVI correlated with increased risk for MACE (relative risk [RR]=2.73, 95% confidence interval [CI], 1.34 to 5.37, p=0.006), and all-cause mortality (RR=3.21, 95%CI: 1.48 to 6.97, p=0.003) in patients with AMI.
In conclusion: Increased LAVI is an independent predictor of outcome in patients with AMI. The assessment of this LA index in these patients in daily practice is important for better risk stratification.

Risk estimates of major adverse cardiac

P506
Correlation between electrocardiography and stress echocardiographic abnormalities and cardiovascular events

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Background: Pharmacological Stress Echocardiography (SE) has prognostic value in patients with known or suspected coronary artery disease. SE positive for myocardial ischemia and the wall motion score index (WMSI) are associated with a worse outcome. However, the literature is ambiguous regarding the prognostic value of ECG changes during pharmacological SE.

Purpose: To correlate the severity of electrocardiographic and echocardiographic changes during pharmacological SE with the occurrence of cardiovascular (CV) events at follow up.

Methods: Unicentric, retrospective study with 789 patients who underwent pharmacological SE between 2010 and 2015. Demographic, clinical, electrocardiographic and echocardiographic data were collected. CV events were defined as death of cardiac cause, occurrence of AMI and need for revascularization. Statistical analysis to assess whether stress ECG changes and peak WMSI during SE relate to the occurrence of CV events at follow up.

Results: The sample of this study has a higher prevalence of male patients (85%) with a mean age of 64±11 years. From the sample, 55% of the subjects had SE due to suspected ischemic coronary disease (ICD) and 43% had SE for the evaluation of already known ICD. SE was performed with dobutamine in 70.6% and without CV events (1.58±0.30 vs. 1.29±0.39, p=0.001), a difference that was observed when univariate logistic regression was applied (p<0.001). The value of peak WMSI was statistically different between patients with and without CV events (1.87±0.30 vs. 1.27±0.39, p=0.001). There was also a correlation between the dimension of ST-segment elevation and the peak WMSI value (R=0.049). These findings did not occur for patients with ST depression. Value of peak WMSI was statistically different between patients with and without unsupported ventricular tachycardia during SE (1.59±0.43 vs. 1.2±0.40, p=0.002).

Conclusion: The study demonstrated an association between the presence of ST-segment changes in stress ECG and the occurrence of CV events. There was also a statistically significant relationship between the size of ST elevation in SE and peak WMSI, which in turn was associated with the development of CV events.

Biomarkers

P507
C-type natriuretic peptide in human blood of adolescent with different degree of endothelial dysfunction: a different trend for plasma levels and mRNA expression.

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Background: C-type natriuretic peptide (CNP) is a member of natriuretic peptide system and it performs its major functions in an autocrine or paracrine manner through specific binding to the membrane guanylyl cyclase natriuretic peptide receptor B (NPR-B). Recent studies indicated that CNP is an important natural regulator of adipogenesis, possibly involved in obesity pathophysiology, especially in pediatric age. Unfortunately, while CNP plasma levels are known in pediatric subjects, no data are available on CNP/NPR-B mRNA expression.

Purpose: Aim of the study was to evaluate both CNP plasma levels and expression of CNP/NPR-B mRNAs in normal-weight (N, n=21) and obese (O, n=15) adolescents (age: 13.5±0.4, years).

Methods: Subjects without cardiac dysfunction, referred as outpatient to the Unit of Pediatric Endocrinology and Diabetes, Department of Clinical and Experimental Medicine, Italy, were enrolled. CNP plasma levels were measured with a specific RIA in plasma samples, while expression of CNP and NPR-B mRNAs was assessed in human whole blood samples by Real-Time PCR. Endothelial function was assessed by measuring reactive hyperemia index (RHI).

Results: CNP plasma levels resulted significantly lower in O (6.1±0.9 pg/mL) than in N (15.2±3.4 pg/mL, p=0.0001), while CNP and NPR-B mRNA expression resulted similar in N (4.1±1.7; 5.0±1.6, respectively) and O (4.3±1.6; 3.5±1.1, respectively). Plasma PCR values were significantly (p<0.0001) higher in O (0.3±0.1 mg/dL) than in N (0.01±0.02 mg/dL), while RHI resulted significantly (p<0.0001) lower in O (1.4±0.08) than in N (2.1±0.04) subjects. Surprisingly, dividing all subjects by RHI median (Group1>1, n=18, Group 2<1, n=15), CNP plasma levels resulted significantly (p=0.017) lower in Group1 (14.3±1.7) than in Group 2 (8.5±1.2), showing a significant correlation between CNP and RHI (r=0.47, p=0.0026), while CNP mRNA expression was significantly (p=0.005) higher in Group2 (6.3±2.1) than in Group 1 (1.8±0.6). NPR-B mRNA resulted similar in Group 1 (4.7±1.8) and Group 2 (4.2±1.0). Our data suggest a different trend in CNP plasma levels and in CNP mRNA expression, that were detected for the first time in human peripheral blood mononucleated cells. This discrepancy could change occurring at CNP transcriptional level in activated leucocytes, due to inflammation, and in blood levels, having CNP paracrine/autocrine activities.

Conclusion: The regulation of CNP/NPR-B transcription constitutes a fruitful area for investigating new therapies targeting CNP/NPR-B production, useful to treat diseases characterized by endothelial dysfunction, such as obesity.

P508
Unexpected age-sex distribution of NP measurements and concentrations: results of big Data analysis

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Introduction: Since the introduction of routine assay for Natriuretic Peptides (NP), their number of clinical applications has grown. Numerous studies have defined their analytical characteristics in patients presenting with acute or chronic dyspnea. Since the prevalence of chronic heart failure (CHF) increases with age averaging 7.5–10% in patients over the age of 75 years, measurements of NP should increase in a similar way. Plasma concentrations of (NT-pro)BNP are known to be higher in O (0.3±0.8 pg/mL) than N (0.8±2.1) and Group 2 (6.3±2.1) than in Group 1 (1.8±0.6). NPR-B mRNA resulted similar in Group 1 (4.7±1.8) and Group 2 (4.2±1.0). Our data suggest a different trend in CNP plasma levels and in CNP mRNA expression, that were detected for the first time in human peripheral blood mononucleated cells. This discrepancy could change occurring at CNP transcriptional level in activated leucocytes, due to inflammation, and in blood levels, having CNP paracrine/autocrine activities.

Methods: We examined all biological tests performed in two districts from the west part of France, “the French Brittany”; covering 13.653km2 and corresponding to a population of 1.723.653 persons. From February 2010 to august 2015, 22 laboratories (including 6 Hospital/civic laboratories and 16 non hospital/civic laboratories) performed 3.606.432 analysis prescriptions in 3.606.432 adult patients>20y. All labor- atories are equipped with Roche diagnostics platform and measure NT-proBNP as the NP.

Results: During the study period, 56.653 (1.6%) measurements of NT-proBNP were performed in 27.527 distinct patients, including 10.1% of measurements in elderly patients ≥80y. NT-proBNP was more often measured in men versus women up to 80 years (p<0.10), was more frequent in women >80y with overall 28,345 measurements in women and 28,303 in men. NT-proBNP measurements gradually increased by 10y-age categories up 80-90y: 39.828 (70.3%) of measurements have been done in elderly patients ≥75y, 31523 (55.6%) in patients ≥80y and 7.605 (13.4%) in patients ≥90y. In all 10y-age categories, the number of measurements gradually increased over time (p<0.05 in all).
As expected, NT-proBNP concentrations increased with advanced age (p < 10-5), with respective mean ± SD and median (IQR) concentrations of 3844 ± 6448 ng/L and 1453 ng/L (468-3770) in patients ≥ 75 years. NT-proBNP concentrations also increased with advanced age but unlike expected were overall more elevated in men versus women. Our report suggests that reference values should be clearly defined in elderly patients and possibly stratified by sex. Big data analysis may offer a unique opportunity to improve our knowledge in current practices.

Number of NT-proBNP measurements across age groups in 2,064,632 patients

Introduction: The clinical and prognostic role of cardiac natriuretic peptides (NTP) in patients with heart failure is well known; recently, several studies have evaluated the possibility of using N-terminal pro-brain natriuretic peptide (NT-proBNP) to evaluate their potential prognostic role in patients with acute coronary syndromes (ACS). Aim of our study was to evaluate the prognostic value of the early measurement of NT-proBNP in patients with acute coronary syndrome-ACS and compare it's significance with other parameters of systolic dysfunction, for example ejection fraction-EF.

Methods: We enrolled n=50 patients admitted to our coronary care units with the diagnosis of acute coronary syndrome-ACS. We used diagnostic methods, such as: Resting ECG, determination of cardiac Troponin I level (cTnI), measurements of NT-proBNP, we also measured CK-MB and performed echocardiography measurement of EF. NT-proBNP and echocardiography measurement we performed also during follow-up: 1-3 months later after the hospital discharge. Results: According our results totally NT-proBNP was elevated in 36% (n = 18) of hospitalized patients who had no symptoms of heart failure and were hospitalized because of ACS (STEMI and NSTEMI). EF < 54% was seen just in n=8 patients who had elevated level of NT-proBNP. All these patients were investigated after 1-3 months from hospital discharge. In our study group we had no one case of patient death. From the group with elevated level of NT-proBNP seven patients (38,8%) had recurrent ischemic events (2 subsequent MI, 5 recurrent angina), and 11 (61%) had symptoms of heart failure (NYHA II-III). We couldn't find correlation between NT-proBNP and decreased EF during hospitalization, but correlation revealed between NT-proBNP elevated level and decreased EF (ejection fraction) p < 0.005 in STEMI group during follow up. Such kind of correlation wasn't found in NSTEMI group p < 0.007, but during follow up we revealed direct correlation between recurrent episode of ischemia, heart failure symptoms, elevated NT-Pro BNP level and decreased EF.

Conclusions: Our results suggest that NT-proBNP levels, measured at admission can have much more predictive value for complications, especially for short-term development of heart failure symptoms in patients with ACS, than EF itself in both subgroups-STEMI and NSTEMI. Measurement of this marker at early stage of hospitalization is easy and simple way to predict short-term complications and avoid them.

P510 Patterns and prognostic Role of N-terminal pro-B-type natriuretic peptide in heart failure with mid-range vs. preserved vs. reduced ejection fraction

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Background: Evidences about the role of N-terminal pro-B-type natriuretic peptide (NT-proBNP) in heart failure (HF) with mid-range ejection fraction (HFrEF) are still limited. NT-proBNP levels are influenced by demographic and clinical characteristics that may differ in HFrEF vs. HF with preserved (HFP EF) and reduced (HFrEF) EF.

Purpose: To determine the different determinants and compare the prognostic role and discriminatory power of NT-proBNP levels in HFrEF vs. HFP EF vs. HFrEF.

Methods: 9,847 out-patients with HFP EF (EF ≥ 50%; n = 1,811) or HFrEF (EF < 40%; n = 3,122) or HFrEF (EF < 40%; n = 5,914) enrolled in the Swedish Heart Failure Registry were studied. High vs. low NT-proBNP levels were defined according to the median value of peptides. Logistic and linear regression analyses were performed to identify the different predictors of high NT-proBNP levels in HFrEF vs. HFP EF vs. HFrEF. Survival models were performed to compare high vs. low NT-proBNP levels for prognosis (overall mortality and the composite of mortality and HF hospitalizations) across the HF subtypes. ROC curves were fitted to assess the different predictive power of NT-proBNP for each outcome in HFrEF vs. HFP EF vs. HFrEF.

Results: Median NT-proBNP levels in HFrEF (1,540 pg/ml, IQR: 602-3,317) were intermediate between HFP EF (1,428 pg/ml, IQR: 523-3,000) and HFrEF (2,288 pg/ml, IQR: 1,022-4,855; p < 0.001). Among 30 variables analyzed (demographic, clinical, medication use), body mass index (BMI), hypertension, diabetes, diabetes mellitus, AF, atrial fibrillation/flutter (AF), use of angiotensin receptor blockers (ARBs), nitrates, oral anticoagulants and digoxin differently predicted high NT-proBNP levels in HFP EF vs. HFrEF vs. HFP EF. In particular, in HFP EF the impact of high BMI (>30 kg/m2) and AF on NT-proBNP was intermediate between that in HFP EF and HFrEF, whereas hypertension, diabetes and use of ARBs and oral anticoagulants were associated with higher NT-proBNP levels in HFP EF. Digoxin use was associated with higher NT-proBNP in HFP EF and HFrEF vs. HFP EF, whereas reduced estimated glomerular filtration rate was associated with higher NT-proBNP levels in HFP EF vs. HFP EF vs. HFrEF. All-cause mortality risk in patients with high NT-proBNP levels vs. those with low values was similarly increased in HFP EF (HR: 2.0) and HFP EF (HR: 1.9) vs. HFrEF (HR: 1.6 and HR: 1.8). ROC curves showed NT-proBNP having a higher predictive power in HFP EF vs. HFP EF vs. HFP EF. Survival models were performed to compare high vs. low NT-proBNP levels for prognosis (overall mortality and the composite of mortality and HF hospitalizations) across the HF subtypes. ROC curves were fitted to assess the different predictive power of NT-proBNP for each outcome in HFrEF vs. HFP EF vs. HFrEF.

Conclusions: HFP EF, HFP EF and HFrEF show different predictors of high NT-proBNP levels. High NT-proBNP, as compared with lower levels, was associated with higher risk of events in HFP EF and HFP EF vs. HFP EF and HFP EF having higher predictive power in HFP EF vs. HFP EF and HFP EF.
Background: Acute heart failure (AHF) syndromes are related to increased morbidity and mortality. Galectin-3 is released by macrophages in response to inflammation and has been considered to be a marker of myocardial fibrosis but also an independent predictor of cardiovascular and total mortality in heart failure patients. The aim of the study was to investigate the role of Galectin-3 in hospitalized patients with AHF and its association with clinical and biochemical parameters.

Methods: We enrolled 76 consecutive patients admitted in a tertiary cardiology department with a diagnosis of AHF (mean age 71 years, 82% males). All participants were evaluated after clinical stabilization 1-2 days prior to discharge. A complete evaluation of all patients was performed including echocardiogram, vascular function (arterial stiffness) and functional status (6 minute walking test – 6MWT). All patients were followed for 6 months and the occurrence of cardiovascular events (fatal, non-fatal or HF rehospitalization) was investigated.

Results: Galectin-3 levels were positively associated with age (p=0.027, r=0.272, p=0.018), female gender (r=0.225, p=0.025), LVEF (r=-0.244, p=0.035) in the total population. In patients with left ventricular ejection fraction (LVEF) ≤40% (n=38), increased Galectin-3 was associated with female gender, reduced CrCl and increased population. In patients with left ventricular ejection fraction (LVEF) >45% (n=13), there was a strong association of Galectin-3 with LVEF and N-terminal pro-BNP (NT-proBNP) (r=-0.766, p=0.002), while the presence of LVEF >45% was associated with higher Galectin-3 levels (r=0.262, p=0.025). No relations between Galectin-3 levels and 6MWT or future event rates were observed. No significant association between Galectin-3 and other parameters was seen in patients with reduced LVEF (r<0.45). Patients with AHF syndrome, Galectin-3 was shown to differentially relate to clinical and biochemical parameters according to the HF phenotype. In patients with preserved LVEF, Galectin-3 was associated with natriuretic peptides levels, arterial stiffness and echocardiographic indices of heart congestion. No relation of Galectin-3 with cardiovascular events was observed at 6 months follow-up.

P515 Biological markers for the diagnosis of heart failure with preserved left ventricle ejection fraction

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Purpose: the possibility of using biological markers of myocardial stress and inflammation for the diagnosis of chronic heart failure (CHF) with preserved (over 50%) left ventricle (LV) ejection fraction (EF).

Methods: included 105 patients with stable CHF (65% men) aged 24-84 (mean 58 ±14) years. Duration AHF ranged from 2 to 90 (mean 24 ±18) months. The etiology of CHF was as follows: ischemic heart disease - 35 (33%) patients, arterial hypertension - 70 (67%). Distribution of patients with CHF by functional classes according to the NYHA classification was: I-72%, II-28%. All CHF patients received drug treatment: ACE inhibitors - 76%, beta-blockers - 72%, diuretics and asprin - 100%, statins - 80%. The control group consisted of 35 healthy. All patients identified NT-proBNP, ANP, adiponectin, galectin-3 and growth differentiation factor 15 (GDF-15) by enzyme immunoassay (ELISA) using procedures recommended by the manufacturers of the reagents. Also, all we surveyed performed echocardiography. Results are expressed as median (interquartile range) values.

Results: The content in NT-proBNP, ANP, galectin-3 and GDF-15 in patients with CHF was significantly higher than in the control group (p<0.001 in all cases). In contrast, the level of adiponectin was significantly higher than in healthy individuals - 11.90 (11.39; 12.60) vs 7.73 (5.38; 8.86) ng/ml in patients with chronic heart failure (p<0.001). The value of LVEF in CHF patients ranged from 30% to 65% and amounted to 45 (29; 51%). In 35 (33%) of patients with CHF LVEF greater than 50%. Correlation analysis Spearman found significant strong correlation (p<0.001 for all markers) between the value of LVEF and the content of all biomarkers, in this case between LVEF and the level of adiponectin found a direct correlation (p=0.862), and between LVEF and the other biomarkers - reverse (from -0.858 to -0.901). Multivariate linear regression analysis found the strongest correlation with the value of LVEF at least with -3 and adiponectin. ROC-analysis confirmed the diagnostic value of adiponectin in patients with CHF with preserved LVEF. Adiponectin values greater than 8.3 mg/ml predicted the presence of CHF in patients with LVEF>50% with a sensitivity of 94.3% and 95% confidence interval (area under the curve 0.977; 95% confidence interval of 0.941-0.999, p<0.001).

Conclusions: 6 among the studied biological markers of myocardial stress and inflammation only adiponectin has diagnostic significance in patients with CHF with preserved LVEF.

P516 The role of sST2 in patients with st segment elevation myocardial infarction

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The biomarker ST2 is a member of interleukin family, which is expressed by cardiomyocytes in two forms – membrane-bound (sST2) and soluble isoform (stST2). ST2 is a “decoy-receptor” for interleukin 33, its level tells us about the left ventricular (LV) remodeling grade and the heart failure’s stage.

Purpose: to investigate the role of sST2 in patients with ST segment elevation myocardial infarction (STEMI).

Methods: 65 patients with STEMI were enrolled to the study. Among them were 83,1% male and 16,9% female. Mean age was 57 ± 2.3 years. All patients underwent a baseline investigation which includes: standard electrocardiography, echocardiography, angiography with stenting of the infarct-related artery. In addition, the level of sST2 was determined during the first day of the disease via ELISA test.

Results: Correlation analysis of the studied parameters showed significant negative correlation between the level of sST2 and the ejection fraction of LV (r=-0.5, p=0.0001), also the rank of correlation coefficient was identified between sST2 and the end diastolic diameter of LV (p=0.01; p=0.03), and the end systolic diameter of LV (p=0.4, p=0.027) which is consistent with the role of sST2 in the progression of ventricular remodeling. The level of sST2 was significantly higher in females compared to males, 98,4±36,6 ng/ml vs 73,0± 29,35 ng/ml, respectively. After comparing the levels of sST2 accordingly to presence or absence of a stable angina before index hospitalization, the patients with a history of stable angina had a significantly lower level of sST2 (p=0.01). Patients with anterior STEMI had higher concentration of sST2 (88,8±3,66 ng/ml) than those with inferior STEMI - 69,38±33,81 ng/ml, p=0.003. For patients with two-vessel coronary artery disease (CAD) sST2 level was 118,26±57,67 ng/ml, for those with three-vessel CAD - 61,79±31,98 ng/ml (p=0.002).

Conclusions: Females are more vulnerable for an early postinfarction remodeling. Higher level of sST2 in patients with anterior STEMI is related to increased infarct zone. Low level of sST2 verifies the patients with a good developing coronary collateral circulation with a history of stable angina before the level of sST2 was determined. The level of injured coronary artery influences on the heart remodeling – two-vessel injury associated with more expressed remodeling compared with multi-vessel patients in STEMI.

P517 Biomarkers in long-term prognosis of chronic heart failure formation in patients with acute coronary syndromes

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The progression of chronic heart failure (CHF) after acute coronary syndrome (ACS) significantly worsens the prognosis for this group of patients. Risk stratification of high risk patient of heart failure formation is very important. In order to diagnose this condition in time the search for biomarkers is going. One of them is the Growth differentiation factor 15 (GDF 15).

Purpose: to estimate the role of GDF 15 in the formation of CHF during the first year after ACS.

Methods: 73 patients were screened with different forms of ACS (55 male and 18 female), mean age was 61 ± 8, 1 3 years. Among them, 54% patients with Q-wave myocardial infarction, 20% - with non-Q-wave myocardial infarction, 26% - unstable angina. All patients underwent a baseline investigation. In addition, the levels of GDF 15, N terminal-pro B-type natriuretic peptide (NT-proBNP) were determined during the first day of hospitalization. The follow-up period was 1 year. The 6-minute walk test (6MWT) was performed for all patients after 1 year for exercise tolerance estimation. All patients were divided into four groups accordingly to the New York Heart Association (NYHA) guidelines (stages IV-V).

Results: the effect of various variables of clinical, instrumental and laboratory status were assessed on CHF progression. For identification of the main risk factors for adverse outcome, we have used logistic regression (LR) method: NT-proBNP (area under curve (AUC) 0.54; p=0.8; 95% confidence interval (CI): 0.31 - 0.72), level of serum creatinine (AUC 0.76; p=0.0002; 95% CI: 0.62 - 0.90), GDF 15 (AUC 0.87; p<0.0001; 95% CI 0.79 - 0.96, NT-proBNP). During the statistical analysis the predictive parameters was calculated: GDF 15 > 2508 pg/ml (specificity (Sp) 95%, sensitivity (Se) 68%), creatinine >118 mmol/L (Sp 86.6 %, Se 56 %). We have developed a LR model (p<0.0001, X2=14,70) with 88% of Se and 98% of Sp that can predict HF formation in patients during the first year after ACS.
Conclusion: the model can be used for risk stratification in development of CHF in patients after ACS in 1 year prognosis.

P518

PlGF: a putative biomarker in heart failure? PhD, Department of Cardiac and Vascular Disease, John Paul II Hospital, Institute of Environmental Health, Lisbon, Portugal

Background/Introduction: Placental growth factor (PlGF) was recently associated to heart failure, contributing to atherosclerosis and vascular remodeling. This putative biomarker might modulate clinical parameters, such as haemodynamic parameters involved in HF subjects.

Purpose: To determine PlGF levels in patients with HF, as well as its relation with disease severity, cardiac biomarkers and genetic variability.

Methods: In patients with HF and preserved or decreased EF (EF <40%) were evaluated some possible cardiac biomarkers, PlGF (pg/mL), NT-proBNP (pg/mL), Galectin-3 (ng/mL) and EPO (mIU/ml) determined by ELISA. The genetic polymorphisms of ACE1 and NO3E were determined by PCR. The sample consisted in 94 patients with HF, aged 78.95 ± 11.9, 52 women (55.3%) and 42 men (44.7%). Statistical methods were the Mann-Whitney test and Spearman correlations. Statistical significance were considered for P < 0.05.

Results: In HF subjects, PlGF medians were 6.09 (0.2-34.3) and EPO medians were 9.45 (1.1-94.1). In our population PlGF were not associated with severity (EF <40%), but EPO levels were (P=0.001). Despite the circulating levels of PlGF and EPO were not correlated between them; we found that PlGF levels and Galectin-3 were inversely correlated with hemoglobin (r=-0.287, P=0.041) and EPO levels directly correlated with neutrophils (%) (r=0.300, P=0.022). Relative to genetic variability, we found that HF subjects with allele A of NO3E polymorphism (AA + AB genotypes) presented a trend for higher levels of PlGF in relation to subjects with BB genotypes (median: 7.39, IQR: 5.47 vs. median: 5.92, IQR: 6.44; P=0.085).

Conclusions: Although we didn’t confirm the role of PlGF in HF, we hypothesized it may be related to inhibition by fms-like tyrosine kinase 1 (Flt-1). Furthermore, the association of higher levels of PlGF to allele A of NO3E polymorphism (lower activity of endothelial nitric oxide) may reflect a hypoxia status in HF subjects and an increased inflammatory process.

P519

Panel of serum markers of fibrosis does not contribute to prognosis in dilated cardiomyopathy

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Background: Serum markers of fibrosis are easily accessible parameters that non-invasively provide insight into the dynamics of fibrosis process in heart failure (HF) and dilated cardiomyopathy (DCM). However, their role as predictors of cardiovascular (CV) events in DCM is less clearly defined.

Methods: Since July 2014 till October 2015 we included 70 DCM patients (pts) (48 ± 12.1 years, EF 24.4 ± 7.4). All pts underwent right ventricular endomyocardial biopsy to study the presence and degree of fibrosis. Markers of collagen type I and III synthesis – procollagen type I and III carboxy- and amino-terminal peptides (PICP, PIIICP, PINP and PIIINP), fibrosis controlling factors – tumor growth factor (TGF-β), transforming growth factor β (TGF-β) and connective tissue growth factor (CTGF) were measured in serum. Primary outcome of the study was defined as death due to HF and urgent HF hospitalization. Results: During 12 month of observation, 6 CV deaths and 19 HF hospitalization occurred. Based on logistic regression models, we verified whether serum markers of fibrosis were associated with the primary outcome. Two predictive models were analyzed: unadjusted model and model with the adjustments to the age, disease duration, ejection fraction, collagen volume fraction, and NT-proBNP. None of the analyzed parameters predicted the occurrence of the primary outcome, either in an unadjusted or adjusted model. Conclusions: Serum markers of fibrosis were found not to be useful in predicting cardiovascular events in DCM during 12 months of observation.

P520

Soluble st2 and galectin 3 as potential biomarkers for cardiac fibrosis in peripartum cardiomyopathy

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Background and objective: Peripartum cardiomyopathy (PPCM) is characterized by new onset of heart failure in late pregnancy and up to the first five months postpartum. The implication of cardiac fibrosis remains controversial in PPCM patients despite clear evidences from animal models. Galectin 3 is a β-galactoside-binding lectin protein that is required for transforming growth factor (TGF)-β pathway-mediated myofibroblast activation leading to cardiac fibrosis. Soluble ST2 (sST2), a truncated soluble receptor of the IL-1 receptor superfamily is highly induced and positively correlated with markers of fibrosis. MicroRNA-21 was implicated in the control of myocardial fibrosis. Galectin-3, sST2 and microRNA-21 were described as prognostic biomarkers in heart failure patients. We aimed to determine the expression levels of these factors and whether they are associated with poor outcome in PPCM patients.

Methods: and results: We recently performed a subgroup biomarker study on 40 consecutive patients with PPCM and 10 age-matched healthy subjects. All patients received ACE inhibitors and beta-adrenergic blocking agents. Plasma NT-proBNP, Galectin 3, microRNA-21 and serum sST2 levels were measured at baseline. Echocardiograms were performed at baseline and six months postpartum. Poor outcome in PPCM patients was defined by NYHA ≥3 or death at 6 month.

At baseline, PPCM patients had significantly higher NT-proBNP, sST2, Galectin 3 and microRNA-21 levels than healthy controls (P<0.005, P=0.0038, P=0.085 and P=0.01, respectively). Six months postpartum, three patients did not improve their cardiac function (EF, 26.7 ± 7.4%) and eight died. Baseline NT-proBNP (3973 ± 956 vs. 1835.2 ± 268 pmol/L, P=0.02), sST2 (67.01 ± 14.2 vs. 28.5 ± 4.3 ng/mL, p = 0.01) and Galectin 3 (5 (13.7 ± 2.8 vs. 8.5 ± 0.66 ng/mL, P = 0.01) levels were significantly higher in patients with poor outcome compared to patients that improved their cardiac function (EF, 45.7 ± 11.3%). sST2 and Galectin 3 expression levels were not correlated with baseline ejection fraction. Circulating microRNA-21 levels were not different between recovered and poor outcome patients.

Conclusion: These preliminary results are very promising as for the first time we demonstrated that sST2, Galectin 3 and microRNA-21 are upregulated in PPCM. Galectin 3 and ST2 may be clinically useful biomarkers that identify a subset of PPCM patients at highest risk of myocardial dysfunction due to fibrosis. These findings should be confirmed in a larger cohort.

P521

HYCHenF: A risk score to predict Congestive Heart Failure Incidence in Hypertension. Based on 18795 individual patient data. H.-H.Kai Ho-Le1, H. Ottomanni1, G. Sitruk2, F. Sublot3, F. Gueyffier1

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Objectives: Patients with hypertension present risk of heart failure development. We aimed to build here a risk score to predict congestive heart failure (CHF) incidence in these patients using data from well-done randomized controlled trials (RCTs) of anti-hypertensive agents.

Method: Data of 18795 hypertensive patients was collected from four trials of INDANA database (Cope, SHER STOP and SYST-EUR). The whole population was randomly divided in two subsets derivation set for model construction and the remaining for model validation with the ratio 2:1 and with similar patient characteristics. We used the Cox proportional hazards model to test the association of each covariable to CHF incidence separately (univariable analysis) and altogether (multivariable analysis) until obtaining the final model where all covariables were significant.

Results: Thirty baseline factors were examined for risk of CHF incidence using a multivariable Cox model, adjusted on trials. Treatment was associated with a significant reduction of 50% of CHF incidence and had no interaction observed with trial or any other covariable. A risk score of CHF incidence in five years was built with 15 significant risk factors; treatment (HR 0.50, CI 0.95%, 0.36 - 0.69, age (HR 1.52, 1.3 - 1.78 by 5-year increase), serum total cholesterol (HR 0.83, 0.73 - 0.96), cigarette smoking (HR 1.74, 1.70 - 2.75), renal function (HR 0.93, 0.87 - 1.00 by 5 mL/min/1.73 m2 increase of glomerular filtration rate), body mass index (HR 1.05, 1.01 - 1.09 by 1 kg/m2 increase), history of myocardial infarction (HR 3.07, © 2017 The Authors
1.76 - 5.34), history of stroke (HR 3.03, 1.47 - 6.25), diabetes baseline (HR 1.63, 1.01 - 2.63) and ratio of systolic/diastolic blood pressure (HR 1.36, 1.17 - 1.58). This model was then transformed to an integer system, with points added for each factor according to its association with CHF incidence risk.

Conclusion: Our work provides a simple risk scoring system for CHF incidence prediction in hypertension, using individual data from well-established RCTs of antihypertensive treatments. We confirmed the same classical risk factors of CHF development found by other studies on other populations of cardiovascular risk.

Table 1. Final model to predict congestive heart failure incidence In hypertension

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Hazard Ratio [95% CI]</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (by 5-year increase)</td>
<td>1.52 (1.30 - 1.78)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Glomerular filtration rate (by 5 mL/min/1.73 m2 increase)</td>
<td>0.97 (0.93 - 1.00)</td>
<td>0.04</td>
</tr>
<tr>
<td>Smoker</td>
<td>1.74 (1.10 - 2.75)</td>
<td>0.038</td>
</tr>
<tr>
<td>Body mass index (by 1 kg/m2 increase)</td>
<td>1.05 (1.01 - 1.09)</td>
<td>0.014</td>
</tr>
<tr>
<td>Serum total cholesterol (mmol/L increase)</td>
<td>0.83 (0.73 - 0.95)</td>
<td>0.011</td>
</tr>
<tr>
<td>History of myocardial infarction</td>
<td>3.07 (1.76 - 5.34)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>History of stroke</td>
<td>3.03 (1.47 - 6.25)</td>
<td>0.003</td>
</tr>
<tr>
<td>Diabetes baseline</td>
<td>1.63 (1.02 - 2.63)</td>
<td>0.044</td>
</tr>
<tr>
<td>Ratio of systolic/diastolic blood pressure</td>
<td>1.86 (1.17 - 2.98)</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

Multivariable analysis adjusted on trials and performed on the training set.

PS52
Exploring risk markers for incident heart failure using a targeted proteomics chip

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Background: The evolving use of multiplex proteomic platforms provides excellent tools for investigations among multiple proteins and risk of incident cardiovascular disease (CVD). In this study, we evaluated the impact of 92 proteins, included in a multiplex panel, on incident heart failure (HF).

Methods: All 92 proteins from the OLINK CVD III panel were analyzed in 1,734 participants from a subsample of the population-based Malmö Preventive Project. Only one protein was below detectable limits in >15% samples, i.e., N-terminal pro-brain natriuretic peptide (NT-proBNP). Therefore, NT-proBNP was analyzed separately using a competitive enzyme immunoassay. Exclusion of subjects with prevalent HF and missing covariates at baseline examination rendered a final study population of 1,705 subjects. Standardized hazard ratios (HR) for logarithmic values of protein concentrations were reported. A two-sided Bonferroni corrected P-value of 0.05/92=5.4x10^-4 was considered statistically significant.

Results: Mean age was 67 years, 29% were women, and 28% had prevalent diabetes. During a mean follow-up time of 8.9 ± 1.5 years, 91 incident HF cases were detected. In age- and sex-adjusted analyses, four proteins were associated with incident HF: NT-proBNP (hazard ratio (HR): 2.55, 95% CI, 2.07-3.15; P=3.4x10^-18), Galectin-4 (GAL-4) (HR 1.60, 1.26-2.01; P=8.4x10^-5), Azurocidin (AZU-1) (HR 1.43, 1.17-1.74; P=4.0x10^-4) and Growth-differentiation factor 15 (GDF-15) (HR 1.58, 1.17-2.07; P=9.6x10^-3). When adjusting for traditional risk factors (age, sex, height, systolic blood pressure, anti-hypertensive medication use, diabetes mellitus, prevalent atrial fibrillation and previous myocardial infarction), only NT-proBNP (HR 2.1, 1.53-2.85; P=4.0x10^-4) and GDF-15 (HR 1.37, 1.01-1.84; P=0.042) remained significantly associated with incident HF.

Conclusion: In a community sample of 1,705 elderly individuals without HF, we used an immunoassay designed to analyze 92 proteins with proposed involvement in immunity/inflammation, CVD, and metabolism to explore potential biomarkers for incident HF, and found NT-proBNP and GDF-15 to be independently associated with future HF development.
May explain sex differences in the pathogenesis of post-MI development of HF.

**Conclusion:**

The association between E/e ratio and plasma levels of BNP and ADM in ESRD patients with preserved left ventricular ejection fraction underlying chronic hemodialysis.

Methods: The study group enrolled 62 ESRD patients treated with hemodialysis three times weekly. BNP and ADM plasma concentration measurements and echocardiographic investigation were performed 30 minutes after hemodialysis. E/e ratio, evaluated by tissue Doppler imaging, measured at the basal septum was used as a surrogate marker for assessing left ventricular filling pressures.

Results: The mean age of patients was 62 ± 25 years, 57% male. The mean BNP and ADM values after hemodialysis were 40 ± 573 pg/ml and 0.06 ± 2.17 pg/ml, respectively. Patients of older age, being on hemodialysis for a longer period, with hypertrophied left ventricles and larger left atria displayed higher E/e values. BNP (r = 0.324, p = 0.018) and ADM (r = 0.319, p = 0.042) plasma levels were positively and significantly associated with E/e. Multivariate regression analysis including BNP, ADM, age, hemodialysis duration, left ventricular end-systolic volume index, ejection fraction, left ventricular mass index and left atrium volume index, revealed that ADM (p = 0.025) but not BNP levels, were independently associated with E/e ratio.

Conclusions: ADM, but not BNP, was independently associated with septal E/e in ESRD patients with preserved left ventricular ejection fraction. ADM plasma levels may be helpful to evaluate left ventricular filling pressures in ESRD patients.
P527
Role of uric acid in progression of heart remodeling in patients after myocardial infarction: liaison between metabolic profile and subclinical inflammation
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Aim: to investigate the potential impact of SUA levels on metabolic profile, subclinical inflammation and heart remodeling in patients after myocardial infarction.

Methods: 147 patients (59.2 ± 0.8 years old) in 6 months after myocardial infarction were included in cross-sectional study. The subjects were divided in two groups with high (0.39 ± 0.06 mmol/l, n=68) and normal (0.32 ± 0.05 mmol/l, n=65) serum uric acid (SUA) levels. Lipid profile and inflammatory biomarkers (high-sensitivity C-reactive protein (hs-CRP), interleukin-1 (IL-1), tumor necrosis factor (TNF)) identification, echocardiography assessment were performed.

Results: patients with high SUA had STEMI (61.3% vs. 17.1%, mostly anterior (53.8% vs. 28.6%), while patients with normal SUA = NSTEMI (82.9% vs. 37.8%). Congestive heart failure often manifested in patients with high SUA (24.5 % vs. 4.9 %). Left ventricle aneurysm was formed only in 7 patients with hyperuricemia. Metabolic syndrome was more often found in patients with high SUA than normal (60.5% vs. 7.3%). Lipid profile of patients with hyperuricemia was characterized by significant increased levels of total cholesterol - 20.9%, triglyceride - by 38.1%, LDL cholesterol - by 31.8% and lower HDL cholesterol - by 32.8% (p < 0.01) compared with patients with normouricemia. Combined dyslipidemia (87.9% vs. 2.4%) and hypertriglyceridemia (6.6% vs. 2.4%) were prevailed in case of hyperuricemia. In patients with high SUA inflammatory biomarkers were increased significantly, including hs-CRP - by 71.4% (IL-1 - by 49.9%, TNF - by 76.2% (p < 0.01) compared with patients with normal SUA. The correlation between elevated levels of hs-CRP and SUA (r = 0.7, p < 0.01), TNF (r = 0.8, p < 0.01), IL-1 (r = 0.7, p < 0.01) was found, confirming the direct role of SUA in inflammation.

Patients with high SUA, compared to those with low SUA, had higher left ventricular mass index (220.9 ± 0.67 g/m² vs. 200.9 ± 0.67 g/m², p < 0.05, left atrial dimension (4.0 ± 0.35 vs. 3.8 ± 0.36 cm, p < 0.01), while did not differ in ejection fraction. Concentric and eccentric hypertrophy were observed in 56.6% and 40.6% patients with hyperuricemia, 26.8% and 31.7% - with normouricemia. Diastolic dysfunction was more frequently investigated in patients with high SUA than with normal SUA levels (p < 0.05) and with higher left ventricle strain in patients with heart failure.

Conclusion: SUA, inflammatory biomarkers and traditional risk factors are associated in patients with high SUA levels, and left ventricle strain in patients with heart failure.

P529
Creatinine or cystatin-C? Differences in renal function estimates and relation to cardiac parameters in patients with neuromuscular disorders
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Background: Commonly used formulas use creatinine plasma levels to predict kidney function. However, in patients with neuromuscular disorders estimation of kidney function is severely limited due to very low creatinine levels and muscle turnover. Cystatin-C, an emerging marker of kidney function is not influenced by skeletal muscle degradation, and might be of clinical value in these patients. Therefore we studied the association of the CKD-EPI formula using either the cystatin-C or creatinine plasma levels with both renal and cardiac function.

Methods: In a tertiary referral academic hospital, we consecutively enrolled 39 patients with neuromuscular disorders that were screened for possible cardiac involvement. In all these patients we measured creatinine and cystatin-C levels. Cystatin-C based eGFR (CKD-EPI) and creatinine based eGFR were calculated using the CKD-EPI formula. We performed echocardiography to assess left ventricular function. To directly compare the performance of creatinine and cystatin-C, we used the CKD-EPI formula using either creatinine or cystatin-C.

Results: Mean age of the study patients was 31 (SD ± 11), 82% of the patients were male and 59% were diagnosed with either Duchenne or Becker muscular dystrophy. Median creatinine value was 10 μmol/L (IQR 7-23), and for cystatin-C it was 0.81 mg/L (0.71-0.92). Creatinine and cystatin-C in these patients were not correlated with each other. We calculated creatinine based and cystatin-C based CKD-EPI, and they were markedly different: 252 mL/min per 1.73 m² and 113 mL/min per 1.73 m², respectively. Cystatin-C based eGFR were strongly associated with left ventricular ejection fraction (LVEF) (r = -0.78 P < 0.001). Cystatin-C based iGFR (CKD-EPI) was associated with age and cystatin-C levels (β = -0.63 P < 0.01, β = -0.43 P=0.008) which have established relation to renal function, while creatinine based iGFR (CKD-EPI) was only weakly associated with troponin-T and iNT-proBNP (β = 0.36 P=0.026, β = 0.32 P=0.045).

Conclusions: These data indicate that estimation of renal function cannot reliably be achieved with creatinine, while cystatin-C appears a reasonable alternative. Since the majority of patients with neuromuscular dysstrophies develop heart failure, and at some point require heart failure medication, adequate monitoring of renal function is warranted.
Results: LVRR occurred in 45.7% of patients within 22.6 ± 5.28 months after optimal pharmacological or resynchronization therapy. In this group, LVEF increased 24.6 ± 9.3% and a LV diastolic diameter (LVEDD) decrease of 8.8 ± 7.8 mm compared to baseline values (follow-up LVEF of 57.8 ± 7.5% and follow-up LVEDD of 53.9 ± 6.9 mm). Concerning the progression of biomarkers plasma levels in the overall population, there was a significant decrease in BNP (35.3 ± 82.2 vs 120.9 ± 266.5 pg/ml; p = 0.01) as well as an increase in GDF-15 (1161.2 ± 826.4 vs 935.0 ± 512.6 pg/ml; p = 0.04). MMP-3 (10.1 vs 6.0 vs 6.1 ± 3.0 ng/ml; p = 0.01) at the end of follow-up. A subgroup analysis revealed that BNP and MMP-3 changes occurred both in patients with or without LVRR. GDF-15 increased (marginally) in patients that recovered LVEF (1140.0 ± 928.45 vs 808.35 ± 416.6 pg/ml; p = 0.07). Additionally, patients with pharmacological LVRR had lower baseline values of galectin-3 (5.81 ± 2.98 vs 8.68 ± 4.35 ng/ml; p = 0.03).

BNP correlated with LVEDV (r = 0.63, p < 0.01), LVEDV (r = 0.63, p < 0.01), LVEF (r = 0.43, p < 0.01), PASP (r = 0.36, p < 0.01), LAVi (r = 0.53, p < 0.01), and LAVi (r = 0.53, p < 0.01). GDF-15 correlated with LAVi (r = 0.48, p < 0.01), and PASP (r = 0.36, p < 0.01), while MMP-3 correlated with PASP (r = 0.32, p < 0.01), sphericity index (r = -0.29, p = 0.02). MMP-3 had a positive correlation with LVEF (r = 0.35, p = 0.01).

Conclusions: Lower baseline values of galectin-3 were associated with LVRR. GDF-15 and MMP-3 increased during follow-up showing important significant correlations between their circulatory levels and echocardiographic parameters of LV remodeling, suggesting there is a multidirectional pathway of activation in HF that involves cytokines, ECM activation and apoptosis. Considering the role that these markers hold at the level of myocardial fibrosis, our data clearly demonstrate the changes at the ECM have an impact on myocardial function and structure recovery in DCM patients.

PS31

Diagnostic and prognostic value of elevated serum concentrations of procalcitonin in patients with suspected heart failure and infection - A systematic review and meta-analysis

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Purpose: The serum concentration of procalcitonin (PCT), a diagnostic tool of bacterial infection, is higher in patients presenting with heart failure (HF) and concomitant infections than in patients with HF alone, and in patients with infection alone. However, its prognostic significance remains uncertain in patients with HF.

We reviewed and performed a meta-analysis of studies that measured PCT in patients with acute or chronic HF and suspected infection in order to evaluate the changes of prognostic value in predicting the impact of PCT concentration in this population.

Methods: Out of 73 published studies, we identify 7 that were eligible for our analysis, including a total of 5,810 patients. We estimate PCT concentration in patients with or without HF and/or infection. We also compared the short-term and long-term mortality of patients with versus without elevated serum PCT concentrations. Risk ratios (RR) and confidence intervals (CI) were calculated.

Results: The mean age of the study samples ranged for 58 to 81 years and the proportion of men ranged to 47 ± 66%. The analyzed follow-up ranged from 1,6 days to 180 days and the cutoff PCT concentrations ranged from 0.1 to 0.25 ng/l. Patients with HF and concomitant infection tended to have a higher PCT concentration than those with HF alone (respectively 0.26 ng/l [0.06, 0.46] vs 0.10 ng/l [0.08, 0.12]; p = 0.059).

The mortality rates of patients with elevated PCT concentrations was significantly higher that of patients with PCT concentrations in the normal range at 30, 90 and 180 days (respectively RR 30 days 2.66 [1.74, 4.05] RR 90 days 2.12 [1.58, 2.83 ]; RR 180 days 2.06 [1.13, 3.78 ]).

Conclusions: This review and meta-analysis contribute to strengthen the conclusions of several recent studies of the prognostic role of PCT in patients suffering from HF. The measurements of PCT concentrations enabled their short-term risk stratification. Further studies may investigate outcomes with risk stratification driven by procalcitonin levels in patients presenting with suspected or confirmed HF.
Background: Physical activity and appetite are important for maintaining physical health. Yet, sedentary lifestyle and poor appetite are frequently observed in the heart failure (HF) population. However, the relationships between these phenomena are not yet clearly understood.

Purpose: To investigate the relationship between physical activity and appetite in patients with stable HF.

Methods: In this cross-sectional study, a consecutive sample of 186 patients with confirmed HF in NYHA class II-IV (median age 72y, 70% men, NYHA class II 61%) participated in the study. Patients were recruited from three HF outpatient clinics in central Sweden. Physical activity measures included total energy expenditure (TEE), active energy expenditure (AEE) above 3 METs, average daily METs and number of steps per day during four days using a validated multi-sensor wearable armband (SenseWear®, Body Monitoring System). Patients also self-reported their physical activity on a ten-point numeric rating scale, from extremely low (1) to extremely high (10). Self-reported appetite was measured by Council on Nutrition Appetite Questionnaire (CNAQ), an 8-item instrument (score range 0-40) where CNAQ ≤28 indicate poor appetite. Associations between physical activity and appetite were analyzed by Spearman correlation while differences in physical activity between poor vs good appetite were analyzed using Mann Whitney U test.

Results: There was a significant positive relationship between physical activity and appetite assessed by TEE (rs=0.18, p=0.012), AEE of moderate intensity (3 METs) (rs=0.28, p=0.000), number of steps (rs=0.29, p=0.000), average METs intensity (rs=0.29, p=0.001), levels of self-reported physical activity (rs=0.249, p=0.000), and self-reported physical activity (rs=0.191, p=0.009). Levels of physical activity in the low appetite group differed significantly from the group with better appetite, which was seen in all physical dimensions. TEE (U=3225, z=-2.28, p=0.024), active energy expenditure (AEE) (U=12902, z=-3.178, p=0.001), number of steps (U=3706, z=-3.734, p=0.000), average METs intensity (U=4329, z=-2.540, p=0.011), levels of self-reported physical activity (U=3185, z=-2.47, p=0.013).

Conclusion: This study shows that physical activity is associated with appetite and that levels of physical activity differs between patients with poor and good appetite. These findings have implication for both research and practice and underlines the importance in monitoring both physical activity and appetite. Further research is needed to determine whether interventions targeting physical activity also improve appetite and vice versa in the HF population.

Background: It is known that women often experience poorer quality of life and more symptoms of depression, both among patients with heart failure and in the norm population. Further it is also known that female caregivers experience more burden and stress in relation to caregiving compared to men.

Aim: The aim of this study was to explore gender differences with regard to quality of life, symptoms of depression, perceived control, emotional support and caregiver burden in patients-partner dyads affected by heart failure.

Method: The study is a secondary analysis of baseline data from a RCT targeting patients with heart failure and their caregiving partners. A total of 155 patient-partner dyads where included. Data were collected using SF-36, Beck Depression Inventory, Control Attitude Scale, a single item to measure emotional support and the Caregiver Burden Inventory.

Results: There were no significant difference in age, educational level, lifestyle or comorbidities between the genders in either the patient or caregiver group. Mean age of female patients (n=88) was 70 and male patients (n=117) 72 years, female caregivers 68 and male caregivers 70 years. Most patients and caregivers stated that they had someone to confide in. Male patients experienced this to a significantly higher extent than female patients (p<0.001). There were no significant gender differences between the caregivers in perceived emotional support or caregiver burden. There were several gender differences in the eight domains of health-related quality of life measured by SF-36 among the patients. Male patients had significantly better physical function (48 ± 27 versus 36 ± 24), social function (67 ± 28 versus 52 ± 27) and mental health (70 ± 22 versus 61 ± 17). A similar picture was seen among caregiving partners with male partners having significantly better physical function (81 ± 21 versus 72 ± 23), less bodily pain (82 ± 20 versus 67 ± 2), and better mental health (75 ± 15 versus 68 ± 22). Female patients had more symptoms of depression than males (p=0.048) with 50% of the females having depressive symptoms and 30% of the males. However, there was no gender difference with regard to depressive symptoms in caregivers. No significant gender differences in perceived control over the heart disease neither among the patients, nor among their caregiving partners were found.

Conclusion

In patient and caregiver groups that were equal with regard to age, educational level and comorbidities we found differences between male and female caregivers with regard to health-related quality of life, but no differences in emotional support, perceived control over the heart failure condition, depressive symptoms or caregiver burden. Female patients were found to be more vulnerable than males with poorer quality of life, less emotional support and more depressive symptoms. Interventions targeting to support female patients are warranted. Support programs for caregivers should include both men and women.
intake was highest in patients whose caregiver also consumed a high sodium diet. These results suggest that interventions aimed at improving LSD adherence should target both patients and family members together.

Results: Of the 550 patients (123 women), with a mean age of 71.4 ± 9.8 years and mean EF of 32.1% ± 6.7, 432 patients were in sinus rhythm, 451 patients were in NYHA class ≤ class ≥ class ≤ class ≥ class > ≥ class ≥ class ≥ class > 9.0 in GC (p = 0.04). The remaining demographic data, previous co-morbidities, previous medication and the date of discharge, and in-hospital mortality were evaluated. Results: A total of 1006 hospitalizations were performed, corresponding to the same number of patients, with an age range from 77.5 ± 10.1% of 50.8% of males. 336 patients were included in GA (36.4%), 417 in GB (41.5%) and 223 in GC (22.2%). The inter-groups comparison is presented in Table. In-hospital mortality was 3.8% in GA, 8.4% in GB, and 9.0% in GC (p = 0.04).

Conclusions: In this population it is evident the negative impact of age on intrathecal national mortality. It also evidences a higher prevalence of females and patients with HF with preserved EF (HFrEF) with advancing age, which are underrepresented in clinical studies. Somewhat unexpectedly, there is a lower prevalence of AF, coronary artery disease (CAD) and diabetes mellitus (DM) in the older patient group, which can be explained by the greater prevalence of HFREF. As expected, this also evident that medical therapies are underused in the elderly.

P538
The characteristics of heart failure ambulatory patients with reduced ejection fraction who attend a specialized heart failure clinic compared to those who decline such follow-up
ZI Zaza Iakobishvili1; D Murrminkas2; A Porter1; H Jino3; S Birkenfeld4; D Hasdai5
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Background: Specialized heart failure (HF) clinics have been established to ameliorate management. The proportion of HF patients who choose to attend such clinics and their demographic and clinical characteristics remain unknown.

Methods: We analyzed the electronic records of all 115739 patients 18 years old and insured by our Health Services in the Holon/Bat-Yam District. We identified 550 patients with EF < 40% and age under 85 years. In collaboration with the general practitioners in the district and under the auspices of the district management, all suitable patients were actively solicited by a dedicated nurse to attend a specialized HF clinic within their community. The demographic and clinical characteristics of the patients who elected to attend the clinic were compared with those who declined.

Results: Of the patients who were actively solicited, of whom 22.4% were women, 210 (38.1%) elected to attend the clinic, 173 men and 37 women. Men were more likely to attend the clinic (40.5% of men in the cohort vs 30.0% of women, p = 0.05). Of interest, patients who attended the clinic were less likely to be in NYHA class 1-2 (39.0% vs 65.6% among patients who did not attend, p = 0.06). There were no other differences in baseline characteristics, including the proportion of patients receiving evidence-based medications.

Conclusions: Although a specialized HF clinic was readily available, in our cohort of ambulatory HF patients with reduced ejection fraction only 36.1% elected to attend. Efforts should be made to make this service attractive and accessible.

P537
The potential use of ivabradine among ambulatory patients with heart failure with reduced ejection fraction in the real world scenario
ZI Zaza Iakobishvili1; D Murrminkas2; A Porter1; H Jino3; S Birkenfeld4; D Hasdai5
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Background: Ivabradine, an inhibitor of the If channel, is a relatively new addition to the pharmacological therapeutic regimen for heart failure with reduced ejection fraction (HFrEF). In particular, it is indicated for HFrEF patients in sinus rhythm, NYHA class ≤ 2, ejection fraction (EF) ≤ 35%, and heart rate ≥ 75/min.

Aim: We sought to evaluate the potential use of ivabradine in a large cohort of real-world, ambulatory HFrEF patients.

Methods: We analyzed the electronic records of all 115739 patients 18 years old and insured by our Health Services in the Holon/Bat-Yam District. We identified 550 patients with EF < 40% and age under 85 years. We then further sought the patients who met the criteria for use of ivabradine, as described above.

Results: Of the 550 patients (123 women), with a mean age of 71.4 ± 9.8 years and mean EF of 32.1% ± 6.7, 432 patients were in sinus rhythm, 451 patients were in NYHA class ≤ 2, 401 patients had EF < 35%, and 362 patients had heart rate ≥ 75/min (some patients had more than one exclusion criterion). Altogether, only 154 patients (28.3%) were apparently suitable for consideration of treatment with ivabradine, of whom 138 patients (89.6%) were under treatment with beta blockers (mean 38.6% ± 21.6 of maximal dose, and only 2.7% of patients receiving maximal beta blocker dose).

Conclusions: In a large cohort of real-world, ambulatory HFrEF patients, approximately only a quarter of the patients were apparently suitable for consideration of ivabradine treatment. Some patients were not under beta blocker treatment, and the vast majority was receiving submaximal doses. Thus, it seems that there is substantial room for improvement in beta blocker therapy before initiating treatment with ivabradine.

P536
Health Care Professionals’ compassion rounds
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Background: “Health Care Professionals” (HCPs) compassion rounds” are a multidisciplinary forum aiming to help HCPs improve emotional expression, teamwork and communication. The main aim of our study was to explore the views of HCPs about the rounds and assess the impact of these rounds on teamwork and job satisfaction.

Method: A quasi experimental study was conducted in a cardiology/cardiosurgery hospital. Three rounds were established in which a patient case was described and then discussed by a multidisciplinary group. Twenty-five HCPs participated in the study and completed TeamSTEPPS and Minnesota Satisfaction Questionnaires validated in Greek, before and after the rounds. After the rounds, 10 participants were selected (via purposive sampling) to participate to focus groups. Quantitative and qualitative data were analyzed using t-test and content analysis, respectively.

Results: An upward trend on teamwork and job satisfaction was observed after the rounds, with no statistical significance (p = 0.10, p = 0.18). Four main themes extracted: exposing emotions; personal impact; inequality of topics; frontiers. Overall, participants reported benefited on sharing concerns and identifying needs in their work environment, teamwork and the management that could be improved.

Conclusions: Findings suggest that “HCPs compassion rounds” may contribute to more positive feelings about teamwork, better collaboration and job satisfaction.

POPLIMONSTIES – EPIDEMIOLOGY

P538
The characteristics of heart failure ambulatory patients with reduced ejection fraction who attend a specialized heart failure clinic compared to those who decline such follow-up
ZI Zaza Iakobishvili1; D Murrminkas2; A Porter1; H Jino3; S Birkenfeld4; D Hasdai5
1Rabin Medical Center, Petah Tikva, Israel; 2Heart Failure Unit, Clalit Health Services, Tel Aviv, Israel

Background: Specialized heart failure (HF) clinics have been established to ameliorate management. The proportion of HF patients who choose to attend such clinics and their demographic and clinical characteristics remain unknown.

Methods: We analyzed the electronic records of all 115739 patients 18 years old and insured by our Health Services in the Holon/Bat-Yam District. We identified 550 patients with EF < 40% and age under 85 years. In collaboration with the general practitioners in the district and under the auspices of the district management, all suitable patients were actively solicited by a dedicated nurse to attend a specialized HF clinic within their community. The demographic and clinical characteristics of the patients who elected to attend the clinic were compared with those who declined.

Results: Of the patients who were actively solicited, of whom 22.4% were women, 210 (38.1%) elected to attend the clinic, 173 men and 37 women. Men were more likely to attend the clinic (40.5% of men in the cohort vs 30.0% of women, p = 0.05). Of interest, patients who attended the clinic were less likely to be in NYHA class 1-2 (39.0% vs 65.6% among patients who did not attend, p = 0.06). There were no other differences in baseline characteristics, including the proportion of patients receiving evidence-based medications.

Conclusions: Although a specialized HF clinic was readily available, in our cohort of ambulatory HF patients with reduced ejection fraction only 36.1% elected to attend. Efforts should be made to make this service attractive and accessible.

P539
Acute heart failure in the elderly and very old.
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Introduction: Heart Failure (HF) is a syndrome with increasing incidence with population aging. However, the guidelines are based on studies in younger populations, and it is not always possible to apply all therapies measures due to comorbidities and interactions.

Objectives: To evaluate the impact of advanced and very advanced age on comorbidities, therapy and outcomes in a population admitted with HF.

Methods: All consecutive HF admissions in a cardiology department were evaluated for a 6 years (Y) period. Only the first episode of each patient was included. Patients were divided into groups (G) according to age (GA: ≤ 70Y, GB: 76-85Y, GC: ≥ 86Y). The remaining demographic data, previous co-morbidities, previous medication and the date of discharge, and in-hospital mortality were evaluated. Results: A total of 1006 hospitalizations were performed, corresponding to the same number of patients, with a mean age of 77.5 ± 10.1% of 50.8% of males. 336 patients were included in GA (36.4%), 417 in GB (41.5%) and 223 in GC (22.2%). The inter-groups comparison is presented in Table. In-hospital mortality was 3.8% in GA, 8.4% in GB, and 9.0% in GC (p = 0.04).

Conclusions: In this population it is evident the negative impact of age on in-hospital national mortality. It also evidences a higher prevalence of females and patients with HF with preserved EF (HFrEF) with advancing age, which are underrepresented in clinical studies. Somewhat unexpectedly, there is a lower prevalence of AF, coronary artery disease (CAD) and diabetes mellitus (DM) in the older patient group, which can be explained by the greater prevalence of HFREF. As expected, also evident that medical therapies are underused in the elderly.
Conclusions: Although there is a strong male preponderance among ambulatory mended dosage.

we did not identify a gender bias in pharmacological treatment in our cohort. HFrEF patients and subtle differences in demographic and clinical characteristics, could be applied to them without significant changes.

Results: The average age was lower in HA (61.8 vs. 77.8 years p = 0.0002). The mean left ventricular ejection fraction in HA was higher (51.1 vs 37.7% p = 0.0006). Ischemic disease etiology was more common in SL, while hypertension was more common in HA. There was a better performance in six minute walk test in patients who are living in HA (207.9 vs 277.5 meters p = 0.004). There were no differences between mortality (20.5% vs 17.3% p = 0.5), hospitalizations (24.3% vs 34% p = 0.7) and cardiac emergencies (29.7% vs 39.1% p = 0.31) in both groups.

Conclusion: In spite of chronic hypoxemia, patients living at high altitude had no significant clinical differences with patients who are living at sea level. Guidelines could be applied to them without significant changes.

Introduction and problematic: Heart failure is a common pathology, with a heavy morbidity and mortality. Its prevalence in the world varies between 1% and 2% of the adult population and reaches 10% after 70 years. It represents the ultimate evolution of many cardiovascular diseases, especially ischemic and hypertensive. Heart failure is associated with high mortality and mortality.

The 5 year survival is 35% in men and 55% in women, significantly lower than the survival of certain cancers. It represents a major public health problem with the highest care cost among all cardiovascular disease. Knowledge about the pathophysiology of heart failure have evolved considerably in recent years; therefore, its management has also seen a lot of progress where new techniques have emerged and made possible functional improvement and, especially a better survival, to certain category of patients.

Conclusion: Despite the epidemiological, clinical, etiological and pathological characteristics of heart failure in patients hospitalized in the cardiology department of the hospital during the period 2005-2014.

Results: 850 patients of which 64% are men. The average age was 63 years. The most frequent antecedents were ischemic heart disease (42.36%) hypertensive heart disease (40.36%) and valvular heart disease (27.27%).

Summary: Heart failure has been classified as one of the 10 most frequent and severe diseases, and one of the most frequent autopathic causes of death. It has been related with the presence of specific gene variants (CHD7, CDH3, PCSK9) and the magnesium deficiency. The achievement of a primary prevention strategy is the most promising contribution.

Conclusion: Heart failure is a disease with a still insufficient management. The approach to this disease should be multidisciplinary and be tailored to the specific needs of each individual. The future is promising.

Conclusions: The presence of women in the intermediate EF group is greater than in the group with depressed EF and lower than in the group with preserved EF. 2. The presence of hypertension in the intermediate EF group is lower than in the group with preserved EF and similar to the group with depressed EF. 3. There is no difference between the intermediate EF group and the other groups regarding the presence of ischemic heart disease and atrial fibrillation, although there is a difference between the group of preserved EF and depressed EF.

3. There are no significant differences regarding the presence of diabetes mellitus and renal failure among the 3 groups.

Background: Heart failure (HF), in particular with reduced ejection fraction (HFrEF), is associated with considerable morbidity and mortality in both genders. Frequently, women are less likely to receive evidence-based treatments than men, despite similar management recommendations.

Aim: We sought to investigate gender differences in treatment for HFrEF in a large cohort of ambulatory patients.

Methods: We analyzed the electronic records of all 115739 patients 18 years old and insured by our Health Services in the Holon/Bat-Yam District. We identified 550 patients with EF ≤40% and age under 85 years.

Results: Women comprised a small minority of the cohort (n = 132, 22.4%), tended to be slightly older (72.7 ± 10.3 vs 70.9 ± 9.6 years, p = 0.08), and had slightly higher HF EF values (33.2% ± 6.9 vs. 31.7% ± 6.6, p = 0.02), yet were similarly likely to be in NYHA class 1-2 (53.5% vs. 46.6%, p = 0.08). Nevertheless, evidence-based treatments were comparable among genders (Table), including the proportion of patients receiving the maximal recommended dosage.

Conclusions: Although there is a strong male preponderance among ambulatory HFrEF patients and subtle differences in demographic and clinical characteristics, we did not identify a gender bias in pharmacological treatment in our cohort.

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Poster 541

Is there a significant gender bias in treatment among ambulatory patients with heart failure with reduced ejection fraction in the real world scenario?

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Background: Heart failure (HF), in particular with reduced ejection fraction (HFrEF), is associated with considerable morbidity and mortality in both genders. Frequently, women are less likely to receive evidence-based treatments than men, despite similar management recommendations.

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Conclusions: Although there is a strong male preponderance among ambulatory HFrEF patients and subtle differences in demographic and clinical characteristics, we did not identify a gender bias in pharmacological treatment in our cohort.
Hypertension, diabetes mellitus, and tobacco were the most frequent risk factors. The left heart failure was the most common table: 73.45% of patients were in their first acute decompensation. Regarding the trigger bronchial infection (29.45%) and dietary change (22.72%) were the most common factors. 38% were male. The mean time since initial diagnosis was 6 years (range 0-45 years). Mean BMI was 27, with 24% of the cohort having a BMI ≥ 30. The registry enrolled 1486 consultations from June 2008 to November 2014. The team analyzed the meaning of the main reason for consultation, "dyspnea", as respiratory and cardiologic episodes, while 13.6% of those with dyspnea presented "fever" as a reason for consultation, which is frequent in other surgical units analyzed. The percentage of patients with heart failure was 36.45%. Main etiology for heart failure was ischemia (54.72%). HFpEF was seen in 21.74% of patients. 22.29% patients had AF. Inhospital mortality among the patients with heart failure was 9.45%. Rehospitalisation rate was 18.9% while mortality on follow up was 8.1%. Among the patients with HFpEF and HFrEF, there was no significant difference in inhospital mortality, rehospitalisation and mortality on follow up.

### Conclusion:
- The high rates of ACS, HFpEF and AF among the elderly are highlighted, along with the high inhospital mortality, particularly in those who presented with severe LV systolic dysfunction.

### Profile of Heart Failure among elderly

<table>
<thead>
<tr>
<th></th>
<th>HFpEF (%)</th>
<th>HFrEF (%)</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>84.1</td>
<td>85.2</td>
<td>0.095</td>
</tr>
<tr>
<td>Male/female</td>
<td>0.93</td>
<td>1.23</td>
<td>-</td>
</tr>
<tr>
<td>Diabetes</td>
<td>98.6</td>
<td>100</td>
<td>0.19</td>
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<tr>
<td>Hypertension</td>
<td>100</td>
<td>100</td>
<td>0.19</td>
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<tr>
<td>Ischemic heart disease</td>
<td>56.7</td>
<td>74.13</td>
<td>0.055</td>
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<tr>
<td>Chronic kidney disease</td>
<td>16.7</td>
<td>22.41</td>
<td>0.490</td>
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<tr>
<td>AF</td>
<td>20</td>
<td>18.96</td>
<td>0.910</td>
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<td>Complete heart block</td>
<td>6.77</td>
<td>7.72</td>
<td>0.365</td>
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<td>Coronary angiogram</td>
<td>11.66</td>
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<td>0.071</td>
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<tr>
<td>Percutaneous coronary intervention</td>
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<td>0.420</td>
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<tr>
<td>In hospital mortality</td>
<td>10</td>
<td>12.06</td>
<td>0.775</td>
</tr>
<tr>
<td>Rehospitalisation</td>
<td>20</td>
<td>15.52</td>
<td>0.814</td>
</tr>
<tr>
<td>Mortality on follow up</td>
<td>8.34</td>
<td>8.62</td>
<td>0.972</td>
</tr>
</tbody>
</table>

### P547
Heart failure as the cause of more than 40% of dyspeas in an orthopedic surgery unit

P Losada Mora1; A Alfonso Miguel Garrido Castro2; JL Carrillo Linare3; M Jimenez4; L Morillo5; JM Garcia Prieto6

**Introduction:** Consultations are a widely used resource between different units in a hospital. In particular, those from Orthopedic Surgery and Traumatology (OST) unit are some of the most frequent.

**Objectives:** To analyze the most frequent consultations patients admitted to OST unit asked to a specific team of Cardiology and Internal Medicine physicians, and identify how many of them can be attributed to heart failure.

**Material and methods:** Descriptive analysis of the reasons for consultation on patients admitted to the OST Service who suffered some kind of medical decompensation that needed to be notified to Cardiology or Internal Medicine.

**Results:** From June 2008 to November 2014, 1486 consultations were sent from the OST Service to a team assigned to the control of medical pathologies, formed by professionals of Cardiology and Internal Medicine. The most common reason for consultation was “dyspnea” in 371 cases (25%), followed by “diabetes control” and “blood pressure” in 371 cases (25%). The digestive pathology occupied 10.5% of the consultations, but these were specified according to the disease (diarrhea, nausea-vomiting or abdominal pain). 4% of the consultations were sent because of “analytic alterations”. It was remarkable the absence of “fever” as a reason for consultation, which is frequent in other surgical units analyzed; this is because fever is valued in OST by the Infectious Diseases Service.

The team analyzed the meaning of the main reason for consultation, “dyspnea”, as a term that was considered too nonspecific. The result was that 48.7% of the dyspeas were of respiratory origin, with the most frequent pneumonitis (32%), of which 56% were nosocomial, noncondensing respiratory infection (26%), exacerbation of COPD (18%) and bronchospasm (16%).

41% of dyspea corresponded to heart failure; 66% of the cases, the main factor inducing dyspea was not clearly identified (most of the patients presented mixed respiratory and cardiologic episodes), while 13.6% of those with dyspea presented excessive intravenous fluid therapy, 11.3% anemia secondary to the intervention, and another 11.3% was due to uncontrolled atrial fibrillation. The rest of dyspeas were mainly due to diabetes (4.7%) and pulmonary thromboembolism (2%). In 3.7% of the cases no dyspea was observed.

**Conclusions:** One-fourth of the consultations for medical decompensation in patients admitted to OST correspond to dyspea. Almost half of them correspond to heart failure, induced in a very high percentage by potentially preventable situations such as excessive intravenous therapy or anemia after the surgery. Besides, high
PSYCHOSOCIAL - ETHICAL CONCEPTS - EDUCATION

PS549
Impact of the implantation of a cardioverter defibrillator on quality of life in heart failure patients: preliminary results of the EDUC-DAI study
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Funding Acknowledgements: Fédération Française de Cardiologie

Background: The implantation of a cardioverter defibrillator (ICD) is associated with an impairment of quality of life. Quality of life in heart failure patients with an ICD is not well documented.

Objectives: To assess quality of life in heart failure patients implanted with ICD (with or without a cardiac resynchronization therapy) in a French tertiary center and involved in our educational therapeutic program. Materials and Methods: Every patient receiving an ICD from September 2015 to July 2016 at Pitié Salpêtrière university hospital were included. This cohort comes from the EDUC-DAI study which evaluates the impact of an educational therapeutic program for ICD patients. Quality of life of ICD heart failure patient was compared to those without heart failure. It was then compared to the general French population whether or not they experience heart failure. Results: Between September 2015 and July 2016, 80 patients completed the SF36 questionnaire. 46/60 (71%) had a clinical heart failure. The mean age of the heart failure patients was 63.4 ± 10.1 years old. Mean left ventricular ejection fraction in the heart failure group was 29 ± 8% and 34/46 (74%) benefited from a cardiac resynchronization therapy. Quality of life was significantly impaired in both groups compared to the general French population aged from 55 to 64 years old. Conclusion: In this cohort, ICD recipients have an impaired quality of life compared to the general French population whether or not they experience heart failure. This suggests that ICD implantation has a real impact in quality of life for all patients. Therapeutic education of patients can help them to develop coping skills.

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Comparison of anxiety, depression and psychological stress levels between heart failure patients and caregivers of heart failure and chronic obstructive pulmonary disease patients.

INTRODUCTION: Being a caregiver (CG) of a heart failure (HF) patient affects health negatively. It is thought that this impairment mainly depends on the CGs’ characteristics and not on the patients’. However, HF patients often have comorbidities such as chronic obstructive pulmonary disease (COPD), and there are no studies that describe if the CGs’ health characteristics differ between CGs of HF patients and CGs of HF + COPD patients. Purpose: To compare the health-related quality of life and the perceived self-efficacy of CGs of HF patients and CGs of HF + COPD patients.

METHODS: This study included 18 CGs of HF patients (G1) and 18 CGs of HF + COPD patients (G2), which completed the SF-12 questionnaire and the Perceived Self-efficacy in Caregivers of Chronically Ill Scale. The first includes 8 dimensions: Physical functioning, Social functioning, Role-physical, Role-emotional, Mental health, Energy/vitality, Pain and General health perception. The second classifies perceived self-efficacy as low, moderated and high. Comparisons between groups were made by unpaired Mann-Whitney U test since the data did not have a normal distribution. Results: There were no significant differences in age and sex between the two groups (G1: 65.50 ± 12.22 years, 77.8% women; G2: 55.83 ± 12.90 years, 77.8% women). There were significant differences in the General health perception (XG1=66.39 ± 21.20, XG2=52.77; U=73, p < 0.01) and Mental health (XG1=77.03 ± 21.62, XG2=64.81 ± 16.41; U=98, p < 0.05) SF-12 dimensions, and also in the total score of perceived self-efficacy (G1=100.44 ± 8.64, G2=80.39 ± 28.32; U=85, p < 0.01). For both tests, a lower score indicates more impaired health. Conclusions: CGs of HF + COPD patients have higher impairment in their general and mental health, and they perceive themselves less efficient. For this reason, treatment that offer them caregiving and solving problems skills should be prioritized, as it could improve their health and self-efficacy.

Comparison of anxiety, depression and psychological stress levels between heart failure and chronic obstructive pulmonary disease patients with better and poorer performance of the six-minute walk test

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1National Autonomous University of Mexico, Mexico City, Mexico; 2Instituto Nacional de Enfermedades Respiratorias Ismael Cosio Villegas, Heart Failure and Distress Respiratory Clinic, Mexico City, Mexico

INTRODUCTION: Psychosocial factors such as anxiety, depression and psychological stress affect the prognosis of patients with heart failure and chronic obstructive pulmonary disease (HF + COPD). Performance of the Six-Minute Walk Test (6MWT) has been used for estimating this prognosis. Literature states that patients who walk less than 300 meters have a worse prognosis. Purpose: To compare the anxiety, depression and psychological stress scores of those patients with HF + COPD who walked less or more than 300 m in the 6MWT.

METHODS: This study included 31 patients with HF + COPD, which completed the Hospital Anxiety and Depression Scale (HADS) and the Perceived Stress Scale. The HADS questionnaire is a reliable self-rating scale that classifies anxiety and depression into three ranges: normal, mild-moderate and severe. The Perceived Stress Scale measures the frequency of exposure to stressful situations during the past month. Comparisons between groups were made by unpaired Mann-Whitney U test since the data did not have a normal distribution. Results: The sample was divided into two groups based on the walking distance of the 6MWT: Group 1 (G1) walked less than 300 m (163.19 ± 82.99 m) and Group 2 (G2), more than 300 m (414.13 ± 91.77 m). 51.6% of the patients walked less than 300 m (G1: n=16, G2: n=15). There were no significant differences in age and sex between the two groups (G1: 69.38 ± 14.52 years, 68.8% women; G2: 60.07 ± 13.57 years, 53.3% men). There were significant differences in anxiety scores (XG1=6.19 ± 4.55, XG2=2.53 ± 2.66; U=52, p < 0.01). Although there were no significant differences in depression and psychological stress, G1 had higher depression (XG1=16.19 ± 2.36, XG2=6.19 ± 2.66; U=96, p < 0.01) and perceived stress scores (XG1=24.72 ± 9.13, XG2=21 ± 5.60, XU=52, p < 0.01). For both tests, a lower score indicates more impaired health. Conclusion: In this sample, patients that walk less than 300 m in the 6MWT have higher scores of anxiety. For this reason, treating anxiety symptoms is essential, as it could improve the patients’ prognosis and quality of life. Although these are preliminary results from a small sample, we will continue working on it.

Factors associated with self-care behaviours in heart failure: a systematic review of european heart failure self-care behaviour scale (EHFScBS) studies

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Funding Acknowledgements: Heart failure epidemiology in Slovenia: prevalence, hospitalizations and mortality (ZI-7459) financially supported by the Slovenian Research Agency.

Background: Due to the important role of self-care in the comprehensive management of patients with heart failure (HF), The European Heart Failure Self-Care Behaviour Scale (EHFScBS) was developed and tested to measure behaviours that HF patients perform to maintain daily life activities, healthy functioning, and wellbeing. Available evidence shows individual differences in patients’ engagement in HF self-care behaviours, but the findings regarding the influence of personal and environmental factors on HF self-care remain inconclusive.

Aims: We reviewed literature to evaluate importance of factors associated with HF self-care behaviours as measured by the EHFScBS.

Methods: Following PRISMA guidelines, PubMed, Scopus and ScienceDirect were searched for studies using EHFScBS. Associating factors of HF self-care, obtained in observational studies were qualitatively synthesised to explore association levels of most commonly addressed factors.

Results: From total of 1357 potentially eligible abstracts screened 74 full-text papers were retrieved and reviewed to include 30 studies in the qualitative synthesis. A diverse range of personal and environmental factors associated with self-care behaviours in HF patients was identified (71 different factors in 18 sub-categories and 6 categories). Association levels between the EHFScBS score and seven factors: age (reported in 11 studies), health-related quality of life (8), gender, education, NYHA class (7), depressive symptoms (6) and LVF/EF (3), were most often reported, generally indicating negligible or low associations. However, consistent significant association (p < 0.05, demonstrated in ≥ 75 % of studies) between HF self-care behaviours and depression was found, while NYHA class and health-related quality of life showed non-significant associations with HF self-care behaviours in most of the studies.

Conclusion: Many factors were analysed for potential associations but only depression was consistently associated with EHFScBS score.

Physical activity of STEMI patients after cardiac rehabilitation

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INTRODUCTION: While there is a common agreement regarding the efficacy of cardiac rehabilitation (CR) in improving the prognosis of patients after ST-elevated myocardial infarction (STEMI), improving physical activity (PA) after CR is another important goal in STEMI patients.

Purpose: The aim of our study was to estimate the levels of PA in STEMI patients after CR, also known as the third stage of CR and to analyse possible association of both early and late factors of CR and levels of PA in the future.

Methods: It was a retrospective analysis of STEMI patients who underwent invasive coronary angiography and percutaneous coronary intervention (PCI) after STEMI followed by CR in years 2007-2013. The group consisted of 141 patients; the average time of follow-up was 30 ± 14 months (max. 96 months). Information on patients’ current activity was assessed with validated International Physical Activity Questionnaire (IPAQ), which takes into consideration time per day and week spent on vigorous (e.g. lifting heavy weights, aerobicics) and moderate (riding bike, playing volleyball) activity, walking and sitting. The analysed factors of further physical activity were: gender, age, body mass index (BMI), hypertension, diabetes mellitus.
type 2, atrial fibrillation, history of previous MI or stroke, ejection fraction, type of infarction related artery, localization of MI, peak levels of troponin I (TnI), creatine kinase-MB (CK-MB) mass, initial metabolic equivalent of task score (METs), METs after CR, improvement of METs, number of training sessions (12 or 24).

**Results:** In the analysed group of patients 97.89% of them maintained any form of physical activity. The percentages of patients classified to the high, moderate and low/absent level of activity groups were 20.57% (n = 29), 59.57% (n = 84) and 19.86% (n = 28), respectively. No statistically significant relation between the factors and physical activity was observed.

**Conclusions:** The physical activity long after CR is maintained by the majority of patients. Most commonly patients maintain the moderate PA.

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**P556**

Determinants of frequent ventricular extrasystole during ergometry with oxygen consumption with exercise-induced VE.

**Introduction:** In patients with coronary artery disease, ventricular arrhythmias during exercise may indicate a two to eightfold increase in the probability of cardiac death. However, factors related to ventricular extrasystoles (VE) other than ischemia are not known.

**Material and Methods:** Cross-sectional study. 63 patients undergoing ergometry with oxygen consumption, with ischemic heart disease who were discharged from an acute coronary event who underwent cardiac catheterization and coronary revascularization between 2 and 3 months before the test were included, being excluded those with a positive result for myocardial ischemia. Frequent VE were considered in those that were at rest not observed in the VE and during any stage of the exercise test (based on previous work by Schweikert RA), manifested a frequency of seven or more VE/minute, isolated, in pairs, bigeminism or ventricular trigeminism. Demographic variables, blood analysis, characteristics coronary and angio-plasty, electrocardiographic, echocardiographic, cardiovascular risk factors and other comorbidities were evaluated. Statistical analysis SPSS 20. Qualitative variables were evaluated by X². The quantitative are expressed as means ± SD, evaluated with student T and the non-parametric with U Mann-W. Statistical significance p < 0.05.

**Results:** 63 patients analyzed. 14(22.2%) presented exercise-induced VE. Mean age 57.8 years; 90.5% men, 6.3% bronchopathy moderate, 49.2% hypertension, 20.6% diabetics, 63.5% dyslipemic, 50.8% smokers, mean ejection fraction 56.3%. There were significant differences between the two groups; In the thickness of the interventricular septum, a mean 10.4mm in the group that did not present VE (group1) and 12mm in the patients induced the VE (group2), p = 0.01. Maximum heart rate reached during the exercise test, group1 a mean 133.3bpm, while in group2 120.4bpm, p = 0.03. Pulse of oxygen was lower in group1 a mean of 13.3%M/beat and in group2 15.7M/beat, p = 0.03. RER achieved, group1 reached an RER 1.04, while group2 1.1, p = 0.03. The equivalent O2 is lower in group1 with a mean 13.3%M/beat and in group2 15.7M/beat, p = 0.03. The creatinine levels were lower in group1 with an average 38.2% and in group2 26.4%, p < 0.01. The pressure of O2 at maximum load is lower in group1 with a mean 103.3mmHg and in group2 107.5mmHg, p = 0.02. The equivalent O2 is lower in group1 with a mean 34.2mg/dl and in group2 39.5mg/dl, p = 0.01. HDL cholesterol, in group1 38.7mg/dl and in group2 32.4mg/dl, P=0.02. The creatinine levels were lower in group1 with an average 38.2% and in group2 26.4%, p < 0.01. The pressure of O2 at maximum load is lower in group1 with a mean 103.3mmHg and in group2 107.5mmHg, p = 0.02. The equivalent O2 is lower in group1 with a mean 34.2mg/dl and in group2 39.5mg/dl, p = 0.01. HDL cholesterol, in group1 38.7mg/dl and in group2 32.4mg/dl, P=0.02. The creatinine levels were lower in group1 with an average 38.2% and in group2 26.4%, p < 0.01. The pressure of O2 at maximum load is lower in group1 with a mean 103.3mmHg and in group2 107.5mmHg, p = 0.02.

**Conclusions:** In our study, the group of patients who had frequent VE induced during the exercise test had interventricular Septum thickness, reached a lower cardiac frequency at maximum load, a lower maximum pulse O2 rate, RER on higher maximal load, higher respiratory reserve consumption, higher oxygen pressure at maximal load, higher oxygen equivalent, lower HDL cholesterol levels and higher creatinine levels than the group of patients who did not present VE during the exercise test.

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Cardiac rehabilitation in older patients: long-term effects

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Introduction: It has been acknowledged that elderly may also benefit from cardiac rehabilitation programmes (CRP). However, the long-term impact of controlled exercise training in older patients is not completely clear.

Purpose: To compare patients aged ≥65 years with those <65 years concerning baseline clinical profile, functional capacity (FC) and the long-term response to CRP.

Methods: We performed a retrospective analysis of prospectively collected data on a cohort of patients referred to CRP after an acute coronary syndrome (ACS). Patients were divided into two groups, G1: age ≥65 years and G2: age <65 years. FC was assessed using metabolic equivalents (METS) achieved in standard exercise test performed in 3 moments, T1: baseline; T2: at the end of CRP; T3: after 12 months of follow-up. A mixed between-within analysis of variance was used to allow comparison between groups and at different time periods.

Results: Of a total 469 patients, 73 patients were aged ≥65 years. Mean age was 69.1 ± 3.9 years in G1 and 51.3 ± 7.9 years in G2. In both groups, most patients were male. Diabetes was more prevalent in G1 (37.3% vs 13.5%, p < 0.001) while active smoking was more frequent in G2 (88.0% vs 29.3%, p < 0.001). Mean LDL-cholesterol was higher in G2 (125.0 ± 37.7 mg/dL vs 105 ± 32.8 mg/dL, p < 0.001). The main diagnosis in G1 was acute myocardial infarction (AMI) without ST elevation (50.9%) and in G2 was AMI with ST elevation. In both G1 e G2, obstructive disease of one coronary artery was the most prevalent finding at coronary angiography and percutaneous coronary intervention was the treatment of choice. Patients from the 2 groups improved their FC between T1 and T2, and showed a nonsignificant decrease between T2 and T3 (T1: G1: 7.8 ± 1.9 METS vs G2: 9.2 ± 2.3 METS; T2: G1 9.4 ± 1.8 METS vs G2: 11.1 ± 2.0 METS; T3: G1: 9.3 ± 1.8 METS vs G2 11.0 ± 2.2 METS, within-groups partial Eta square 0.28, p < 0.001). Comparing between-groups, FC of G2 was better than G1 at all 3 moments (partial Eta square 0.09, p < 0.001).

Conclusion: Although FC of older patients was inferior to younger patients, we showed also improvement of functional capacity. We noted several rhythm disturbances complications by telemetry (VT, VES, SVES, and new on set of AF). Also we noted silent ischemia in 2% after CABG with ST depression detected by cardiac output and oxygen uptake at peak exercise at different heart failure stages.

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1 University of Milan, Milan, Italy; 2 University of Trieste, Trieste, Italy

Introduction: In heart failure (HF) patients, alterations in central haemodynamics, peripheral vasodilatory capacity, intrinsic skeletal muscle changes, pulmonary, iron deficiency, anaemia and overall conditioning status can all impair effective oxygen delivery and utilization. A reduced cardiac output (CO) response during exercise is an early and major limiting factor to exercise performance in HF patients. According to Fick’s law, CO is directly proportional to oxygen consumption (VO2) and inversely proportional to arteriovenous oxygen difference (A-aO2). However, in HF patients A-aO2 shows a relevant interpatient variability and the role of the different peripheral mechanisms in determining exercise performance may vary at different stages of the disease.

Purpose: To analyze the correlation between peak exercise VO2, CO and A-aO2 at different stages of HF.

Methods: We retrospectively analyzed data of 278 consecutive stable ambulatory HF patients (NYHA II-III) who performed a maximal cardiopulmonary exercise test with simultaneous CO measurement by inert gas rebreathing technique. We evaluated resting hemoglobin of all patients and in a subset of them also biomarkers of iron metabolism. Iron deficiency was defined as serum ferritin concentration <100 μg/L or between 100 and 300 μg/L with transferrin saturation < 20%. Results: A linear regression model demonstrated the following equation: CO = 5.3 x VO2 + 1.13 (r2=0.705, p < 0.001). We analyzed the correlations between peak CO and peak VO2 grouping patients according to exercise limitation (% achieved of predicted peak exercise VO2): Group 1 consisted of 101 patients with peak VO2 < 50% of predicted; Group 2 of 89 patients with peak VO2 ≥50% < 65% of predicted VO2; Group 2 of 88 patients with peak VO2 ≥65% of predicted. Group 1 had the lowest peak exercise CO and A-aO2. Group 2 patients achieved significantly lower peak exercise CO when compared to Group 3. We observed a linear relationship between VO2 and CO at peak exercise in Group 1 (r2=0.381, p < 0.001), the strongest in Group 2 (r2=0.758, p < 0.001) and Group 3 (r2=0.744, p < 0.001). Several reasons may be responsible for this lack of correlation: the strongest in Group 2 (r2=0.758, p < 0.001) and Group 3 (r2=0.744, p < 0.001). Several reasons may be responsible for this lack of correlation: the stronger in Group 2 (r2=0.758, p < 0.001) and Group 3 (r2=0.744, p < 0.001).

Conclusions: The peripheral component of peak VO2 seems to be multifactorial and more determinant in patients with more severe HF, while the haemodynamic....

Please note: The above text is a natural language representation of the document and may contain minor differences in formatting or layout from the original document.
Background: Regular physical activity is recommended in patients with chronic heart failure to improve their functional capacity. Walking is a popular, effective and safe form of physical activity and pedometers have shown potential to increase walking across a range of chronic diseases. It is not known whether a pedometer-based intervention improves functional capacity and neurohumoral modulation in heart failure patients.

Methods: The project is designed as a multicentre randomized controlled trial, with follow-up at 6 and 12 months. Physically inactive participants (n=200) with chronic heart failure (with both reduced and preserved ejection fraction) will be randomly assigned to intervention or control arms.

The six-month intervention will consist of an individualized pedometer-based walking program with weekly step goals, monthly face-to-face sessions with the physician, and monthly telephone calls with the research nurse. The intervention will be based on effective behavioural principles (goal setting, self-monitoring, personalized feedback).

The primary outcome is the change in a 6-minute walk distance at 6 months. The secondary outcomes include changes in serum biomarker levels, pulmonary congestion assessed by lung ultrasound, average daily step count measured by accelerometer, anthropometric measures, depression symptoms, health-related quality of life, self-efficacy, and MAGGIC Risk Scores.

Discussion: To our knowledge, this is the first study to evaluate a pedometer-based walking intervention in patients with chronic heart failure. The study will contribute to a better understanding of physical activity promotion in heart failure patients as well as to informing future physical activity recommendations and heart failure guidelines.

Comparison between the D6MWT

<table>
<thead>
<tr>
<th>Variables</th>
<th>1st Evaluation</th>
<th>2nd Evaluation</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>506.90 ± 67.08</td>
<td>532.80 ± 89.89</td>
<td>0.14</td>
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<tr>
<td>Exercise</td>
<td>556.10 ± 100.54</td>
<td>590.40 ± 67.97</td>
<td>0.007</td>
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</tbody>
</table>

Wilcoxon Test *Mann-Whitney Test

P656 Real-time monitoring of hemodynamic response during resistance exercise in cardiac surgery patient

J-H Jung-Hyun Choi1; B-J Lee2; M-J Shin1

1Busan National University Hospital; Busan, Korea Republic of

Object: Coronary artery bypass grafting (CABG) is a surgery that improves blood flow to the heart for the patient who have severe coronary artery disease. After that surgery, the patient should be treated in intensive care unit (ICU). During that period, physical functioning will be impaired. Physical therapy interventions delivered in the ICU can reduce these impairments, but the safety is not still established especially to the patient who received CABG. We monitored the patients using a software during exercise and this is the first attempt in Korea.

Method: 4 patients who received CABG were exubilated, had hemodynamic stability and proper awareness to cooperate were enrolled to exercise. A low-intensity resistance exercise was comprise of 3 sets of isokinetic knee extension, 15 times per each set, with 2-Kg sandbag at the patient’s ankle. We use the software named DateX-Ohmeda S/5 Collect to collect records of vital signs from B650 monitoring system. (Fig 1)

Result: All four patients had the low intensity resistance exercise safely in ICU at post-operative day 3. In the patient 1, vital signs during exercise were as follow: at the resting period, blood pressure (BP) was 137.93 ± 1.02/84.98 ± 0.62 mmHg (mean BP: 103.38 ± 0.76 mmHg). At the 1st, 2nd and 3rd exercise period, BP were slightly increased to 143.35 ± 0.68/79.86 ± 0.30 mmHg, 142.42 ± 0.91/88.76 ± 0.33 mmHg, 144.73 ± 0.90/82.39 ± 0.56 mmHg, respectively. The BP was decreased to 140.15 ± 0.77/85.21 ± 0.44 mmHg at recovery period. Baseline heart rate (HR) was 78.83 ± 0.55 beats/minute, increased to 80.38 ± 1.15 beats/minute at exercise period and decreased to 77.15 ± 0.63 beats/minute at recovery. The blood oxygen saturation level (SpO2) was maintained, between 97.95 ± 0.13% and 98.51 ± 0.02%. The patient did not complained of chest pain, dyspnea, excessive fatigue, and other symptoms during the entire period.

Discussion: Exercise for critically ill patients in ICU is important and necessary, but physicians were passive to prescribe exercise because of safety issue by this time. But using this type of monitoring system, we can monitor real-time vital signs during interventions. In future, well-designed randomized study involving more participants may be necessary to confirm the safety and effectiveness of exercise during ICU hospitalization and early post-operative days.
hospitalization and 3 P. were implanted with an ICD before starting the Pr. The initial mean EF was 39.5% and EC measured in METs was 7.0 ± 2.7. There were no complications in any of the P. and only one of them left the Pr. prematurely. Eighteen P. (75%) experienced an improvement in functional capacity of at least 2 METS—mean EC increase in absolute terms: 2.7 ± 1.1 METs, R P (11.1%) normalized their ventricular function and the percentage of P. with severe LVSD was reduced from 13.8% to 5.6% (p < 0.02). The results of the P. are shown in table 1.

Conclusion: Cardiac rehabilitation can be safely implemented in P. with LVSD and after SCA. Therefore, we should not be hesitant to refer these P. to a CRP as they can benefit from exercise capacity improvement and lifestyle correction, which in turn will help to improve their cardiovascular outcomes.

Results of the program

<table>
<thead>
<tr>
<th></th>
<th>At the beginning of the Pr.</th>
<th>At the end of the Pr.</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>22 patients (75.9%)</td>
<td>3 patients (14.3%)</td>
<td>0.05</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>81 mg/dL</td>
<td>77.5 mg/dL</td>
<td>0.06</td>
</tr>
<tr>
<td>LDL cholesterol</td>
<td>96 mg/dL</td>
<td>92 mg/dL</td>
<td>0.03</td>
</tr>
<tr>
<td>Abdominal perimeter</td>
<td>91.5 cm</td>
<td>91 cm</td>
<td>0.10</td>
</tr>
<tr>
<td>Ejection fraction</td>
<td>39.5%</td>
<td>47%</td>
<td>0.01</td>
</tr>
<tr>
<td>Exercise capacity</td>
<td>7.0 METs</td>
<td>10.1 METs</td>
<td>0.01</td>
</tr>
</tbody>
</table>

P564

The role of diastolic function in the quality of life and functional capacity of patients with heart failure undergoing a combined exercise program

MG Roscani1; TF Fabr1; AM Catai2; FHO Ribeiro2; JA Araujo Junior1; JHM Mattos3; DAA Rossi3; HC Borea4; GBZ Bazan5; MTS Peracoli2; JC Huet6; BB Mabutauri2

(Federal University of Sao Carlos, Medical Department, Sao Carlos, Brazil; Sao Paulo State University, Botucatu Medical School, Department of Internal Medicine, Botucatu, Brazil; Federal University of Sao Carlos, Physiotherapy, Sao Carlos, Brazil; Federal University of Sao Carlos, Biosciences, Sao Carlos, Brazil; Univ. Estadual Paulista (UNESP), Biosciences Institute, Botucatu, Brazil)

On behalf of: NUPECE

Funding Acknowledgements: Financial Support: FAPESP 2015/02727-5 and 2013/24607-1

Background: The favorable effects of a combined exercise program (CEP) in patients with heart failure (HF) are established in the literature. There are controversies if these beneficial effects are due to the improvement in left ventricle diastolic function (LVDF) with the exercise. The aim of this study was to evaluate the effect of CEP on LVDF assessed by echocardiogram and verify if the LVDF is associated with improvement in the quality of life (QOL) and functional capacity (FC) of these patients.

Methods: Randomized clinical trial that included 42 patients with HF and reduced ejection fraction (<50%), older than 18 years divided into two groups matched for age and sex: Control group n=22: underwent supervised CEP composed of aerobic exercise supplemented by resistance exercise 3 times a week for 12 weeks. The two groups underwent initially and after 12 weeks for clinical evaluation, 12-minute walk test to assess the FC, trans thoracic echocardiography and assessment of QOL by the SF-36 questionnaire. The diastolic function was assessed by mitral annulus velocities on tissue Doppler, mitral inflow patterns and indexed atrium volume in the absence of significant mitral reflow. Statistical analysis was performed using test “t” of the results of the differences between the pre and post moments of the protocol comparing the two groups, or Mann Whitney test for data with non-normal distribution. Correlation test was used for variable associations of the same group. Results: There was no difference in diastolic function variables between the groups and no correlation with QOL and CF. The Intervention Group, compared to Control Group, showed significant improvement at the end of research in the dyspnea (p < 0.01) and chest pain (p = 0.02) symptoms, improvement in the FC (p < 0.001) and in four of the eight dimensions of QOL questionnaire: functional capacity (p < 0.001), physical limitation (p < 0.001), general health (p < 0.001) and vitality (p < 0.001).

Conclusion: Supervised CEP of 12 weeks was able to promote favorable impact on symptoms, CF and QOL in patients with HF and reduced ejection fraction. These effects were not depend on LVDF.

Comparison of VO2 between Groups

P565

CPET-based “rule out” tool for pulmonary vascular resistance > 3 WU

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1University Hospital of Coimbra, Cardiology, Coimbra, Portugal

Aims: We aimed to elucidate potential relationships between cardia pulmonary exercise test (CPET) variables and invasive measures of right ventricular afterload and translate those findings into a clinical “rule out tool” for pulmonary vascular resistance (PVR) > 3 WU, in and stage heart failure patients awaiting cardiac transplantation.

Methods: Retrospective study that included stable end-stage heart failure patients who underwent a cardiac catheterization in hospital evaluation for heart transplantation and performed CPET and invasive hemodynamic assessment ≤ 7 days apart.

Results: 51 patients were included. PVR was positively correlated with VE/VCO2 slope (r=0.41, p=0.013) and negatively correlated with PETCO2 at AT and peak O2 pulse (r=-0.42, p=0.013 and r=0.38, p=0.005, respectively). Pulmonary arterial compliance was negatively correlated with VE/VCO2 slope (r=-0.34, p=0.046) positively correlated with PETCO2 at AT and O2 pulse at AT (r=0.47, p=0.005 and r=0.46, p=0.007, respectively). A “rule out” tool for PVR>3 WU including peak O2 pulse and VE/VCO2 slope showed a sensitivity of 91%, specificity of 48%, positive likelihood ratio of 1.73 and negative likelihood ratio of 0.19, being particularly useful in the identification of low risk patients for high PVR. For an estimated pre-test prevalence of 42%, a low risk classification decreases the probability of high PVR to 12%. Conclusion: CPET predicts invasive measures of right ventricular afterload in end stage HF patients. A low risk CPET reduces the probability of PVR>3 WU from 42% to 12%. A potential clinical application of these findings is the periodicity guidance of invasive hemodynamic assessment in patients listed for cardiac transplantation

PULMONARY HYPERTENSION

P566

Platelet reactivity in advanced chronic left heart failure with secondary pulmonary artery hypertension - A hidden potential tool in patient management

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Background: Pulmonary artery hypertension (PAH) caused by chronic heart failure (HF) has a large impact on patient outcomes. Both systolic and diastolic HF cause an increased left atrial filling pressure and a postcapillary PAH which, if left untreated, eventually induces irreversible structural changes in pulmonary arterioles. Pathogenetic pathways leading towards elevated pulmonary vascular resistance (PVR) in idiopathic PAH is based on vasoconstriction, inflammation, thrombosis and vascular proliferation. Platelets are known mediators in each of these processes and have been shown to have an important role in the development of idiopathic PAH. However, the extent to which platelets are involved in the pathogenesis of secondary PAH, especially due to HF, remains unclear and insufficiently explored.

Purpose: We investigated whether platelet reactivity (PR) correlates to the level of PAH and/or the reversibility of pulmonary artery haemodynamics in patients with advanced HF.

Methods: Platelet reactivity was tested using Multiplate function analyzer (ASP, ADP, COL, TRAP tests) in patients with advanced chronic HF undergoing diagnostic evaluation at our department. Blood samples were taken directly from Swan-Ganz catheter during the right heart catheterization before and immediately after PVR reversibility tests was performed using intravenous prostaglandins.
Purpose: We aimed to investigate the role of resting and peak exercise sPAP and ΔsPAP to predict cardiovascular (CV) outcome.

Methods: A total of 50 patients (mean age 61.6 ± 11.3 years, 40% female) with heart failure and a history of myocardial infarction were included in the study. Demographic, laboratory and resting echocardiographic parameters of the patients were collected. Additionally all patients underwent bicycle stress echocardiography and resting sPAP, peak exercise sPAP and ΔsPAP were recorded. Primary end point was development of any CV event, including heart failure, recurrent acute myocardial infarction, coronary revasculatization or CV death.

Results: During median follow-up of 12 months CV events occurred in 26 of 50 patients (52%). The incidence of CV events was higher in females (p = 0.01) when compared with males. In addition those who experienced CV events were older (84.7 ± 12.2 years vs 58.3 ± 9.6 years, p = 0.042), had lower 6 minutes walking distance (321.9 ± 61.5 m vs 411.4 ± 84.5 m, p = 0.002), higher log-NT-proBNP level (3.19 ± 0.6 vs 2.6 ± 0.5, p = 0.001), worse NYHA class (2.3 ± 0.6 vs 1.6 ± 0.5, p = 0.001), higher peak exercise sPAP (57.5 ± 13.6 mmHg vs 47.6 ± 10.7 mmHg, p = 0.006) and higher ΔsPAP (18.1 ± 9.4 mmHg vs 11.1 ± 6.1 mmHg, p = 0.001). In univariate analyses peak exercise sPAP, log-NT-proBNP level, 6 minutes walking distance, gender and NYHA class were among predictors of CV event development. In multivariate analyses, only female gender (p = 0.038, odds ratio = 3.56, 85% confidence interval: 1.100 - 25.683) and ΔsPAP (p = 0.002, odds ratio = 1.125, 95% confidence interval: 1.017 - 1.243) were independent predictors of CV event development. In multivariate analyses peak exercise sPAP, ΔsPAP and ASPI, ADP and COL tests correlated significantly to changes in PAPm (R=0.589, P=0.000; R=0.406, P=0.021; R=0.607, P=0.004, respectively).

Conclusion: Our study is the first to investigate and demonstrate the clinical significance of ΔsPAP. According to our findings ΔsPAP has a potential to be used in diagnosis, classification, staging and management of various disease states which needs and warrants to be tested with large scale prospective studies.
P570
Morbidity and mortality in patients with pulmonary hypertension treated with iloprost

L C Liz Carolina Casasult Martinez; LFG Fernandez Chamorro

Introduction: Pulmonary hypertension (PH), has a difficult diagnosis and poor prognosis, can be primary or secondary and has a high mortality rate.

Objective: To determine the morbidity and mortality in PH in patients under treatment with iloprost during the period of August, 2013 to August, 2016.

Methods: Observational, cross-sectional, retrospective study in patients with PH treated with iloprost in functional class III or IV of the World Health Organization (WHO) (p) upon admission.

Results: Study population 33 patients. Deaths from August 2013 to August 2016: 8/33 (24%), mortality was as follows: first year 4/33 (9%), second year 6/33 (18%) and third year 8/33 (24%). Distribution by sex: female 33/33 (79%). Deaths: first year 8/33 (24%), second year 6/33 (18%) and third year 8/33 (24%). Deaths by sex: female 26/33 (79%).

Conclusion: A mortality rate was observed according to the international literature. The female:male sex ratio was 3.7:1. There was a higher mortality rate among women. The high risk factor for PH that was related to a higher percentage of hospitalization was PC6min <300m (79%), time of onset of symptoms> 1 year (75%), Pro-BNP >300 pg/ml (39%), right ventricle failure (50%). Reasons for hospitalization: Acquired community pneumonia 21%, Congestive Heart Failure (13%), Arrhythmias (12%), Haemorrhages (12%), Connective tissue diseases (CTD) (39%) were the most frequent and the highest percentage of deaths were: 8 of 8 deaths (75%), 4 with Scleroderma and 2 with lupus. The most frequent cardiovascular risk factors (CVRF) were: Hypertension (45%), obesity (24%), overweight (21%).

P571
Right ventricular 18F-FDG uptake in PET/CT hybrid and hemodynamics in patients with pulmonary arterial hypertension.

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1Medical University of Białystok, Białystok, Poland; 2Medical University of Białystok, Department of Cardiology, Białystok, Poland; 3Medical University of Białystok, Department of Nuclear Medicine, Białystok, Poland; 4Medical University of Białystok, Laboratory of Molecular Imaging, Białystok, Poland

Right ventricular (RV) function is a major determinant of survival in patients with pulmonary arterial hypertension (PAH). RV 18F-fluor-2-deoxyglucose (FDG) accumulation in positron emission tomography (PET) was recently connected with progressive RV dysfunction in PAH patients. In our pilot study we compared hemodynamic measurements obtained during right heart catheterization (RHC) and RV function assessed in magnetic resonance imaging (MRI) with PET-derived glucose uptake values.

Methods: Twenty stable PH patients (mean age 50.1 ± 16.5 years, diagnosis confirmed in RHC according to current ESC criteria, I-III WHO class, all prevalent cases, treated with specific PAH therapies) had cardiac PET/MRI scans for FDG as a tracer. FDG uptake was presented as a standardized uptake value (SUV) of both left (LV) and right ventricles. A ratio of SUV/LV/SUVV was then calculated. RV EF was assessed in MRI scans performed simultaneously with PET, whereas hemodynamic measurements were obtained from right heart catheterisation performed within two months from the PET/MRI scanning.

Results: Subjects presented wide range of pulmonary vascular resistance (PVR) (2.1 to 18.9 mU), mean pulmonary artery pressure (mPAP) (24 to 90 mmHg) and RV ejection fraction (RVEF) (27% to 58%). SUV/LV/SUVV directly correlated with mPAP (p <0.05, p <0.001), PVR (p <0.05, p <0.001), right atrial pressure (RAP) (p=0.48, p =0.03) and inversely with RV (p=0.52, p =0.04). Mean SUV/LV/SUVV ratio was 0.97 ± 0.63. SUV/LV/SUVV ratio also correlated with mPAP (p=0.04, p <0.001), PVR (p=0.15, p <0.001) and RVEF (p<0.07, p <0.02). Patients with mPAP higher than 40 mmHg presented abnormally high SUV/LV/SUVV ratio (1.28 ± 0.38, p <0.001).

Conclusions: Increased glucose uptake in RV myocytes as assessed by FDG PET is associated with worse hemodynamics indicating more advanced PH. Similarly, worse RV function evaluated in MRI was associated with increased FDG uptake in RV. PET/MRI hybrid could provide insights into right ventricle function and metabolism in PH patients, however its usefulness in diagnostic process requires further investigations.

P572
Predictors of irreversible pulmonary hypertension reduction with Sildenafil therapy in heart transplant candidates

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Objective: Increased transpulmonary gradient (TPG) and pulmonary vascular resistance (PVR) without reversibility with vasodilators/reversible pulmonary hypertension (IPHT), are considered as contraindications to orthotopic heart transplantation (OHT) in advanced heart failure (HF) patients. We sought to determine predictors of reduction of IPHT secondary to Sildenafil therapy in patients with advanced HF disqualified from OHT due to increased TPG and PVR.

Methods: 50 patients (46 M, mean age 54.3 ± 8.9 years, NYHA 3 ± 0.4, ischaemic eetiology n=19) with indications for OHT based on clinical assessment, N-terminal pro-brain natriuretic peptide (NT-proBNP), ECG, echocardiography, cardiology test (VO2) were disqualified from OHT following right heart catheterization with nitroprusside (NPS) study confirming IPHT (TPG>12 mmHg, PVR>2,5 Wood units). In all patients Sildenafil was introduced and uptitrated to a maximal tolerated dose following optimal medical therapy according to ESC guidelines. Patients were assessed at 3-month intervals. Results: During 10.9 ± 4.2 months observation reduction of TPG (4,2 to 1,3, p<0.005), PVR (4,2 ± 1,3, p=0.002, Wood units) and PVR at baseline (OR 0,79, 95% CI (0,67-0,93) p <0.005 ]; PVR at baseline (OR 0,55, 95% CI (0,31-0,99) p <0.05) were defined as markers of IPHT reduction with Sildenafil. On multivariate analysis PCW (p =0.03) was identified as an independent independent of of successful reduction of TPG and PVR with Sildenafil enabling patient qualification for OHT (PCW <20 mmHg, sensitivity 54%, specificity 100%).

Conclusions: Sildenafil can support pulmonary hypertension reduction in advanced heart failure patients ineligible for orthotopic heart transplantation due to increased transpulmonary gradient and pulmonary vascular resistance. Pulmonary capillary wedge pressure prior to Sildenafil therapy was identified as an independent predictor of successful reversibility of pulmonary hypertension.
**P573**

**Physiological insights of exercise hyperventilation in pulmonary hypertension**

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1Cardiology Center Monzino IRCCS, cardiology, Milan, Italy; 2San Giuseppe Hospital, Pneumology, Milan, Italy

**Background:** Pulmonary hypertension (PH) patients show, during exercise, an excessive increase in pulmonary ventilation (VE) compared to carbon dioxide output (VCO2), determining a high VE/VCO2 slope. There are several possible causes, including an elevated dead space ventilation (VDE), VE/perfusion (Q) mismatch and/or an enhanced peripheral or central chemoreceptor activity. We evaluated the causes of exercise hyperventilation in PH patients.

**Methods:** Eighteen class I and IV PH patients underwent cardiopulmonary exercise test with hemogasanalysis at every minute. VE, alveolar ventilation (VEALV) and VEDS were measured. Residual chemoreceptor sensitivity was analyzed through hypoxia/hypercapnia tests.

**Results:** 

- **P573.01:** VE/VCO2 slopes were 1.06 ± 0.24/min and 39.1 ± 9.0, respectively. In the exercise, 30% of VE was due to VEDS. VE/VCO2 slope significantly correlated with VEDS/VCO2 slope (r=-0.82, p < 0.001) but not with VEALV/VCO2 slope (r=0.3, p=ns). 
- **P573.02:** Exercise end-tidal CO2 (PetCO2) correlated with VEDS/VCO2 slope (r=-0.79, p < 0.001) and VE/VCO2 slope (r=-0.91, p < 0.001). 
- **P573.03:** DS/tidal volume and P(rarterial-et)CO2 were elevated without arterial hypoxemia suggesting a high VE/Q mismatch. Peripheral responses to hypoxia and hypercapnia were 0.416 ± 0.426 L/min/VCO2sat and 0.079 ± 0.047 L/min/mmHg, respectively.

**Conclusions:** Depression of central chemoreceptor activity was not correlated with P573 hypoxemia/hypercapnia slope.

**Introduction:** Pulmonary Hypertension (PH) is a disease characterized by an increase in pulmonary resistances that leads to right heart dysfunction, heart failure and death. There are multiple associated pathophysiological mechanisms that are used as therapeutic targets. Macitentan (M) is a non-selective inhibitor of endothelin receptors, which has demonstrated clinical benefits in morbidity and mortality in a Phase III study. Macitentan and Mortality in Pulmonary Arterial Hypertension SERAPHIN trial.

**Objective:** To describe the clinical efficacy in our population of Macitentan in PH patients.

**Material and methods:** A prospective, consecutive, open, phase IV registry of patients with PH who started treatment with M (Opsumit MR) in Argentina, from March 2015 to November 2016, was performed. We included those p who received M for at least 6 months or presented an event. Baseline characteristics, functional class (FC), 6-minute gait test (TM6M), adverse effects and survival were determined according to the recommendations of the national and international guidelines, at baseline and at 6 month. Clinical efficacy was determined by the improvement in FC from III-IV (advanced) to FC I-II (not advanced), and improve-ment in 6MWT > 15%. The data was loaded into an Excel database and evaluated with the Bioestat 5.0 program. The normality of the sample was analyzed by the D’Agostino-Pearson test. In relation to the distribution, the t test was used for quantitative variables, Chi2 for qualitative and McNemar test for paired variables. A p value of < 0.05 was defined as a significant difference between baseline and 6 months.

**Results:** We included 151 p, 74% women, the average of age was 46 years (28-63) and 98.4% had HP group 1. 98.6% received M 10 mg and 1.4% 5 mg. At base-line, functional class evaluation presented the following distribution: FC I 12.4%, II 19%, III 42.3% and IV 12.9% (advanced FC 78.2%). The mean baseline TM6M was 321 m (250-400). At 6 months FC I was 13.5%, II 62.2% and III 24.3% (advanced FC 24.3%), with significant statistical benefit (p < 0.001).

**Conclusion:** In our PH registry, administration of Macitentan was associated with a significant benefit in achieving the objectives of functional class improvement and in the distance reached in the 6MWT (76 meters), at 6 months. These data are in agreement with those obtained in the randomized study SERAPHIN.

**RIGHT VENTRICULAR FUNCTION**

**P576**

**Right ventricular dilatation in coronary artery disease patients without myocardial infarction**

E Ilrjoslovskaya et al; KA Zuznetsov et al; DV Kunitschin; OI Pushkariev et al; EA Gorbatenko et al

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**Background:** Detection of right ventricular (RV) dilatation in patients with coronary artery disease (CAD) is very important to identify subjects at high risk for adverse cardiovascular events. Data about factors associated with RV dilatation in CAD patients without myocardial infarction (MI) are insufficient.

**Purpose:** To reveal factors associated with RV dilatation in CAD patients without MI.

**Methods:** Of 16,839 patients from coronary angiography database we selected patients without acute or prior MI, congenital or acquired valvular heart disease with stenosis ≥75% or of at least one coronary artery, 1,134 patients without RV dilatation (and-dilatate RV outflow tract diameter > 26 mm) and 75 patients with RV dilatation (RV outflow tract diameter ≥ 30 mm). Patients with RV diameter > 26 mm and < 30 mm were not included to have higher discrimination between groups.

**Results:** There were more male patients in the group with RV dilatation (92.0% vs 80.2%, p = 0.012). Mean body mass index (BMI) was higher in this group (31.7 ± 5.2 kg/m² vs 30.1 ± 4.7 kg/m², p = 0.019). Patients with RV dilatation more often had a higher NYHA functional class (II – 22.2% vs 12.5%, p = 0.002), angina (45.5% vs 17.8%, p = 0.001), reduced LV systolic function (LV ejection fraction < 50% - 24.3% vs 2.9%, p = 0.001) and significant mitral regurgitation (MR) (25.4% vs 4.0%, p = 0.001). There were no differences in lipid profile and coronary angiographic parameters between the groups. The prevalence of high CCS angina class (8/9) was lower in the group with RV dilatation (30.3% vs 52.8%, p = 0.007). According to the multivariate analysis, RV dilatation was independently associated with reduced LV systolic function (OR 4.22; 95% CI 1.73-10.30; p = 0.002), male gender (OR 4.03; 95% CI 1.47-11.04; p = 0.020), angina (OR 2.98; 95% CI 1.62-5.49; p = 0.001), significant MR (OR 2.34; 95% CI 1.44-3.81; p = 0.001), higher NYHA functional class (OR 1.87; 95% CI 1.05-3.32; p = 0.043), higher BMI (95% CI 1.02-1.15; p = 0.015), and lower CCS angina class (OR 0.42; 95% CI 0.25-0.71; p = 0.001).

**Conclusions:** RV dilatation in patients without MI was predominantly associated with male gender, parameters describing severity of LV dysfunction and higher BMI.

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PS77
Right ventricular systolic dysfunction in patients with coronary artery disease: gender-related differences
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Background: Right ventricular (RV) dysfunction is one of the most significant independent predictors of prognosis in patients with coronary artery disease (CAD) who were presented with myocardial infarction (MI) and without it. However, gender-related differences in RV function of CAD patients are still poorly understood.

Aim: To evaluate gender-related differences in echocardiographic parameters of the right chambers of the heart in CAD patients.

Material and Methods: 719 patients with coronary artery disease undergoing medical examination on an outpatient basis in the Federal Budgetary Institution Rehabilitation Center "Topaz" of the RF Social Insurance Fund were included in the study. All patients were assigned to two groups according to the gender: Group 1 – men (n = 432, 61 [55; 67] years), Group 2 - women (n = 287, 62 [56; 67] years).

Results: The analysis of the structure and systolic function of the RV showed that RV and right atrium (RA) end-diastolic dimension, diastolic RV wall thickness, and RA area were significantly higher in men than in women (p < 0.001). Thus, the prevalence of RV systolic dysfunction (SD) was similar in both groups of patients: 17.6% in men and 15% in women (p = 0.356). The independent predictors of LV SD in both groups were as follows: prior coronary artery bypass grafting (CABG), decreased early mitral flow propagation velocity (p = 0.05). However, reduced left ventricular ejection fraction (LVEF; p < 0.001) was found only in men.

Conclusion: The prevalence rate of right ventricular systolic dysfunction in patients with coronary artery disease was similar in both men and women. Men demonstrated lower values of systolic and diastolic LV function. The factors associated with RV systolic dysfunction in both groups were as follows: prior CABG and diastolic LV dysfunction. Reduced LVEF was found only in men. The results of this study should be used to assess gender-related differences in RV function in CAD patients.

PS78
Echocardiographic predictors of acute right ventricular dysfunction in postoperative state of congenital heart surgery
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1National Institute of Cardiology Ignacio Chavez, Cardiac Intensive Care Unit, Mexico City, Mexico

Background: Congenital cardiac diseases have become more prevalent in adult population. We can now say that in most of the western civilization it is possible for the 85% of the new born with congenital cardiac disease to survive to adult age. Congenital defects are classified as simple and complex. In the study we now present we included complex congenital cardiopathies and patients with two or more common defects.

Purpose: This study was supported with grants from the Instituto de Salud Carlos III, FEDER “Unión Europea, Una forma de hacer Europa” (ISCIII - PA 14/0184).

Methods: We analyzed the files of the intensive care unit from January 2015 to December 2016. Inclusion criteria: complex congenital heart disease who went through a surgical correction of their defect, age greater than 18 years, went through a surgical correction of their defect, age greater than 18 years, and functional changes of RV when there is acute pressure and volume overload, including volume and pressure overload, and its potential reversibility.

Conclusions: The free wall strain was only calculated after cardiac surgery, obtaining an OR of 1.3, and it showed relation to acute right ventricular dysfunction. Free wall thickening measure reflects preconditoning that can bear greater intracavitary pressure and this can be a protection factor against acute heart failure during the postsurgical process and also chronic right heart failure. Nevertheless the exact Fisher’s test for both parameters showed no statistical significance maybe restricted by the amount of the sample, which was one of the most important limitations of our study.

Table I P579

<table>
<thead>
<tr>
<th>Pressure overload, n 13</th>
<th>Pressure overload, n 13</th>
<th>Pressure overload, n 13</th>
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<tbody>
<tr>
<td>p</td>
<td>Basal</td>
<td>Early (4 h)</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>hs-cTnT 205±154</td>
<td>87±80</td>
<td>13±8</td>
</tr>
<tr>
<td>NT-ProBNP 3410±3000</td>
<td>1650±1000</td>
<td>159±130</td>
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<tr>
<td>RV diameter 45±3</td>
<td>39±3</td>
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<tr>
<td>PASP 62±20</td>
<td>45±5</td>
<td>30±5</td>
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<tr>
<td>TAPSE 14±5</td>
<td>19,6±3,6</td>
<td>19±7</td>
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<tr>
<td>S' 9±2,5</td>
<td>13±2,6</td>
<td>15±3</td>
</tr>
</tbody>
</table>

ABBREVIATIONS: hs-cTnT: Ultrasensitive Troponin T; RV: Right ventricle; PASP: Pulmonary artery systolic pressure, estimated by transthoracic echocardiography; TAPSE: Tricuspid annular plane systolic excursion (mm); S': Systolic velocity of the tricuspid ring (cm/sec); m: Months.

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Results: 13 patients with acute pressure overload were evaluated. Table I shows the main analytical and echocardiographic results, both basal and evolutive. At baseline, 10 patients (77%) had a depressed function of the RV and 11 (85%) presented RV dilatation. At 3 months all patients normalized the function of the RV. 17 patients with acute volume overload were assessed, 14 (84%) average age 57 ± 8 years. At the first moment after overload, no patient presented RV dysfunction; however, 6 patients (35%) presented a slight RV dilatation which did not implied related clinical events. At 3 months, 2 patients had a slight RV dilatation without dysfunction.

Conclusions: Ventricular dilatation and dysfunction with short-term reversibility is frequent in RV acute pressure overload. Dilatation without dysfunction is produced in the RV acute volume overload, but dilatation tends to persist.

### LEFT VENTRICULAR FUNCTION

**P560**

Predictors of diastolic function and adverse diastolic remodeling after ST-elevated myocardial infarction

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University Medical Center Groningen, Cardiology, Groningen, Netherlands

Funding Acknowledgements: The GIPS-III trial was supported by grant 95103007 from the Netherlands Organization for Health Research and Development

Background: Pathologic cardiac remodeling as a result of acute myocardial infarction (AMI) can deteriorate systolic and/or diastolic function and ultimately cause heart failure. Previous research in the post-AMI setting has mainly focused on systolic dysfunction. This one-sided focus has left gaps in our knowledge on how remodeling affects diastolic function.

Purpose: We aimed to determine the risk factors associated with diastolic function and diastolic remodeling after AMI.

Methods: This is a sub-study of the GIPS-III trial, a single center, randomized, double blind, placebo-controlled study. Non-diabetic ST-elevated myocardial infarction (STEMI) patients were randomized to metformin or placebo initiated directly after PCI. The primary endpoint was left ventricular ejection fraction at 4 months measured by MRI. Trans-thoracic echocardiography was performed during hospitalization and after 4 months to evaluate diastolic function as a predetermined secondary endpoint. As previously reported, both endpoints were unaffected by metformin treatment.

Results: 267 (70%) patients from the GIPS-III cohort had E/e' available at both time points. Mean age was 58.0 ± 11.3 years and 23.2% were females. Linear regression analyses of the baseline variables found a multivariable model with age, gender, hypertension, multi vessel disease, glucose, and peak CK-total to be predictive for E/e' (R²=0.20). After correction for E/e' during hospitalization female gender (β=0.26), multi vessel disease (β=0.26), and higher glucose (β=0.26) were found to be associated with adverse diastolic function.

Conclusions: Age, female gender, history of hypertension, multi vessel disease, glucose and peak CK-total are independently associated with worse diastolic function at 4 months after STEMI. Furthermore, female gender, multi vessel disease and higher glucose are independently associated with adverse diastolic remodeling.

**Table:** Multivariate prediction models

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Multivariate model</th>
<th>Multivariate model adjusted for E/e' in hospital</th>
<th>P-value</th>
<th>Coeff. a</th>
<th>SE b</th>
<th>P-value</th>
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<td>Female gender</td>
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<td>Multi vessel disease</td>
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<td>&lt;0.01</td>
<td>0.75</td>
<td>0.26</td>
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<tr>
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<td>0.08</td>
<td>0.01</td>
<td>0.04</td>
<td>0.07</td>
<td>0.56</td>
</tr>
</tbody>
</table>

a. Coefficient b. Standard error c. Total creatine kinase

**P561**

Mid-range ejection fraction as a continuum of poor prognosis - a national STEMI patients analysis

C Catarina Ruivo1; F Montenegro Sa1; L Graca Santos1; J Correia1; J Morais1

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On behalf of: Portuguese National Registry of Acute Coronary Syndromes

Background: Heart failure with mid-range ejection fraction (mEF – ejection fraction 40–49%) is a newly defined entity that certainly will be considered in future ST segment elevation myocardial infarction (STEMI) patients approaches. We aim to characterize these patients and analyze in-hospital adverse events according to their EF.

Methods: A retrospective analysis of data from consecutive STEMI patients enrolled in a multicenter national registry from October 2010 to September 2016 was conducted. The clinical characteristics and coronary angiographic findings were evaluated and compared between patients with EF>50% (n=2236, 57.1%), EF 40-49% (n=929, 23.7%) and EF <40% (n=749, 19.1%) on Echo. Different components of delay were considered and compared: time from symptom onset (SO) to first medical contact (FMC) (SO-FMC), from SO to reperfusion therapy ([SO-RT) both fibrinolysis and percutaneous coronary intervention (PCI)], FMC to RT (FMC-RT). In-hospital adverse events (death, sustained arrhythmias or mechanical complications) were considered as endpoints.

Results: Comparative analyses between patients with EF>50%, EF 40-49% and EF <40% found a continuum in: increase age (61 ± 13 vs. 63 ± 14 vs. 64 ± 14, p <0.01), longer delays (SO-FMC: median time of 110 (interquartile range: 60-205) minutes vs. 120 (86-128) vs. 123 (88-202), p<0.001), increased in-hospital mortality rates (7.0% vs. 2.4% vs. 6.3% p<0.001) and multivessel coronary artery disease in an increase proportion of patients (40.6% vs. 41.0% vs. 45.4%, p<0.06). Analyzing the endpoints, we observed increasing in-hospital mortality rates (0.7% vs. 2.4% vs. 9.2%, p<0.001), sustained arrhythmias (1.3% vs. 3.0% vs. 8.3% p<0.001) and mechanical complications (0.5% vs. 1.1% vs. 2.3%, p<0.001).

Conclusion: Patients with mEF are particularly important stratum of patients to identify because they have significant rates of in-hospital adverse events. They represent a continuum of higher baseline risk profile and higher hemodynamic instability, in whom the tendency to delay their treatment can lead to higher myocardial damage, with reduction of EF.
diagnosis in the following period after each of the predefined time-points of follow-up, had always lower previous LVEF (figure). Also during the first 6 years patients who died had significantly worse LVEF dynamics in the precedent study period.

Conclusions: LVEF in patients with depressed systolic function significantly improves up to 3 years, and remains steady afterwards. HFmrEF showed higher LVEF rise during follow-up relative to HFrEF, yet at the end of follow-up survivors of both groups had similar LVEF. Non-ischemic aetiologies showed higher improvement and maintain higher LVEF values along follow-up. Decedents always had lower LVEF and also tended to have worse dynamics in the precedent study period.

PS83
Development and validation of sex-specific diagnostic models to detect diastolic dysfunction in primary care
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2Julius Health Center - Julius Gezondheidscentra, Utrecht, Netherlands

Funding Acknowledgements: Dutch Heart Foundation: 2013/T084

Background: The prevalence of undetected left ventricular diastolic dysfunction (DD) is high in the general population particularly in the elderly population. This is mainly due to the asymptomatic nature of the disorder making it difficult to diagnose in primary care. Identifying people at high risk of DD is important as DD is a prognostic indicator of heart failure and future cardiovascular and all-cause mortality.

Purpose: The purpose of this study was to develop diagnostic models that can be implemented in primary care to assess who is at risk of DD and therefore requires importing sex differences in the underlying mechanisms of DD. We present a diagnostic model for DD that performs better in men than for women indicating the need to investigate DD in a sex-specific manner.

Conclusions: Clinical predictors of DD differ between men and women highlighting important sex differences in the underlying mechanisms of DD. We present a diagnostic model for DD that performs better in men than for women indicating the need to investigate DD in a sex-specific manner.

Discrimination and calibration

<table>
<thead>
<tr>
<th>Developed in</th>
<th>Validated in</th>
<th>c-statistic</th>
<th>c-statistic</th>
<th>Observed/ Expected (OE) ratio clinical model &amp; NTproBNP</th>
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<td>0.52</td>
<td>2.65</td>
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</table>

PS84
Heart failure with mid-range ejection fraction: prognostic impact of left bundle branch block
H Hugo Antunes1; I Abrav1; J Pereira1; M L Goncalves1; B Marmelo1; I Pires1; D Moreira1; I Almeida1; M Correia1; C Cabral1
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Introduction: Left Bundle Branch Block (LBBB) is associated with poorer prognosis in patients (P) with heart failure (HF) with reduced ejection fraction (rEF). In the new classification of HF, a new group of P with mid-range ejection fraction (HFmrEF) appears. Clinical characteristics and therapeutic approach still remain uncertain in this group of P.

Objectives: To evaluate the prognostic impact of LBBB in P with HF and mEF.

Methods: We identified all patients admitted for HF in a single center between 01/01/2009 and 31/12/2014. Only the first episode of each patient was included. Only the P with mEF (40-49%) were selected. We considered 2 groups: group with presence of LBBB (gLBBB) and a control group without LBBB (gCONTR). We compared in-hospital mortality (IHm), the combined endpoint (death / hospitalization for HF) at 6 and 18 months (M) and the survival curves of each group.

Results: Of a total of 1006 P admitted, 191 cases were included: 59.7% male and mean age 75.72 ± 10.33 years. IHm was 2.6%. The combined endpoint at 6M was 29.7% and 52.2% at 18M. gLBBB represents 17.6% of the P. In this group, there was predominance of females (64.7% vs 35.0%, p < 0.001) and of P. diabetics (50.0% vs 29.5% p = 0.021) compared to gCONTR. There were no differences in age, other cardiovascular risk factors, history of ischemic heart disease, chronic kidney disease or atrial fibrillation.

Analytically, there was no difference in hemoglobin, creatinine or BNP admission. gLBBB evolved more frequently with acute renal injury (32.4% vs 16.2%, p = 0.031). There were no statistically significant differences in IHm (gLBBB 2.9% vs 2.5%). There was a greater number of events in the medium and long term follow-up. These results may have an impact on future research, particularly with regard to the benefit of early cardiac resynchronization therapy.
Prevalence and correlates of left ventricular diastolic dysfunction in hypertensive community residents with preserved ejection fraction. Insights from survey-SEPHAR III

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1University of Medicine and Pharmacy Carol Davila, Bucharest, Romania; 2Emergency Hospital Bucharest, Bucharest, Romania

Introduction: Left ventricular diastolic dysfunction (LVDD) is present in half of patients with hypertension and has been associated with increased cardiovascular morbidity, as well as the development of heart failure with preserved ejection fraction (HFpEF). Without proper medical treatment the progression continues toward systolic LV dysfunction an clinical overt heart failure

Purpose: We aimed to evaluate the prevalence and predictors of diastolic dysfunction in hypertensive adults from an national representative survey SEPHAR III survey.

Methods: Adult subjects enrolled in SEPHAR III survey were evaluated throughout two study visits by; anthropometric measurements, 3 sitting BP measurements per visit according to ESC-EH Guidelines, arterial stiffness measurements (with an oscilometric device), laboratory workup (lipids, fasting plasma glucose, HbA1c) and standard echocardiography. Normotensive state was defined as BP below 140/90 mmHg and lack of HT history or treatment. LVH was defined as indexed left ventricular mass (ILVM) > 95g/m2 in females and > 115 g/m2 in males. HT prevalence and control was defined by current ESC-EH Guidelines. Diastolic dysfunction was defined by E/A < 1 or ≥2 on Doppler mitral inflow.

Results: From the total 889 adult hypertensive subjects identifies in SEPHAR III survey (mean age 55.79 ± 15.68, 51% males, 72.2% treated hypertension, out of which 30.8% with controlled BP values), diastolic dysfunction was recorded in 46.9%. Diastolic dysfunction was similar in treated vs. non-treated hypertensive (46.3% vs. 48.6%), and significantly less frequent among controlled vs. uncontrolled hypertensives (39.9% vs. 48.9%). Adjusting for MAP, treatment and treatment control, regression analysis confirmed as predictors of diastolic dysfunction: PWVao (OR 1.10; 95% CI for OR: 1.01-1.25), BP control (OR 0.85; 95% CI for OR: 0.86-0.89), an hypertensive treatment with RAAS blockers (OR 0.74; 95% CI for OR: 0.71-0.76), aortic SBP (OR 1.10; 95% CI for OR: 1.01-1.25).

Conclusions: Our study reveals that beyond well recognized determinants of diastolic dysfunction [LV, AF, BP values, RASS blockade], parameters of arterial stiffness and central BP values independently contribute to diastolic dysfunction adult hypertensive subjects, stressing the need specific treatment strategies, preventing the progression to overt heart failure.

PS56

Hermodemic correlates of right ventricular dilatation in pulmonary hypertension due to HFpEF

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Background: Right ventricular (RV) remodelling and pulmonary hypertension (PH) are increasingly recognized in heart failure with preserved ejection fraction (HFpEF), with high prevalence and poor outcome. Factors leading to RV dilatation in PH-HFpEF patients are unknown.

Purpose: We thought to determine the hemodynamic correlates of RV dilatation (indexed end-diastolic right ventricular area EDRA) in HFpEF patients with PH.

Methods: Right heart catheterization and echocardiography were performed in 93 PH-HFpEF patients (60 women) enrolled prospectively in our center. PH-HFpEF was defined by a resting mean pulmonary artery pressure (mPAP) ≥ 25 mmHg and a resting pulmonary artery wedge pressure (PAWP) >15 mmHg.

Results: Mean age (± SD) was 69 ± 12 years, mPAP was 40 ± 10 mmHg, PAWP was 21 ± 4 mmHg. 30 PH-HFpEF patients (31%) had RV dilatation. The Pearson correlation coefficient between EDRA (9.6 ± 3.1 cm²/m²) and hemodynamic variables was 0.39 for right atrial pressure (RAP) and 0.36 for the diastolic pressure gradient (each p < 0.001), and 0.27 for mPAP (p = 0.01). There was no correlation between EDRA and PAWP; pulmonary vascular resistance or pulmonary arterial stiffness.

Conclusion: In PH-HFpEF patients, we documented a significant relationship between RV remodeling and RAP, mPAP and the diastolic pressure gradient. The classic variables quantifying pulmonary arterial load (resistance, stiffness) did not contribute.

PS57

Left ventricular diastolic dysfunction and cardiovascular mortality in dialysis patients with preserved ejection fraction.

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1University Hospital Center Mother Theresa, Department of Cardiology & Cardiac Surgery, Tirana, Albania; 2University Hospital Center, Nephrology-Dialysis-Transplant Department, Tirana, Albania; 3Hygeia Hospital, cardiology department, Tirana, Albania; 4Institute of Public Health, Tirana, Albania

Introduction: Cardiovascular disease is the major cause of death in dialysis patients. Diastolic dysfunction (DD) is common among dialysis patients. The aim of the study was to evaluate diastolic dysfunction, using TDI, in hemodialysis (HD) or peritoneal dialysis (PD) with preserved ejection fraction, and to identify its correlation with cardiovascular mortality.

Methods: A case control study was conducted, enrolling all patients on chronic dialysis (HD and PD) older than 18 years, who had more than 3 months in therapy. The echocardiography was performed 2-24 h after the dialysis session. LV diastolic dysfunction was defined as E/E’ > 14. All patients had been followed up for 2 years. The end point was cardiovascular mortality.

Results: Our population consisted in 122 pts, 78 pts (61%) on hemodialysis, mean age 53.4 ± 14.5 years, mean time on therapy 10.4 ± 14.4 months, 56% of patients were male, 27.8% with diabetes melitus, 31.8% with hypertension; EF 0.60 ± 0.07. Patients were divided in two groups according to presence of diastolic dysfunction (n=62) vs. absence of diastolic dysfunction (n=60). The end point was cardiovascular mortality. Median follow up was 15.5% (19 events). The main causes of CV death were sudden deaths (31.5%), deaths from ischemic heart disease and stroke with 26.4% respectively; 19.7% in the group of patients with E/E’ averaged >14. Cardiovascular mortality during follow up was 15.5% (19 events). The causes of CV death were sudden deaths (31.5%), deaths from ischemic heart disease and stroke with 26.4% respectively; 19.7% in the group of patients with E/E’ averaged >14 vs 10.1% in the group with E/E’ averaged ≤14 (p = 0.023). Binary logistic regression analysis showed that E/E’ averaged >14 [OR: 0.01 (1.01-2.1) p = 0.011], was independent risk factor for cardiovascular mortality

In conclusion: Diastolic dysfunction is independent predictor of cardiovascular mortality in dialysis patients with preserved ejection fraction.
Purpose: Left atrial volume index (LAVI) elevation is a significant predictor of cardiovascular disease. Progression of LAVI has also been shown to predict cardiovascular outcomes in the general population but little data exists in the diabetic population. LAVI progression may contribute to heightened cardiovascular risk in diabetic patients. The aim of this study is to describe LAVI progression in a community diabetic population compared with a non diabetic at risk cohort.

Methods: Patients attending the STOP-HF service between January 2011 and December 2013 were included in this study. Using transthoracic echocardiography, we measured LAVI in all participants in addition to standard Doppler-echo-cardiographic parameters. Echocardiography was performed at baseline and at a predefined follow up visit (2 – 5 years post baseline). Based on previous reported observations from our unit, significant change in LAVI (LAVI progression) was defined as a change in baseline LAVI > 3.5 ml/m2.

Results: There were 1253 patients enrolled in the service. Four hundred and fifty four (36.2%) of these were diabetic (median age 63.5, 57.7% male). There was no difference in baseline cardiovascular risk factor between the groups except hypertension which was higher in the diabetic population (74% vs 66.8% p = 0.01).

Conclusion: LAVI progression was seen in almost one third of patients (44.3% male, median age 67.9) (Table one).

Diabetics with LAVI progression were more often male (60.3% vs 34.8%, p < 0.001) with hyperlipidaemia (88% vs 71.6% p = 0.05). Both groups had similar rates of hypertension (78.5% vs 72.1%, p = 0.24) There was no significant difference between the progressor groups in left ventricular ejection fraction (baseline median 67% vs 67%, follow up median 66.2% vs 66%, p = 0.97), left ventricular mass index (baseline median 91.1g/m2 vs 98.9g/m2, follow up median 93.6g/m2 vs 97g/m2, p = 0.004) or E/E’ (Baseline median 8.4 vs 8.9, follow up median 8.5 vs 8.2, p = 0.02). Use of RAAS modifying therapy was similar in both progressor groups (48.1% vs 48.7%, p = 0.25).

Conclusion: LAVI progression was similar in the diabetic and non diabetic groups, occurring in almost one third of patients. These at risk groups need further attention given the increased cardiovascular risk associated with diastolic dysfunction.

P589 Heart rate variability in heart failure patients with mid-range versus preserved ejection fraction and premature ventricular complexes

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2 Th. Buregulea Hospital, University of Medicine and Pharmacy Carol Davila’, Bucharest, Romania

Background: Heart failure (HF) with reduced left ventricular ejection fraction (LVEF) has a high ventricular arrhythmic risk but there is few information about the arrhythmic risk in patients (pts) with heart failure and mid-range LVEF (HFmrEF or preserved LVEF HFpEF). Purpose: To evaluate the heart rate variability (HRV) in the time and frequency domains as marker of myocardial electrical instability in sinus rhythm pts with HFmrEF versus pts with HFpEF.

Methods: We included consecutive pts in sinus rhythm with HFmrEF (EF>40%-49%) and HFpEF (EF<50%) and premature ventricular complexes (PVC) during 24 hours ECG Holter monitoring. Pts with HF and reduced LVEF, atrial fibrillation or autonomic neuropathy were excluded. Demographic data, NYHA class and medical history were noted. The severity of PVC was evaluated according to the Lown classification. HRV was determined in the time domain (standard deviation of normal to normal (NN) R-R Intervals - SDNN; standard deviation of the average NN intervals calculated over 5 minutes periods - SDANN; mean of the 5-min standard deviation of the NN interval calculated over 24 h - SDNN index; root mean square of successive differences - RMSSD; proportion of pairs of successive NNs that differ by more than 50 ms divided by total number of NNs - pNN50) and in the frequency domains (total power - TP; very low frequency – VLF; low frequency – LF; high frequency – HF, LF/HF ratio). Statistical analysis was performed with Epi Info 8.

Results: 70 pts were included, 37 ± 9 years old, 57.1% men, 88.6% pts had hypertension, 65.7% coronary artery disease, 40% old myocardial infarction, 8.6% peripheral artery disease, 40% diabetes, 40% chronic kidney disease, 48.6% pts had HFrEF and 51.4% HfMRF. 82.9% pts were in NYHA class II, 28.6% in NYHA class III and 8.6% in NYHA class IV. There were statistically significant more Lown IV PVC (couplets and ventricular tachycardia) in HfMRF than in HFrEF pts (84.4% vs 52.9%, p < 0.001). There were no statistical differences between the two groups regarding SDNN, SDANN, pNN50, RMSSD, pNN50%. LF/HF ratio was augmented in HFrEF comparing to HFpEF (p = 0.08).

Conclusion: The majority of HFmrEF pts had Lown IV PVC, with a statistical significant greater prevalence than in HFpEF pts. HRV parameters were similar in HFmrEF and HFpEF pts except LF/HF which was augmented in HFrEF compared to HFpEF, reflecting a more important sympathetic nervous stimulation.

P590 Does RAAS modifying therapy attenuate the cardiomyopathic effect of diabetes?

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Purpose: In the general population, the presence of left ventricular diastolic dysfunction (LVDD) is an independent risk factor for cardiovascular disease including heart failure. We hypothesised that LVDD is more prevalent in diabetic populations than in a general at risk cohort resulting in worse cardiovascular outcomes. The aim of this study is to describe the prevalence of diastolic dysfunction in a community diabetic population and an at risk non diabetic population and to characterise those with diastolic dysfunction.

Methods: Patients enrolled in the STOP-HF service between January 2011 and December 2013 were included in this study. Using transthoracic echocardiography, we measured LAVI in addition to standard Doppler-echo-cardiographic parameters. (LAVI < 28 ml/m2 = normal, > 28 – 32 ml/m2 = indeterminate and > 32 ml/m2 = increased). Echocardiography was performed at baseline and at a prede- fined follow up visit (2 – 5 years post baseline).

Results: There were 1253 patients in this cohort. Four hundred and fifty four (36.2%) of these were diabetic (median age 63.5, 57.7% male). Baseline cardiovascular conditions were similar in both groups except hypertension which was higher in the diabetic population (74% vs 66.8% p = 0.01). The median BNP level at baseline was lower in the diabetic group (15.9 pg/ml vs 21.9 pg/ml, p < 0.001). The mean LAVI was 26.1 ml/m2 in the diabetic group and 26.8 ml/m2 in the non diabetic group (p = 0.0766). E/E’ was similar in both groups (baseline median 8.8 vs 8.1 p = 0.0699). Use of RAAS modifying therapy was higher in the diabetic group (59.7% vs 44%, p < 0.001).

Conclusion: Despite the higher rate of hypertension in the diabetic group, prevalence of LVDD was similar in both groups. This may reflect the fact that both groups are managed in a heart failure prevention service where emphasis on RAAS modifying therapies and other cardioprotective medications is standard.

P591 Significant diastolic dysfunction is associated with cardioembolic stroke independent of history

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1 Texas Heart Institute, Cardiac Electrophysiology, Houston, United States of America; 2 Tulane University, Cardiology, New Orleans, United States of America; 3 Tulane University, neurology, New Orleans, United States of America; 4 Michael E. DeBakey VA Medical Center, Cardiac electrophysiology, Houston, United States of America

Hypothesis: Diastolic dysfunction (DD) is an independent risk factor for Cardioembolic Stroke (CES) in patients both with and without atrial fibrillation (AF).

Background: DD may be associated with a thrombotic milieu, even in the absence of AF. Present guidelines are ambiguous whether risk stratification for AF should include DD. It is also unknown if DD is a risk factor for stroke without AF.

Methods: All patients admitted with diastolic dysfunction grade < 4 and recorded stroke based on TOAST classification between 6/2008-5/2014 were identified.
Transthoracic echocardiogram was used to diagnose and grade DD. Multivariable logistic regression was used to investigate the independent associated variables between stroke type and DD, adjusting for age, race, sex, and history of CHF, HTN, DM, stroke, mitral regurgitation (MR), AF and age. Results: 388 patients met study criteria; 97 (25.0%) had DD grade > 1, the mean (SD) age was 62.46 (11.67), 154 (39.79%) were female, 17 (4.44%) had AF, and 77 (27.80%) had CHF. In fully adjusted multivariable regression, DD grade > 1 significantly increased the odds of CHF (OR 3.95; 95% CI 1.02-15.36; p = 0.047).

Conclusion: DD (grade > 1) is an independent risk factor for patients with CHF irrespective of AF. Larger studies are essential to delineate the complex relationship of DD and CHF, both with and without AF, to determine appropriate anticoagulation strategy. This is particularly so as DD itself has been incriminated in the pathogenesis of AF.

Multivariable analysis of DD and Stroke

<table>
<thead>
<tr>
<th>Covariate</th>
<th>OR</th>
<th>95% CI</th>
<th>P-value</th>
<th>Best cut-off value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD grade&gt;1</td>
<td>3.95</td>
<td>(1.02-15.36)</td>
<td>0.047</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.02</td>
<td>(0.97-1.07)</td>
<td>0.461</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.50</td>
<td>(0.95-1.62)</td>
<td>0.245</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.39</td>
<td>(0.13-0.12)</td>
<td>0.102</td>
<td></td>
</tr>
<tr>
<td>CHF History</td>
<td>2.56</td>
<td>(0.63-10.50)</td>
<td>0.191</td>
<td></td>
</tr>
<tr>
<td>Hypertension History</td>
<td>0.39</td>
<td>(0.07-2.30)</td>
<td>0.300</td>
<td></td>
</tr>
<tr>
<td>Diabetes History</td>
<td>0.41</td>
<td>(0.13-1.30)</td>
<td>0.130</td>
<td></td>
</tr>
<tr>
<td>Atrial Fibrillation History</td>
<td>3.01</td>
<td>(0.17-64.83)</td>
<td>0.456</td>
<td></td>
</tr>
<tr>
<td>Mitral Regurgitation</td>
<td>1.66</td>
<td>(0.95-5.55)</td>
<td>0.370</td>
<td></td>
</tr>
</tbody>
</table>

P593
Diagnostic score for the detection of cardiac amyloidosis in patients with left ventricular hypertrophy
E Carlu1; GM Galinier1; CD Carrie1; RJ Roncalli1; FP Fournier1; RD Ribes1; LO Larez1
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Background: Cardiac amyloidosis (CA) is a disease with poor prognosis. Early non-invasive identification is of growing clinical importance. The objective of our study was to integrate clinical, electrocardiographic and echocardiographic parameters to build a diagnostic score in patients with left ventricular hypertrophy (LVH).

Methods and Results: 114 patients with LVH underwent a cardiac magnetic resonance and a 99mTc-3,3-diphosphono-1,2-propanodicarboxylic acid scintigraphy allowing to discriminate 3 groups of diagnosis: CA (n = 50), hypertrophic cardiomyopathy (n = 19) and unspecified cardiomyopathy (n = 45). Seven continuous variables associated with CA (systolic arterial pressure < 130 mmHg; PR duration > 200 ms; Sokolow index < 12 mV; diastolic left ventricular posterior thickness > 13 mm; E/Ea ratio > 10; global longitudinal strain > -12% and sum of basal longitudinal strain > -47%) were selected according to the best cut-off value. The area under the ROC curve for the diagnosis of CA using the score was 0.933 (95% CI 0.889-0.978). The best cut off value for the score was 3 leading to a sensitivity of 90% and specificity of 81%.

Conclusions: An integrated evaluation of 7 diagnostic factors to build a diagnostic score is an easy method to discriminate CA in patients with LVH.

<table>
<thead>
<tr>
<th>Variables associated with CA</th>
<th>AUC</th>
<th>IC95%</th>
<th>P-value</th>
<th>Best cut-off value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic arterial pressure</td>
<td>0.789</td>
<td>0.619-0.919</td>
<td>0.001</td>
<td>&lt; 130 mmHg</td>
</tr>
<tr>
<td>Troponin</td>
<td>0.667</td>
<td>0.515-0.819</td>
<td>0.061</td>
<td></td>
</tr>
<tr>
<td>NT pro-BNP</td>
<td>0.667</td>
<td>0.515-0.817</td>
<td>0.063</td>
<td></td>
</tr>
<tr>
<td>PR duration</td>
<td>0.740</td>
<td>0.600-0.881</td>
<td>0.007</td>
<td>&gt; 200 ms</td>
</tr>
<tr>
<td>Sokolow index</td>
<td>0.793</td>
<td>0.569-0.917</td>
<td>0.001</td>
<td>&lt; 12 mV</td>
</tr>
<tr>
<td>Di + Dill + DIII</td>
<td>0.758</td>
<td>0.594-0.921</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Diastolic LV posterior thickness</td>
<td>0.758</td>
<td>0.624-0.891</td>
<td>0.004</td>
<td>&gt; 13 mm</td>
</tr>
<tr>
<td>Transmital flow peak E velocity</td>
<td>0.751</td>
<td>0.612-0.890</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>E wave deceleration time</td>
<td>0.756</td>
<td>0.608-0.904</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Transmital flow E/A ratio</td>
<td>0.741</td>
<td>0.587-0.895</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td>E/Ea ratio</td>
<td>0.808</td>
<td>0.688-0.928</td>
<td>0.001</td>
<td>&gt; 10</td>
</tr>
<tr>
<td>Global longitudinal strain</td>
<td>0.775</td>
<td>0.644-0.907</td>
<td>0.002</td>
<td>&gt; -12%</td>
</tr>
<tr>
<td>Sum of basal longitudinal strain</td>
<td>0.776</td>
<td>0.647-0.908</td>
<td>0.002</td>
<td>&gt; -47%</td>
</tr>
</tbody>
</table>

P592
Effect of increased oxygen on exercise

<table>
<thead>
<tr>
<th>Variable</th>
<th>21% oxygen</th>
<th>28% oxygen</th>
<th>40% oxygen</th>
<th>P value (between 21% and 28%)</th>
<th>P value (between 21% and 40%)</th>
<th>P value (between 28% and 40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean exercise time (minutes)</td>
<td>9.07 (3.24)</td>
<td>9.46 (3.15)</td>
<td>9.15 (3.21)</td>
<td>0.06</td>
<td>0.11</td>
<td>0.44</td>
</tr>
<tr>
<td>Peak workload (watts)</td>
<td>61 (27)</td>
<td>64 (27)</td>
<td>62 (27)</td>
<td>0.16</td>
<td>0.14</td>
<td>0.14</td>
</tr>
<tr>
<td>Metabolic equivalent</td>
<td>2.5 (1.1)</td>
<td>2.6 (1.1)</td>
<td>2.6 (1.2)</td>
<td>0.10</td>
<td>0.10</td>
<td>0.74</td>
</tr>
<tr>
<td>BORG score</td>
<td>4.7 (1.7)</td>
<td>4.5 (1.5)</td>
<td>4.8 (2.0)</td>
<td>0.32</td>
<td>0.65</td>
<td>0.19</td>
</tr>
<tr>
<td>Heart rate at peak exercise (bpm)</td>
<td>111 (26)</td>
<td>109 (22)</td>
<td>108 (24)</td>
<td>0.87</td>
<td>0.44</td>
<td>0.42</td>
</tr>
<tr>
<td>Oxygen saturations at peak exercise (%)</td>
<td>95 (6)</td>
<td>97 (5)</td>
<td>94 (7)</td>
<td>0.20</td>
<td>0.09</td>
<td>0.55</td>
</tr>
</tbody>
</table>

bpm: beats per minute

Poster Session 1
P594
Diastolic dysfunction in patients with primary antiphospholipid syndrome
A Djokovic1; L Stojanovic1; S Radovanovic1; B Todros1; D V Simic1; M Zravkovic1; I Almeida1; M Correia1; C Cabral1
1Hospital Sao Teotonio, Cardiology, Viseu, Portugal

Introduction: Diastolic dysfunction may be a significant predictor of cardiovascular disease. Left atrial volume index (LAVI) is a simple and non-invasive parameter associated with increased risk of overall and cardiovascular mortality. Patients with primary antiphospholipid syndrome (PAPS) have significant left atrial dilatation and atrial fibrillation. In this study, we evaluated the presence of diastolic dysfunction in PAPS in comparison to healthy subjects.

Methods: A total of 101 PAPS patients were enrolled and compared to 32 age- and sex-matched controls. Diastolic function was assessed by measuring the echocardiographic parameters of left atrial volume index (LAVI) and the ratio of early diastolic filling wave velocity (E) by tissue Doppler imaging to systemic venous pressure (IVRT). Patients were divided into subgroups according to the presence of intellectual disability and the presence of a positive lupus anticoagulant (LA). The primary endpoint was the occurrence of major adverse cardiovascular events (MACE).

Results: The LAVI was significantly higher (p = 0.008, p = 0.024) in PAPS compared to controls. LA+ showed a trend towards a lower E/IVRT ratio (p = 0.058). In patients with LA+, LAVI was significantly higher (p = 0.027) compared to LA- patients. LA+ patients showed a significant heart failure event rate (p = 0.033).

Conclusion: Left atrial dilatation is an independent predictor of diastolic dysfunction in patients with PAPS. LA+ patients had a higher risk of heart failure events compared to LA- patients. Left atrial volume index measured by tissue Doppler imaging is a simple parameter that allows for the identification of diastolic dysfunction in PAPS.

P598
Prognostic impact of spironolactone in patients with heart failure with preserved ejection fraction
H Hugo Antunes1; A Gil1; ML Goncalves1; L Abreu1; IB Marmelo1; IF Pires1; DM Moreira1; I Almeida1; M Correia1; C Cabral1
1Hospital Sao Teotonio, Cardiology, Viseu, Portugal

Introduction: Therapy for heart failure with reduced ejection fraction (HFrEF) is well established, with a prognostic impact in this group of patients (P). On the other hand, no treatment showed convincingly to reduce the morbi-mortality in P with heart failure with preserved ejection fraction (HFpEF). The aim of this study is to investigate the prognostic impact of spironolactone therapy in P with HFpEF.

Methods: We identified all patients admitted for HF in a single center between 01/01/2009 and 31/12/2014. Only the first episode of each patient was included. Only the P with HFpEF were selected. We considered 2 groups, according to therapy instituted at the time of discharge: Group with Spironolactone (gSpiro) and group without spironolactone (gCONT).

Results: Of a total of 1006 P admitted, 435 cases were included: 61.2% female and mean age 79.4 ± 8.3 years. In-hospital mortality was 3.2%. The combined endpoint at 12M was 45.7% and 56.9% at 24M. The two groups were similar in terms of co-morbidities (Arterial hypertension in the gSpiro 66.2% vs 75.7%; Diabetes 29.6% vs 38.0%; History of ischemic heart disease 13.8% vs 9.6; History of stroke 9.2% vs 6.1%; p > 0.05).

Conclusion: This study showed that spironolactone therapy is associated with a greater number of adverse events at both 12 and 24M, although this difference was not evident when the survival curves of both groups were evaluated. Thus, in this study, there was no benefit in the introduction of spironolactone in patients with HFpEF.
Conclusion: for higher costs.

Results: basically male, a low hemoglobin level, high oxygen uptake (VO2max), coronary artery malmarys. The strict protocol excluded patients with major, symptomatic mitral regurgitation. Regarding the ALDO-DHF cohort we have to allow for the relatively young, "oligosymptomatic patient selection. The strict protocol excluded patients with major, e.g. pulmonary, co-morbidities leading to a lower limit of the costs. Further investigation is needed regarding the impact of co-morbidities and their effect over a longer period of time. Simultaneously, this analysis shows that early diagnosis and prevention of co-morbidities are necessary to reduce costs in the health care system.

Purpose: Heart failure with preserved EF (HFrEF) is characterized by phenotypic heterogeneity. Loss of atrial function is of relevance in HFrEF, and interstitial dysynchrony (IAD) appears to be one of its aspects. The prevalence of IAD has not been compared between patients with HF and various categories of LVEF.

Methods: Data from 51 patients (24 HFrEF, 6 HfLVEF, 21 HFrEF) diagnosed with HF per current guidelines were analyzed retrospectively. IAD was measured from echo Doppler traces as the difference between the time of transmitial and transtricuspid A wave onsets.

Results: IAD=60 ms was present in 8 HFrEF pts. (33.3%), 1 HFrEF (4.8%) and 1 HfLVEF patient (16.7%) (p=0.039). Compared to pts. with LVEF<50%, those with HFrEF were older, had higher SBP, heart rate, LVEF, LV mass, smaller LVIDd and lower sPAP; there was no difference in incidence of diabetes, NYHA class, NT-proBNP or eGFR, E/e or atrial volumes. Higher IAD was associated with a higher proportion of HFrEF, lower heart rate, and higher risk (Table 1).

Conclusion: IAD is more prevalent in HFrEF compared to patients with LVEF<50% and does not appear associated with standard clinical parameters, NT-proBNP, LV mass, E/e or atrial size.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>1 Quartile</th>
<th>2 Quartile</th>
<th>3 Quartile</th>
<th>4 Quartile</th>
<th>P value for trend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=13</td>
<td>n=13</td>
<td>n=15</td>
<td>n=10</td>
<td></td>
</tr>
<tr>
<td>IAD (ms)</td>
<td>&lt;9</td>
<td>9-24</td>
<td>24-49</td>
<td>&gt;49</td>
<td></td>
</tr>
<tr>
<td>HFrEF (n, %)</td>
<td>9 (69.2%)</td>
<td>5 (38.5%)</td>
<td>6 (40%)</td>
<td>1 (10%)</td>
<td>0.02</td>
</tr>
<tr>
<td>HFrEF (n, %)</td>
<td>3 (23.1%)</td>
<td>0 (0%)</td>
<td>2 (13.3%)</td>
<td>1 (10%)</td>
<td></td>
</tr>
<tr>
<td>HFrEF (n, %)</td>
<td>1 (7.7%)</td>
<td>8 (61.5%)</td>
<td>7 (46.7%)</td>
<td>8 (80%)</td>
<td></td>
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<tr>
<td>Age (years)</td>
<td>61.7±13</td>
<td>63.3±17</td>
<td>68.7±11</td>
<td>68.8±10.5</td>
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</tr>
<tr>
<td>Male sex (n, %)</td>
<td>8 (61.5%)</td>
<td>6 (46.2%)</td>
<td>5 (33.3%)</td>
<td>2 (20%)</td>
<td>0.2</td>
</tr>
<tr>
<td>History of AF</td>
<td>5 (38.5%)</td>
<td>5 (38.5%)</td>
<td>5 (33%)</td>
<td>6 (60%)</td>
<td>0.59</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>116.4±19</td>
<td>130±19.1</td>
<td>122.6±21.3</td>
<td>138±17.9</td>
<td>0.06</td>
</tr>
<tr>
<td>Heart rate (BPM)</td>
<td>76.2±13</td>
<td>75.9±13.3</td>
<td>64±10.7</td>
<td>66.7±14.7</td>
<td>0.028</td>
</tr>
<tr>
<td>eGFR (ml/min/1.73 m2)</td>
<td>55.1±26.6</td>
<td>67.2±17.9</td>
<td>53.3±16.3</td>
<td>54.7±21.9</td>
<td>0.31</td>
</tr>
<tr>
<td>NT-proBNP (pg/mL)</td>
<td>2396.5±7</td>
<td>2765.7±2</td>
<td>3262.9±6</td>
<td>665.1±5</td>
<td>0.22</td>
</tr>
<tr>
<td>NYHA II/III/IV</td>
<td>6 (46.2%)</td>
<td>9 (61.5%)</td>
<td>9 (60%)</td>
<td>7 (70%)</td>
<td>0.7</td>
</tr>
<tr>
<td>LAVI (ml/m2)</td>
<td>43±18.5</td>
<td>39.1±10.5</td>
<td>39.9±13.4</td>
<td>50.5±19.7</td>
<td>0.31</td>
</tr>
<tr>
<td>RWT (m/m2)</td>
<td>35.2±16.6</td>
<td>24.4±10.7</td>
<td>30.3±21.5</td>
<td>24.7±19.8</td>
<td>0.65</td>
</tr>
<tr>
<td>EF (%)</td>
<td>32.1±12.6</td>
<td>47±18.5</td>
<td>44.7±16.6</td>
<td>54.8±16.3</td>
<td>0.014</td>
</tr>
<tr>
<td>LVIDd (cm)</td>
<td>2.6±1.0</td>
<td>5.6±0.8</td>
<td>5.5±0.6</td>
<td>5.5±1.1</td>
<td>0.17</td>
</tr>
<tr>
<td>sPAP (mmHg)</td>
<td>47.2±18.3</td>
<td>36.9±10.5</td>
<td>44.5±20.2</td>
<td>36.9±8.4</td>
<td>0.41</td>
</tr>
<tr>
<td>E/e'</td>
<td>15.9±10.8</td>
<td>14.5±7.8</td>
<td>13.7±4.8</td>
<td>19.4±6.1</td>
<td>0.38</td>
</tr>
</tbody>
</table>

Values are given as mean ± standard deviation.

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P598

Is there an association between hidden HFrEF and markers of preclinical atherosclerosis?

AM Jakstaità1; J Celutkienè2; J Badanieè2; E Rinkuniene2; A Cypiene2; I Stivykoèka3; M Miglnèka3; R Navickà2; L Rysnakò4; A Laucevicius5

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Background: In 2020 the prevalence of HFrEF is projected to exceed 8% of persons older than 65 years. However, there is a lack of knowledge on early detection of HFrEF and its relation to cardiovascular risk markers.

Purpose: To investigate the association between early heart failure with preserved ejection fraction (HFrEF) and arterial markers of preclinical atherosclerosis.

Methods: We performed a prospective study and evaluated 148 high cardiovascular risk patients. Inclusion criteria were: metabolic syndrome (MetS), availability of brain natriuretic peptide (BNP) test, cardiopulmonary stress test, echocardiography and arterial markers (pulse wave velocity (PWV), augmentation index (AI), common carotid artery intima media thickness (IMT), common carotid artery stiffness (CAS),

Table 1
ankle-brachial index (ABI), reactive hyperemia index (RHI). We considered patients as having initial HFpEF if peak VO2 value was lower than 90% and/or BNP ≥50 pg/ml.

All patients were divided into 5 groups: (1) without HFpEF, with normal values of peak VO2 and BNP; (2) with at least one abnormal finding, either VO2 or BNP; (3) with elevated BNP (4) with decreased peak VO2, (5) with both abnormal findings.

Results: 46 men and 102 women were analysed, mean age 56.41 ± 6.57 years. Group 1 was composed of 52 healthy individuals (35.14%), group 2 - of 198 (64.86%), group 3 - of 23 (9.05%), group 4 - of 80 (54.55%), group 5 - of 28 (18.92%) patients. Significant differences were found between group 1 and remaining four groups in values of BNP – in group 2, 3, 4 and 5 (16.22 ± 6.30 vs. 31.71 ± 21.35, 50.69 ± 21.90, 27.39 ± 20.93 and 48.59 ± 21.60, respectively; p < 0.000), for peak VO2 – in group 2, 3, 4 and 5 (10.31 ± 7.64 vs. 82.69 ± 14.03, 87.42 ± 17.40, 74.90 ± 9.25 and 77.89 ± 9.83, respectively, p < 0.000). After comparison of arterial markers significant differences were found between groups 1 and 2, 3, 1 and 5. Mean AI values were found as follows: 31.20 ± 9.87 vs. 27.33 ± 7.44, p = 0.016 and 31.60 ± 10.16 vs. 27.33 ± 7.44, p = 0.020. Average correlation was found between peak VO2 and left ABI (r = 0.421; p = 0.036), right ABI (r = 0.433; p = 0.040) in group 3 and weak relation between BNP and right CAS (r = 0.300; p = 0.032) in group 1.

Conclusions: Two thirds of studied MetS patients had at least one pathological finding indicative of occult HFpEF. A significant relationship between heart failure markers and markers of preclinical atherosclerosis was found.

ISCHEMA - REPERFUSION - PRECONDITIONING - POSTCONDITIONING

P603
ST-elevation myocardial infarction: risk factors at admission associated with a prolonged in-hospital stay
MJ Maria Joao Vieira1; M Madeira1; L Reis2; P Dinis1; J Ribiero1; A Fernandes2; F Caetano3; M Alves1; C Lourenco2; R Teixeira2; LG Goncalves2
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Introduction: The length of hospital stay is an important measure of efficiency in the use of hospital resources as health care costs increase with prolonged hospitalization. Several predictors of length of hospitalization have been described in patients with ST-elevation myocardial infarction (STEMI), but little is known about the risk factors at admission for a prolonged in hospital stay (IHS).

Aim: Determine the risk factors at admission associated with a prolonged IHS in patients (Pts) undergoing percutaneous coronary intervention (PCI) for STEMI.

Methods: We performed a retrospective study of 313 consecutive patients (Pts) presented with STEMI (mean age: 64 ± 13.8, 72.8% male) who underwent PCI. Patients were divided in two groups based on mean in-hospital stay: ≤ 5 days (short IHS) and > 6 days (long IHS). Demographic, clinical, laboratory and echocardiographic parameters at admission were evaluated. Statistical analysis was performed using Stata software version 14.1.

Results: Of the population, 229 Pts (73%) were included in the short stay group and 84 Pts (27%) were included in the long stay group. Male gender is associated with a shorter IHS (76.4% short IHS vs 85.7% long stay, p = 0.019). Patients with long IHS were older (62 vs 69 years old, p < 0.001), were more likely to have prior arterial hypertension (75 vs 61%, p = 0.003), prior history of chronic kidney disease (23 vs 7.0%, p = 0.001) and prior acute coronary event or heart failure. Symptom onset to first medical contact (FMC) time (patient delay), was 120 (40–240) min. Symptom onset to arrival at hospital (patient delay + health care system delay) was 175 (125–230) min. Symptom to PCI delay in all recruited patients never exceeded 500 min. All studied time delays revealed moderate to high positive correlations with BNP levels measured at 24 hours from reperfusion and at 7th day of admission, but not BNP level at admission: i.e. patient delay + health care system delay #1 and BNP 2 – Spearman R = 0.63 (p = 0.006), patient delay + health care system delay #1 and BNP 3 – Spearman R = 0.72 (p = 0.024). Measured STEM delays negatively correlated with left ventricular ejection fraction (Spearman R: -0.57 vs -0.79, p < 0.05).

Conclusion: Received data demonstrate significant impact of time delays on severity of myocardial dysfunction and risk of new-onset heart failure following STEMI. PCI to PCI time was associated with increased risk of new onset of heart failure) at delays of more than 60 min.

P604
Primary percutaneous coronary intervention in women. Independent risk factors for death and major events after immediate and medium-term follow-up
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Background: Coronary heart disease is the leading cause of mortality and morbidity. A higher mortality risk for acute STE myocardial infarction has been a common finding in the past, even after acute percutaneous transluminal coronary angioplasty (PTCA). Prior studies have reported worse results after PTCA in women than in men. However, recent data suggest that this difference is less marked.

Objective: To determine gender-related differences and risk factors for death and major events, both in-hospital and at six-month follow-up, of patients that have been admitted within the first twelve hours of ST-segment elevation acute myocardial infarction (AMI) and primary PTCA in other to set out whether there are gender differences in a real-world contemporary treatment and outcome.

Methods: For two consecutive years, 199 consecutive patients were enrolled in the study, with ST-segment elevation AMI and primary PTCA without cardiogenic shock. The immediate outcome, in-hospital and six-month follow-up were studied. Multivariate Cox analysis were performed to identify independent predictors of death and major events.

Results: Clinical characteristics were similar in both groups, except that women were older than men (67.04 ± 11.53 3 59.70 ± 10.88, p = 0.0001). In-hospital mortality was higher among women (9.1% ± 1.5%; p = 0.0171), as was the incidence of major events (12.1% ± 3.5%, p = 0.0026). The difference in mortality rates remained the same at six months (12.1% ± 1.5%, p = 0.0026). The independent
predictors of death in multivariate analysis were: female gender and age >80 years old. Independent predictors of major events and/or angina were: multivessel disease and severe ventricular dysfunction. Conclusion: After ST-segment elevation AMI and primary PTCA, the independent predictors of mortality throughout the follow-up were female gender and age >80 years, in both in-hospital and six months follow-up.

P060
Cardiogenic shock in acute myocardial infarction
R Rim Ben Said1; B Jadaida2; M Mimouni2; M Gommidh2; N Ben Mansour2; R Dahmani2; C Chourabi2; H Mahfurdi2; N Hajjoub2; A Hagg2; D Lahdhib2; W Ferni2; H Haouala1
1La Rabta hospital, cardiology, Tunisia, Tunisia; 2Military Hospital of Tunis, Tunis, Tunisia

Introduction: Cardiogenic shock (CS) remains the leading cause of death in the acute phase of myocardial infarction (MI). Mortality from CS remains high despite marked advances in the treatment of MI. The aim of our study was to investigate the epidemiological clinical and echocardiographic characteristics of a series of patients hospitalized for MI complicated by CS as well as the predictive factors of in-hospital mortality.

Methods: We retrospectively analysed 70 patients affected by AMI complicated by CS admitted to cardiology department of the military hospital between October 2005 and April 2015.

Results: A total of 70 patients were included in the study; 56 (80%) patients were male. The mean age was 63 ± 10 years. Thirty-nine percent were admitted before the 6th hour from the onset of the chest pain, 12% were admitted between the 6th and the 12th hour and 44% were admitted beyond the 12th hour. On admission, 41% of patients were in left ventricular failure and 59% in shock.

The majority of myocardial infarction (45%) were anterior followed by inferior infarction with extension to the right ventricle (34%). The mean LVEF was 49 ± 14.4%. The mean LVEF was 37.8% in anterior MI and 57.6% in inferior MI. Mean LV and diastolic diameter was 53.17 ± 7.8 mm and the mean LV systolic diameter was 36.5 ± 5.1 mm. Two patients had intraventricular thrombus. Ischemic myocardial regeneration grade I. II was found in 4 patients. 22 patients had right ventricular dysfunction. Mean systolic pulmonary pressure was 37 mm Hg ± 10. Six patients had paracardial effusion.

Thrombolysis was performed in 51% of patients, 57% of them had thrombolysis before the 6th hour. Seventy-two (72%) of patients underwent angiography and 56.6% had percutaneous coronary intervention (PCI). Of these, 27% were taken for primary PCI and 73% had rescue PCI. Angiography had identified a single-vessel disease in 29% of cases, double-vessel disease in 44% of cases and multi-vessel disease in 29% of cases. Revascularization was complete in 37% of cases. The success rate of PCI was 85%. The average of hospital stay was 7 ± 8 days. In hospital outcome of the study, patients revealed a mortality rate of 47%, occurring on average in the 6th day of hospitalization. We found that renal failure (p = 0.014), late onset of shock (p = 0.031), hyperkalemia (p = 0.016), leukocytosis (p = 0.02), use of vasoressors (p = 0.003), LVEF (p = 0.004) and the anterior territory of MI (p = 0.06) were significantly predictive of hospital mortality.

Conclusion: Despite significant advances in the treatment of myocardial infarction, particularly techniques of reperfusion, therapeutic drug, and the advent of several circulatory support techniques, mortality of cardiogenic shock in acute phase of myocardial infarction remains high.

MOLeCULAR BIOLOGY - GENETICS

P061
Genome wide association study reveals novel genetic loci associated with renal function in heart transplant recipients receiving calcineurin inhibitor therapy
D David Snipeskis1; M Hathcock1; W Kremers1; A Batzer1; G Jenkins1; S Kushwaha1; N Pereira1
1Mayo Clinic, Cardiovascular Diseases, Rochester, United States of America

Introduction: Certain genetic variants are associated with a predisposition to develop renal dysfunction in the general population. There have been no genome-wide studies (GWAS) performed that assess the association of common genetic variation with renal function in heart transplant (HTx) recipients receiving calcineurin inhibitors (CNi).

Methods: Clinical and demographic data of patients that underwent HTx between January 1998 and December 2014 and were receiving CNI therapy was assessed.

p-value
Genotyping was performed using Illumina Infinium HumanCoreExome v1.0 analysis kit. A GWAS utilizing linear regression models were performed with estimated glomerular filtration rate (eGFR). When eGFR was unavailable, the Modification of Diet in Renal Disease (MDRD) formula was used to estimate it at 1 year as the phenotype after adjusting for baseline eGFR and change to sirolimus therapy.

Results: A total of 287 patients were included, and 314,903 single-nucleotide polymorphisms (SNP) were analyzed. The average age was 50 years (standard deviation, 12.5). Most were of European descent (n = 278, 96.9%) and male sex (n = 179, 71%). Significant variants in HMHB1 (rs198378, p = 2.37e-6), C12orf75 (rs13230881, p = 2.76e-6), LOC339884 (rs53646103, p = 2.93e-6), LOC10042392 (rs4617520, p = 6.07e-6), and MMP12 (rs652438, p = 7.05e-6) genes were associated with renal function as assessed by eGFR (Figure 1 and Table 1).

Conclusions: Our first of its kind GWAS demonstrates that genetic variation in five individual genes are associated with renal function in HTx recipients receiving CNI therapy. Larger studies are needed to replicate these findings and aid in the development of a genetics-based risk model for CNI nephrotoxicity.

Table 1

<table>
<thead>
<tr>
<th>Chromosome</th>
<th>Gene</th>
<th>Reference number</th>
<th>Minor allele frequency</th>
<th>Beta (SE)</th>
<th>p-value</th>
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<tbody>
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<td>3</td>
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<tr>
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<td>0.05</td>
<td>16.70 (3.64)</td>
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</tr>
<tr>
<td>12</td>
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<td>rs12300881</td>
<td>0.07</td>
<td>14.55 (2.03)</td>
<td>2.76e-6</td>
</tr>
</tbody>
</table>

**Figure 1.**

P607

Coronary heart disease and genetic polymorphisms, clinical, angiographic, procedure technique and long-term follow-up evaluation post percutaneous coronary intervention, major events and restenosis

LLB Bandera1; IP Borges1; EGS Peixoto2; RJS Andrade3; ILP Anjos1; RBS Peixoto1; SA Simoes1

1 Medical School of Severino Sombra University, Vassouras, Brazil; 2 Fluminense Federal University, Niteroi, Brazil; 3 Rio de Janeiro State Government, Rio de Janeiro, Brazil

Background: There are clinic and genetic polymorphism differences in coronary artery disease (CAD). Percutaneous coronary intervention (PCI), clinic, angiographic, procedure technique may influence the evolution, major events (death, AMI, revascularization) and clinical restenosis.

Objective: This study aims to evaluate if genetic polymorphism have some influence in long-term follow-up after PCI.

Methods: A total of 182 patients, the coronary disease group (CDG) with CAD of 221 procedures, there were no difference: between ACE I/D polymorphism AA 36 (100.0), AC 0 (0.0%), CC 0 (0.0%) and AA 135 (74.2%), II 31 (17.0%), (P=0.3612); A166C polymorphism AA 36 (100.0), AC 0 (0.0%), CC 0 (0.0%) and AA 135 (74.2%), (P=0.0026).

Conclusions: In CDG with 221 procedures, there were no difference: between ACE and A166C polymorphism at one, two or three vessel disease; between major events, deaths, AMI and revascularization; and between restenosis and the mean vessel diameter, lesion extension and bare metal or drug eluting stents (DES), although were implanted in 27 (12.2%) patients, being 15 (55.5%) patients with in stent restenosis and the others with small vessel diameter and long lesions.

In CDG there were more males, older people, more smokers, dislipidemia and they were genetically A166C polymorphism different from CG, the latter did not have CC or AC. There were no differences between the variables studied and illness extent, major events and restenosis in the CDG, even in relation to bare stents and DES, maybe because DES were used to the less favorable lesions and in stent restenosis.

P608

Impact of glutathione S-transferase M1 gene polymorphisms on the chronic heart failure

N Natasa Janković1; DV Simić1; O Gudešić1; S Radovacov1; D Džikić1; S Suvakov1; V Corić1; T Đukić1; T Simić1

1 Clinical Center of Serbia, Clinic for Cardiology, Belgrade, Serbia; 2 Military Medical Academy of Belgrade, Belgrade, Serbia; 3 Department of Cardiology, Medical Center Banjanska Kosa, Belgrade, Serbia; 4 Institute for Medical Biochemistry, Belgrade, Serbia

Background: Chronic heart failure (CHF) secondary to ischemic heart disease belongs to oxidative disease. Glutathione S-transferases M1 (GSTM1) is a gene family of phase II metabolic enzymes that detoxify free radicals, particularly in tobacco smoke. Smoking is a potent source of free radicals and well known risk factor for coronary disease. Inactive form of GSTM1 (null genotype) causes lower detoxification, which may be a risk factor for coronary disease.

Aim: To examine influence of different risk factors and GSTM1 polymorphism on the risk of development CHF.

Material and method: The study population consisted of 120 patients with CHF and 69 patients without heart failure in the control group matched for sex and age. The criterion for admission was left ventricular ejection fraction (LVEF) <45%, Age, sex, smoking history, hypertension, dyslipidemia, diabetes mellitus and obesity were evaluated as risk factors. The genetic polymorphism analysis for the GSTM1 gene were determined by multiplex polymerase chain reaction (PCR). Both patients and controls were dichotomized into GSTM1 null and GSTM1 active genotypes. Independent factors on CHF risk were evaluated by multiple logistic regression model.

Results: Frequency of GSTM1 null genotype was higher in CHF patients in comparison to controls (55.8 vs. 49.3%, respectively). GSTM1 null individuals exhibited a higher risk of CHF when compared to carriers of at least one active GSTM1 allele with un-significant of 1.30 (CI:0.72-2.36; p=0.55), Hypertension (OR=1.78; CI:2.89-17.33; p>0.05), diabetes (OR=1.73; CI:1.79-42.86; p>0.05), old age (more than 50 year) (OR=1.21; CI:1.14-26.59; p<0.05) and obesity (OR=1.56; CI:1.16-5.65; p<0.05) were independent risk factors for CHF. Smoking wasn’t independent risk factor for CHF.

P609

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N Natasa Jankovic1; DV Simic1; O Gudezic1; S Radovacov1; D Dziki1; S Suvakov1; V Coric1; T Djukic1; T Simic1

1Clinical Center of Serbia, Clinic for Cardiology, Belgrade, Serbia; 2Military Medical Academy of Belgrade, Belgrade, Serbia; 3Department of Cardiology, Medical Center Banjanska Kosa, Belgrade, Serbia; 4Institute for Medical Biochemistry, Belgrade, Serbia

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**CHF (OR=1.59; CI:0.77-3.29; p=0.05)**. GSTM1 null genotype alone wasn’t independent risk factor for CHF (OR=1.10; CI:0.72-1.69; p=0.20), but GSTM1 null genotype in combination with lipoprotein (a) was independent risk factor (OR=3.99; CI:1.47-10.85; p=0.05).

**Conclusion:** The frequency of GSTM1 null genotype in present study was similar to what was published previously. The presence of GSTM1 null genotype increases the risk of CHF among smokers.

**P609**

**Mutational screening of PKP2 and DSG2 genes in Russian patients with arrhythmogenic right ventricular cardiomyopathy**

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1 Russian Research Center of Surgery, Laboratory of Medical Genetics, Moscow, Russian Federation;  
2 J.M. Sechenov First Moscow State Medical University, Moscow, Russian Federation;  
3 Russian Research Center of Surgery, Moscow, Russian Federation;  
4 European Journal of Heart Failure

**Background:** Arrhythmogenic right ventricular cardiomyopathy (ARV) is an inherited disease characterized by progressive fibro-fatty replacement of right ventricle or both ventricles and leading to electrical instability and sudden cardiac death (SCD). Mutations in five desmosomal genes account for about 65% of all ARVC cases. The most common forms of disease are caused by mutations in PKP2 and DSG2 gene which account 25-40% and 12-40% of all genotypes, respectively. Identification of mutations in ARVC-related genes is one of a major diagnostic criterion (Marcus, 2010).

**Methods:** Instrumental examination and genetic counseling were performed for 38 Russian patients from 35 unrelated families with definite, borderline or possible diagnosis of ARVC (Task Force Criteria, 2010). Clinical examination had included standard and 24-hours ECG monitoring, Echo-CG, cardiac MRI, myocardial biopsy. Genetic study: PCR-based direct Sanger sequencing of coding exons and adjacent intronic areas of PKP2 and DSG2. Potential role of all genetic variants was evaluated in silico by PolyPhen2, SIFT or NetGen2, BDGP tools. The cascade screening for family members of genotype-positive probands was provided upon request. Results: Screening for mutations in the PKP2 and DSG2 in 35 DNA samples was performed. We found four rare genetic variants in PKP2: two truncating mutations W538X, W533del, missense variant P.p.L598P and splice-site mutation c.X52 > T+1. Patients carrying these genetic variants in PKP2 had clinical manifestation at the third/fourth decade of life with high-grade VA. ICDs were implanted in 2 cases. We found four rare genetic variants in DSG2: p.S194L, p.V533L, p.N248H, and p.P494H. Patients carrying these genetic variants in DSG2 also have had clinical appearance at the third decade of life with VT and RV hypertrophy. All variants have not been detected in a healthy cohort (100 samples). Thus, mutations in two genes responsible for most common forms of ARVC were identified in 22.9% of patients. Identification of mutation in DSG2 in male proband of 22 y.o. had led to increase the reliability of the diagnosis from ‘possible’ to ‘definite’. We have analyzed the mutation detection rate in the groups with definite, borderline and possible diagnoses of ARVC and the total contribution of genetic data in the disease diagnosis. Mutational screening for the DSG2, JUP genes and in non-desmosomal genes for patients with no mutations in PKP2 and DSG2 is in process now. Conclusion: We found 8 genetic variants in 35 Russian ARVC index patients (23.3%). Our findings in Russian patients are consistent with the representation data of two common genetic forms of ARVC in other ethnic groups. DNA diagnostics results were used for verification of diagnosis in probands and their families, even on pre-clinical stages of the disease. Positive results were used for ICD risk stratification and decision on ICD implantation.

**Acknowledgements:** This work was supported by grant RNP 16-15-10421.

**Background:** 16-15-10421

**Funding Acknowledgements:** 16-15-10421

**Poster Session 1**

**159**

**Moscow, Russian Federation**

**P612**

**Effects of chronic ACE inhibitor treatment on a translational model of heart failure with preserved ejection fraction**

NAJAH Harb1; 1 Sanofi R&D, Cardiovasculaire et metabolisme, pharmacologie, Chilly-mazarin, France

**Background/Introduction:** Heart failure (HF) with preserved ejection fraction (HfPfE) is a major epidemiological clinical issue, which parallels the prevalence of risk factors in the elderly (e.g. diabetes). In contrast to HF with reduced EF, clinical trials targeting neurohormonal activation with RAAS inhibitors or β-blockers have all failed in HfPfE. This failure has been attributed to patient heterogeneity and poor matching of therapeutic mechanisms and primary pathophysiological processes. Moreover part of the challenge resides also on the lack of relevant animal models recapitulating the contribution of cardiovascular and non-cardiovascular co-morbidities in the etiology of the syndrome. ZDF rats have been recently reported to develop an HfPfE phenotype.

**Purpose:** The objectives of this study were to further characterize cardiac and renal dysfunctions of the ZDF rats and determine whether improving renal function with an ACE inhibitor has a beneficial impact on HfPfE.

**Methods:** The cardiac function of Zucker Diabetic Fatty (ZDF) and lean animals was assessed after 8 weeks of daily treatment with ramipril (1 mg/kg per os) both in vivo, using echocardiography and PV-loop methodologies, and in vitro, using myocyte calcium contractility recording system after primary cardiomyocytes isolation. Renal and cardiometabolic biomarkers were monitored along the time course of the study and renal as cardiac histological analyses were performed at the end.

**Results:** We demonstrated that, at the age of 16 weeks, ZDF rats were overtly diabetic and displayed a significant decrease in cardiac output despite a normal ejection fraction and an increased fractional shortening. Moreover, in comparison to lean controls, ZDF rats showed an impairment of left ventricular (LV) diastolic function as documented by alterations of LV filling (decrease in E/A ratio), LV relaxation (increase in isovolumic relaxation time both in vivo and in vitro) and increase in end-diastolic volume and pressure. This diastolic dysfunction was associated with LV hypertrophy and fibrosis. Plasma biomarkers of HfPfE (ANP, BNP and Galectin-3) were also significantly increased in ZDF animals compared to lean littermates. After 8 weeks of treatment ramipril decreased LV hypertrophy and fractional shortening, increased end diastolic volume and tended to restore cardiac output in ZDF rats. This beneficial effect on cardiac remodeling was not associated with a reduction in plasma ANP, BNP or galectin-3 levels.

**Conclusions:** In summary, this study confirmed the ZDF model as a promising and reproducible model of HfPfE which displays most of the features of this syndrome. Despite a positive effect on cardiac remodeling, ramipril at 1 mg/kg/day partially improved the cardiac function in this HfPfE model.
**P613**

Epigenetic therapy reduces angiotensin-II induced cardiac hypertrophy and fibrosis

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**Funding Acknowledgements:** Enterprise Ireland

**Background:** Heart failure with preserved ejection fraction (HFpEF) is one of the leading causes of global morbidity and mortality. HFpEF is driven by pathological remodelling in the heart where there is hypertrophy of cardiomyocytes (cardiac hypertrophy) and an increased accumulation of extracellular matrix proteins in the interstitium (fibrosis). Recent evidence suggests that epigenetic processes such as DNA methylation are involved in the pathogenesis of cardiac remodelling. Inhibition of DNA methylation may yield a novel therapeutic avenue for the treatment of HFpEF.

**Purpose:** This study investigated the therapeutic potential of the DNA methyltransferase inhibitor, 5-aza-2′-deoxycytidine (5aza) to inhibit pathological hypertrophy and fibrosis in the Angiotensin-II (AngII) infusion model, a preclinical model of HFpEF.

**Methods:** Wild type C57BL/6J mice were implanted with subcutaneous micro-compu-pumps infusing 1000 ng/kg/min AngII to induce cardiac injury. Saline infusion was used as a negative control and blood pressure was measured weekly in conscious mice via tail-cuff method. Infused mice were treated every four days after pump implantation with intraperitoneal administration of either placebo or 5aza. Cardiac structure and function was examined in vivo using non-invasive echocardiography followed by post-mortem histological analysis.

**Results:** Echocardiographic analysis revealed that AngII infused mice treated with 5aza displayed a significant reduction in the left ventricular (LV) mass, interventricular septal wall and LV posterior wall thickness compared to mice which received placebo treatment. Positive pixel analysis of picrosirius red stained cardiac tissue demonstrated reduced levels of moderate and strong positive staining for collagen in the hearts of 5aza treated mice. 5aza was found to have no effect on blood pressure levels.

**Conclusion:** Therapeutic options for HFpEF patients are limited. The DNA methylation inhibitor, 5aza, shows therapeutic potential by reducing hypertension-induced cardiac hypertrophy and fibrosis independently of an effect on blood pressure.

**P614**

Increased plasma clusterin levels in patients with left ventricular remodelling after myocardial infarction has cardiac origin and is due to a defect in proteasome activity

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**Background:** The effects mediated by the action of angiotensin 1-7 could be a new solution in the treatment of heart failure. Angiotensin 1-7 (Ang1-7) shows the antagonistic property to angiotensin II. In our previous study we detected that in co-stimulation of AngII and Ang1-7actin in 10-6 mol / L concentration.

**Methods:** 24 experiments isolated from the hearts of Sprague-Dawley rats with chronic heart failure. With Immunhisto and Western Blot methods we studied the changes of structural proteins-vimentin, α-smaandmyosinheavychainincreasesinco-cultureofCF and CM from P1 to P3, conversely decreases the quantity of Ca43. Desmin was not detected in all passages. Thus already in P3 the CF transform in myofibroblasts The 24-hours stimulation with 10-6 mol / L concentration angiotensin 1-7 has shown the antagonistic property to angiotensin II. The proof of the positive effect of angiotensin 1-7 might have therapeutic potential. The effects mediated by the action of angiotensin 1-7 could be a new solution in the treatment of chronic heart failure.

**Results:**

- **Data:**
  - m-Clu (1.9 fold, p < 0.010) post-MI
  - Clu mRNA level was increased in the LV of rat at 7 days (10 fold, p = 0.001) and 2 months (1.4 fold, p = 0.010) post-MI. Clu precursor form (p-Clu) was only increased at 7 days post-MI (2.2 fold, p = 0.001). Clu mature form (m-Clu) was increased at 7 days (2.5 fold, p = 0.001) and 2 months post-MI (1.3 fold, p = 0.035). Also we observed that Clu mRNA level was positively correlated with ANP and BNP expression at 7 days (r = 0.99, p < 0.001/ r = 0.91, p < 0.001 respectively) and 2 months (r = 0.56, p = 0.000 / r = 0.60, p = 0.011 respectively) post-MI. Clu and m-Clu levels were positively correlated with plasma BNP level (r=0.73, p = 0.001/n=16.0, p = 0.015 respectively) at 7 days post-MI. m-Clu level was positively correlated with LV end diastolic diameters (0.67, p < 0.001) and LV weight/body weight ratio (0.76, p < 0.0001) at 2 months post-MI

- **Data:**
  - m-Clu level was positively correlated with LV end diastolic diameters (0.67, p < 0.001) and LV weight/body weight ratio (0.76, p < 0.0001) at 2 months post-MI

Then, we used primary cultures of rat neonate cardiomyocytes (NCM) that we treated with different modulators of protein degradation (PDG) systems in order to estimate their role in Clu expression and secretion in post-MI. Proteasome inhibition (MG132 treatment) of NCM was validated by increased levels of ubiquitylated proteins. We found increased Clu mRNA (2.2 fold, p < 0.001), p-Clu (2.5 fold, p = 0.001), m-Clu (1.6 fold, p = 0.003) and its secreted form (s-Clu; 4.9 fold, p < 0.001) in the treated cells compared to control cells. We have detected another form of clusterin demonstrated by co-immunoprecipitation as ubiquitylated clusterin only in the MG132 treated cells. We observed a cross-talk between the different PDG systems in the treated NCM with increased LC3/CLC3 ratio corresponding to activation of macroautophagy. To decipher which PDG systems or both are involved in increased Clu, NCM were co-treated with MG132 and 3-MA, an inhibitor of macroautophagy, and we observed increased mRNA Clu (4 fold, p = 0.001) and m-Clu (1.3 fold, p = 0.031) with no difference on p-Clu and s-Clu levels compared to MG132 treated cells.

Our data suggest that the increased plasma levels of Clu in patients with high LVR has cardiac origin and is mainly due to a defect in proteasome activity in heart. More informations are need to understand the cross-talk between the PDG (proteasome and macroautophagy) systems on the behavior of Clu in heart.

**P615**

Angiotensin 1-7 might be a new solution in the treatment of chronic heart failure

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**Introduction:** Cardiac fibroblasts (CF) are the major non-contractile cells present in the myocardium. Proliferation and differentiation of cardiac fibroblasts play a pivotal role in adverse cardiac remodelling. During cardiac remodelling cardiac fibroblasts undergo phenotypic changes: they acquire a myofibroblast character, proliferate and produce extracellular matrix (ECM) proteins. Interactions between cardiac fibroblasts (CF) and cardiomyocytes (CM) are still not fully understood.

**Purpose:** The first aim of our study was to get more information concerning the specific phenotype of cardiac myofibroblasts. The second aim was to learn how changes of properties of CF and CM in co-cultures by the 24-hours stimulation of Angiotensin1 (AngI) and Angiotensin 1-7 (Ang1-7).

**Methods:** We have studied the properties of CF and CM (n = 24 experiments) isolated from the hearts of Sprague-Dawley rats with chronic heart failure. With Immunhisto and Western Blot methods we studied the changes of structural proteins-vimentin, α-smooth muscle actin (α-sma), myosin heavy chain and desmin, and also gap-junctional protein such as Ca43 in P1, P5, P3 of CF and CM co-cultures. At the same time we investigated the quantitative change of these proteins after the 24-hours stimulation of AngI and Ang 1-7 in 10-6 mol / L and 10-7 mol / L concentrations as well as co-stimulation of these therapeutic agents in 10-6 mol / L concentration.

**Results:**

- **Data:**
  - m-Clu (1.9 fold, p = 0.010) post-MI
  - Clu mRNA level was increased in the LV of rat at 7 days (1.9 fold, p = 0.001) and 2 months (1.4 fold, p = 0.010) post-MI. Clu precursor form (p-Clu) was only increased at 7 days post-MI (2.2 fold, p = 0.001). Clu mature form (m-Clu) was increased at 7 days (2.5 fold, p = 0.001) and 2 months post-MI (1.3 fold, p = 0.035). Also we observed that Clu mRNA level was positively correlated with ANP and BNP expression at 7 days (r = 0.99, p < 0.001/ r = 0.91, p < 0.001 respectively) and 2 months (r = 0.56, p = 0.000 / r = 0.60, p = 0.011 respectively) post-MI. Clu and m-Clu levels were positively correlated with plasma BNP level (r=0.73, p = 0.001/n=16.0, p = 0.015 respectively) at 7 days post-MI. m-Clu level was positively correlated with LV end diastolic diameters (0.67, p < 0.001) and LV weight/body weight ratio (0.76, p < 0.0001) at 2 months post-MI

- **Data:**
  - m-Clu level was positively correlated with LV end diastolic diameters (0.67, p < 0.001) and LV weight/body weight ratio (0.76, p < 0.0001) at 2 months post-MI

**Conclusion:** Our study has shown that already in P3 the fibroblasts transform in myofibroblasts. Angiotensin 1-7 shows the antagonistic property to angiotensin II. The proof of the positive effect of angiotensin 1-7 might have therapeutic potential. The effects mediated by the action of angiotensin 1-7 could be a new solution in the treatment of chronic heart failure.

**Phenotype transformation**
Over the past decade, endoplasmic reticulum (ER) stress has emerged as an important mechanism involved in the pathogenesis of cardiovascular diseases including heart failure. Cardiac therapy based on ER stress modulation is viewed as a promising avenue towards effective therapies for the diseased heart. Here, we tested whether sirtuin 1 (SIRT1), a NAD+-dependent deacetylase, participates in modulating ER stress response in the heart. Using cardiomyocytes and adult inducible SIRT1 knockout mice, we demonstrate that SIRT1 inhibition or deficiency increases ER stress-induced cardiac injury, whereas activation of SIRT1 by the sirtuin-1-activating compound STAC-3 is protective. Analysis of the expression of markers of the three main branches of the unfolded protein response (i.e. PERK/eIF2α, ATF6 and IRE1) showed that SIRT1 protects cardiomyocytes from ER stress-induced apoptosis by attenuating PERK/eIF2α pathway activation. We also present evidence that SIRT1 physically interacts with and deacetylates eIF2α. Mass spectrometry analysis identified lysines K141 and K143 as the acetylation sites on eIF2α targeted by SIRT1. Furthermore, mutation of K143 to arginine to mimic eIF2α deacetylation in cardiomyocytes reduced protection against ER stress-induced apoptosis. Collectively, our findings indicate that eIF2α deacetylation confers protection against ER stress-induced apoptosis. It is expected that skeletal muscle cell lines subjected to different iron availabilities and/or hypoxic conditions will demonstrate changes in cell morphology and atrophy of skeletal myocytes. K. A. Kamila, Aleksander Kobak1; M. Kasztura1; M. Dziegala1; J. Balia; A. Orlowska2; V. Kapusniak3; K. Jósiak4; W. Baniasiak5; P. Ponkowski6; E. A. Jankowska6

Influence of iron availability in the normoxic versus hypoxic conditions on the morphology and atrophy of skeletal myocytes. L6G8C5 rat skeletal myocytes were cultured in normoxia or hypoxia at different iron concentrations (i.e. PERK/eIF2α, ATF6 and IRE1) showed that SIRT1 protects cardiomyocytes from ER stress-induced apoptosis by attenuating PERK/eIF2α pathway activation. We also present evidence that SIRT1 physically interacts with and deacetylates eIF2α. Mass spectrometry analysis identified lysines K141 and K143 as the acetylation sites on eIF2α targeted by SIRT1. Furthermore, mutation of K143 to arginine to mimic eIF2α deacetylation in cardiomyocytes reduced protection against ER stress-induced apoptosis. Collectively, our findings indicate that eIF2α deacetylation confers protection against ER stress-induced apoptosis. It is expected that skeletal muscle cell lines subjected to different iron availabilities and/or hypoxic conditions will demonstrate changes in cell morphology and atrophy of skeletal myocytes. K. A. Kamila, Aleksander Kobak1; M. Kasztura1; M. Dziegala1; J. Balia; A. Orlowska2; V. Kapusniak3; K. Jósiak4; W. Baniasiak5; P. Ponkowski6; E. A. Jankowska6

Background: Muscle atrophy reflects a systemic response to various chronic diseases, including heart failure (HF). Disease-associated decrease in muscle tissue mass can occur as a result of various pathologies and one of the reported causative factors is hypoxia. Iron deficiency (ID) is one of the potential pathomechanisms contributing to increased skeletal muscle atrophy and impaired exercise tolerance in HF. It is worthy of mentioning that beneficial effects of iron supplementation on the improvement of muscle function in patients with heart failure with ID have already been reported. However, the mechanisms responsible for this phenomenon remain unknown.

Purpose: It is expected that skeletal muscle cell line subjected to different iron availability and/or hypoxic conditions will demonstrate changes in cell morphology and in the expression of atrophy markers.

Methods: LG6C8 rat skeletal myocytes were cultured in normoxia or hypoxia at different iron concentrations. We analysed cell morphology and expression of Atrogin1, MuRF1, and the ubiquitin proteasome pathway involved in protein degradation during muscle atrophy. ID combined with hypoxia also causes a decrease in SMAD4 expression (p < 0.05) suggesting modifications leading to atrophy. In contrast, cells cultured in a medium enriched with iron during hypoxia exhibited reverse changes in the expression of atrophy markers (all ≤ 0.05) along with increased SMAD4 expression (p < 0.05). Desmin was upregulated in the cells subjected to both ID and iron excess in normoxia (p < 0.01) and hypoxia (p < 0.05), but the greatest augmentation occurred when ID was combined with hypoxia. Notably, in hypoxia an increased expression of Atrogin1 and MuRF1 was associated with an increased expression of transferrin receptor 1, reflecting intracellular iron demand (p = 0.05; p < 0.01). Further, the expression of desmin during hypoxia was associated with an increased apoptotic activity (estimated by Bax/Bcl2 ratio) of skeletal myocytes (p = 0.04; p < 0.001).

Conclusions: Hypoxia and iron deficiency when combined has the most detrimental impact on skeletal myocytes, especially in the context of muscle atrophy markers. Inversely, iron supplementation in vitro conditions might act in the protective manner on these cells.

Alterations in natriuretic peptides system in adult stem cells in heart failure. N Khromova1; V Galienco1; O Smirnov2; P Ikonova1; T Lidyava1; R Dmitrieva1

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Background and aim: Heart failure (HF) is associated with an increase of myocardial and systemic insulin resistance, mitochondrial dysfunction, altered levels of circulating adipocytokines, decrease of metabolism of fatty acids (FA) and a shift toward glucose for ATP generation. Metabolic alterations in HF were demonstrated not only for myocardium, but also for other organs including adipose tissue, skeletal muscles, and bone tissue. Our study was aimed to test the hypothesis that systemic metabolic abnormalities in HF could be related to alterations in signaling pathways known to be important in regulation of metabolism, and regulated by natriuretic peptide (NP) system in adult stem cells derived from skeletal muscle (SC) bone marrow (BMMSC) and subcutaneous (ADMSC) adipose tissue from HF patients related to chronic activation of natriuretic peptides system.

Methods: 7 patients with HF and 6 healthy donors were involved in this study. All patients were diagnosed as having HF based on clinical signs of heart failure and echocardiographic or angiographic evidence of impaired left ventricular systolic function, and have a disease history of at least 12 months. To study the dynamics of gene expression, RNA samples were collected at different time points during adipose and muscle in vitro differentiation course.

Results: The dynamics of expression of NPRA/NPFRC differ significantly between HF and HD in all tested stem cell samples (SC, BMMSC, ADMSC), as well as in course of in vitro adipose differentiation. Data are summarized in Figure 1: the regulation of natriuretic peptides system in adult stem cells of different origin is altered significantly in HF patients.

Conclusion: the observed low ratio of NPRA to NPRC expression in HF samples could indicate the “switch” in NP-cGMP signaling in adipose and muscle tissue in heart failure patients.

Mechanisms of action of sacubitril/valsartan on cardiac remodeling: a systems biology approach

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On behalf of: ICRC Heart Failure and Cardiac Regeneration Research Programme Funding Acknowledgements: Ministerio de Economía y Competitividad (SAF2014-59892), Fundación La MARATO de TV3 (201502, 201516), TelCoL (RD16/0101/0006), CIBER CV (CB16/11/00403)

Sacubitril/Valsartan, proved superiority over other conventional heart failure (HF) management treatments, but its mechanisms of action remains obscure. In this study, we sought to explore the mechanistic details for Sacubitril/Valsartan in HF and post-myocardial infarction (MI) remodeling, using an in silico, systems biology approach. Myocardial transcriptome obtained in response to MI in swine was analyzed to address post-infarction ventricular remodeling. Swine transcriptome hits were mapped to their human equivalents using Reciprocal Best (blast) Hits, Gene Name Correspondence, and trParanoid database. HF remodeling was studied using public data available in GEO (accession GSE57345, subseries GSE57338), processed using the GEO2R tool. Using the Therapeutic Performance Mapping System (TPMS) framework, we visualized the molecular networks of myocardial remodeling and compared these to the mouse myocardium, defining both pathways and including all the information available on Sacubi-tril/Valsartan, were generated. All relationships incorporated into the biological network were drawn from public resources. An artificial neural network analysis revealed that Sacubitril/Valsartan acts syner-gistically against cardiomyocyte cell death and left ventricular extracellular matrix remodeling. When studying each pathway independ-ently, Valsartan was found to improve cardiac remodeling by inhibiting members of the guanine nucleotide-binding protein family, while Sacubitril attenuated cardiomyocyte cell death, hyper trophy, and impaired myocyte contractility by inhibiting PTEN. The complex molecular mechanisms of action of Sacubitril/Valsartan upon post-MI and HF cardiac remodeling were delineated using a systems biology approach. Further, this dataset provides pathophysiological rationale for the use of Sacubi-tril/Valsartan to prevent post-infarct remodeling.

P620

Vegf and hgf realized postinfarction cardiac repair by control cardiac stem cell mobilization, angiogenesis and inflammation

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Chronic heart failure (HF) continues the most important problem of modern medicine. Despite many advances in the management of HF, treatment options for many patients remain limited and new treatment strategies are clearly needed. Gene therapy and therapeutic vascular growth may provide a new treatment option for these patients.

The aim of the present study is to analyse the potential of combined HGF and VEGF gene therapy for stimulation of endogenous mechanisms of cardiac repair after myocardial infarction. As a proof-of-concept we have tried to evaluate VEGF, HGF and VEGF plasmid based gene delivery to rat ischemic myocardium. We have found that within 14 days post injection combination of VEGF + HGF plasmids was superior to single VEGF or HGF in terms of vascular density increase (both capillary and arteriolar), but was unable to significantly reduce post-infarction fibrosis, yet certain trend was observed. HGF and HGF + VEGF injections significantly stimulate accumulation of o-kit + resident cardiac stem cells in border zone and WT1+ epicardial cell activation in compare to VEGF plasmid injections. We have also found the reduction of inflammatory cellular infiltration of border zone in VEGF + HGF group compared to VEGF group, which might indicate decrement of inflammatory response in myocardium. In further in vitro studies using HUVEC and TIME endothelial cells we found that production of pro-inflammatory chemokines MCP-1 and IL-6 is increased by recombinant VEGF and reduced after addition of HGF. Combination of both factors resulted in medium levels of MCP-1 and IL-6 production, thus HGF seems to counteract the pro-inflammatory action of VEGF. As for pro-angiogenic IL-6, both factors had stimulating effect on its production and their combination yielded maximum amount of IL-8 expression and secretion by endothelial cell cultures, which suggests an alternative way for IL-8 regulation involved.

As a result of the study we can conclude that combination of VEGF and HGF has good translational promise for myocardial repair and regeneration. Deeper in-sights into their mechanism of action might show non-canonical properties and modes of action of that combination that may drive its way into practice.
associated with altered Ca signaling during excitation-contraction coupling. Ventricular diastolic dysfunction in obesity-related HFpEF is associated by around 29% in ischemia-reperfusion syndrome. Tetracaine-dependent SR Ca leak, however, was significantly increased in Ln (to 1.9 ± 0.4 vs. 1.0 ± 0.2 and 0.7 ± 0.2 μm/sec in ZSF-obese and WT in n=7, 18 and 11 cells resp.; p <0.05). Moreover, time to 50% of maximal Ca transient was increased in Ln. At 28 weeks, even though in vivo data indicated an HFpEF phenotype in Ob, cardiomyocyte CaT showed significantly reduced peak and SR Ca2+ content indicating that cellular changes in obesity-related HFpEF are highly stage-dependent.

Left atrial size was increased and atrial emptying fraction was reduced vs. CTRL at early states of remodeling despite increased cardiomycyte CaT amplitudes. In addition, our data suggest underlying altered local control of Ca in atrial cardiomycocytes from obesity-related HFpEF vs lean rats with metabolic risk factors.

Methods: Clinical variables such as weight, presence of signs and symptoms of decompenation, management of self-care and adherence to regular use of medications will be monitored through SMS. The system features will be divided into two groups: executed automatically by the system and executed through commands from an operator. This monitoring system will be tested with 10 patients through a pilot study.

Results: It is expected that this prototype of SMS remote monitoring can contribute to improve patient's adherence to self-care and health management. The attainment of these outcomes may contribute to the reduction of crises of decompensation and unplanned hospitalizations.

Conclusions: There is an opportunity to drive the increasing accessibility of mobile technologies to empower patients to monitor and manage their own health after discharge. If the results are favorable, other companies with a similar profile may benefit from this technology.

Characterization of a porcine model of heart failure with preserved ejection fraction

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Funding Acknowledgements: National Medical Research Council Singapore (Industry Alignment Fund)

Background: Heart failure patients with preserved ejection fraction (HFpEF) are increasingly being recognized as a distinct subtype from heart failure patients presenting with reduced left ventricular (LV) ejection fraction. Lack of suitable preclinical large animal HFpEF models is hampering better understanding of this important clinical subgroup of heart failure. We aim to establish and to characterize a porcine model with relevant characteristics of clinical HFpEF.

Methods: and Results: Yorkshire pigs (n=9) were subjected to aortic banding to achieve defined trans-stenotic pressure gradient and were fed with high salt diet for up to 20 weeks. Baseline and follow-up transhastoscopic echocardiography showed LV remodeling with end-diastolic diameter remodeled from baseline of 4.0 ± 0.3 cm to 3.8 ± 0.2 cm, 4.0 ± 0.5 cm and 4.8 ± 0.2 cm (p <0.005) at 4-week (n=3), 12-week (n=3) and 20-week (n=3) respectively. There was an increase in LV mass index (LVM) from 2.5 ± 0.5 to 3.8 ± 0.6, 2.8 ± 0.7 and 3.7 ± 1.0 (p <0.05) respectively during the corresponding follow-up time points. The animals maintained a relatively stable LVEF from 61.8 ± 7.3% to 70.7 ± 7.2%, 65.4 ± 13.8% and 65.0 ± 8.5% during the three follow-up time points, indicating a hypertrophic LV remodeling with preserved systolic function. Compared to diastolic function at baseline, there was a decrease in early (E) and late (A) ventricular filling ratio whereby a reduction in E/A ratio was observed at 20-week follow-up (1.25 ± 0.09 vs 0.97 ± 0.05, p <0.001), suggesting a restrictive LV filling. This was supported by observation of an increase in LV stiffness (Ca) from 0.02 ± 0.01 mmHg/ml to 0.04 ± 0.04 mmHg/ml in response to dobutamine stress at 20-week follow-up as determined by pressure-volume loop.
assessment. Myocardial hypertrophy with enlarged myofibers and increased intersti-
tial fibrosis was observed in the LV and left atrium (LA) during follow-up. Consistent
with heart failure presentation, histopathological examination revealed pulmonary
and hepatic congestion in the HFpEF pig model starting from 12-week follow-up.

**Conclusion:** We characterized myocardial hypertrophy, fibrotic remodeling, restric-
tive filling and peripheral congestion in a novel porcine model with characteristics of
LV diastolic dysfunction with preserved ejection fraction that are consistent with
HFpEF. This may represent a useful tool to study pathophysiological presentation of
clinical HFpEF.

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**P625**

**Right ventricular histological and molecular alterations in a rat model of
HFpEF: effects of exercisetraining**

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**Aims:** Heart failure with preserved ejection fraction (HFpEF) remains a major diag-
nostic and therapeutic challenge in clinical cardiology. Recent studies suggest that
HFpEF is a heterogeneous disease with also demonstrable impairments in systolic
and diastolic function of the right ventricle (RV). However, the underlying mechanisms of impaired RV function in HFpEF are to be characterized. The present
study aimed to investigate histological and molecular changes of the RV in a rat
model of HFpEF, and to characterize whether exercise training has any impact on
these alterations.

**Methods:** RVs were obtained from obese diabetic Zucker fatty / spontaneously
hypertensive heart failure F1 hybrid (ZSF1-obese) rat or ZSF1-lean rats as control
group at 20 weeks of age. In a separate group of experiments, ZSF1-obese rats were
randomly assigned to either a moderate continuous exercise training or sedentary
lifestyle for 8 weeks until the age of 28 weeks. Excised RVs were stained for fibro-
sis, mRNA expression of TNFα, IL-6 and IL-1β was analyzed by qPCR. Quantification
of protein carbonylation was used as a measure of reactive oxygen species burden.
Expression of pro- and anti-inflammatory enzymes was examined, and TNFα-related pro-fibrotic signaling pathways were characterized.

**Results:** At the age of 20 weeks, ZSF1- obese rats exhibited signs of HFpEF when
compared to the lean counterparts, as evidenced by increased E/e' (16 ± 2.0 vs.
22.5 ± 1.3), reduced left ventricular ejection fraction (73 ± 2.0 (76 ± 0.5%)) and
reduced exercise capacity, as determined by VO2max (41.4 ± 1.1 vs. 47.9 ± 2.8
mg/kg/min). ZSF1-obese rats displayed a profound increase in RV fibrosis as com-
pared to ZSF1-lean rats. TNFα levels were higher in RV from ZSF1-obese rats when
compared to ZSF1-lean rats, whereas no change was observed for IL-6 and IL-1β.
Catalase expression was increased in ZSF1-obese rats, suggesting an augmented
reactive oxygen species burden in the RVs. Expression of the NADPH oxidase Nox2
homologue did not differ between both groups. At 28 weeks, differences in RV fibro-
sis between ZSF1- obese and lean rats persisted. Notably, exercise training led to a
decrease in RV fibrosis in ZSF1-obese rats (11% vs. 8% as compared to sedentary
ZSF1- obese rats, P < 0.05), whereas fibrosis in ZSF1-lean rats was not significantly
altered. The favourable effect of exercise training on RV fibrosis in ZSF1-obese rats
was accompanied by decrease in TNFα levels and reactive oxygen species.

**Conclusion:** The present study is the first to characterize morphological changes of
the RV in an in vivo model of HFpEF. The data suggest that inflammation, reactive
oxygen species and fibrosis are major characteristics of the RV in HFpEF, and can
be reversed by exercise training. The underlying mechanisms are part of ongoing
investigations and likely provide important novel insights into the pathophysiology
of the disease and potential novel treatment targets for patients with HFpEF.

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**P627**

**Protection of cardiomyocytes by E2F6 against drug induced cell death**

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**Funding Acknowledgements:** Heart and Stroke Foundation of Canada

**Background:** The E2F pathway impacts the cell cycle to govern growth, differen-
tiation, and death in all cell types but its role in postnatal myocardium remains
evasive. To assess the role of the E2F pathway in postnatal myocardium we
expressed a transgene encoding the repressor E2F6 to interfere with endogenous
E2F activity. These E2F6 transgenic (tg) mice developed a dilated cardiomyopathy
(DCM) in the absence of any apoptosis or growth defects.

**Results:** Micro-array analysis and RT-qPCR revealed a significant increase (p < 0.05)
in the expression of genes which regulate the DNA damage response including the Chek1 kinase, Rad51 and BimL in myocardium from E2F6- (Tg)
mice. We examined the sensitivity to apoptotic death of neonatal cardiomyocytes
(NCM) isolated from E2F6 tg myocardium to Doxorubicin (Dox) and Colbalt Cloto-
ed (CoCl2). Dox treatment of NCMs from WT and Tg myocytes resulted in caspase
3 activation and p38 induction to a similar level with equivalent effects on cell via-
bility. Surprisingly, Dox (50µM) caused a rapid and dramatic loss of E2F6 protein
in cardiomyocytes by 80% at 6hrs (p < 0.05) to non detectable levels within 12hrs.
On the other hand CoCl2 (at concentrations 0 to 1mM) treatment of neonatal car-
diomyocytes isolated from Tg mice demonstrated 6-fold less caspase 3 activation
(p < 0.05), a 60% lower bax/bcl2 ratio (p <0.05), and higher viability in comparison
to their WT treated counterparts. Although CoCl2 also promoted a dose depen-
dent loss of E2F6 protein in Tg NCMs, it was to a much lesser extent compared with
Dox. Unlike CoCl2, Dox activated the p38 death response in cardiomyocytes. In
HeLa cells, Dox induced a dose dependent up-regulation of the pro-apoptotic
E2F1 protein with a marked reduction in E2F6 levels while CoCl2 caused a reduc-
tion in E2F1 without affecting E2F6 levels. In HeLa cells, Dox induced Chek1 and
the loss of E2F6 via post-transcriptional mechanisms and this was not observed
in NCM.

**Conclusion:** These data imply that E2F6 may serve to protect cells from apopto-
sis via distinct mechanisms and strategies to modulate its levels may be a useful
therapeutic to mitigate cell death and disease.

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**P628**

**Comparison of 12-month kinetics of serum markers of collagen synthesis,
transforming growth factor and connective tissue growth factor between
patients with recent and chronic dilated cardiomyopathy**

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**Funding Acknowledgements:** Grant from the Poland National Centre of Science (no. 2013/09/D/NS5/00252)

**Background:** Dynamics of extracellular matrix (ECM) fibrosis process in dilated
cardiomyopathy (DCM) may be assessed non-invasively by means of serum markers
of fibrosis measurements. Aim: To explore the kinetics of serum markers of fibrosis
during 12 month follow-up in DCM.

**Methods:** We included 70 consecutive DCM patients (pts) (48 ± 12.1 years, EF
24.4 ± 7.4%) with new-onset (n = 35, duration ≤ 6 months) and chronic DCM
(n = 35, > 6 months). Markers of collagen type I and III synthesis – procollagen
type I and III carboxy- and amino-terminal peptides (PIIICP, PINP, PIIINP, and
ECM metabolism controlling factors – tumor growth factor beta-1 (TGF-β1) and
connective tissue growth factor (CTGF) were measured in serum at baseline, 3-
and 12-month follow-up. Results: Baseline, 3- and 12-month values of PIIICP, PINP,
PIIINP, TGF-β1 and CTGF did not differ between pts with new-onset and chronic
DCM (Figure 1). Conclusions: Regardless of the disease duration kinetics of
serum markers of collagen synthesis, TGF and CTGF were similar in DCM. Better
understanding of the kinetics of serum markers of fibrosis in DCM may help to
develop tailored therapeutic approach directing ECM fibrosis.

**Figure 1**

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Empagliflozin influence on the course of experimental heart failure in normoglycemic rats

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Purpose: The efficacy of sodium-glucose cotransporter 2 (SGLT2) inhibitor empagliflozin in chronic heart failure in normoglycemic rats was investigated.

Methods: Chronic heart failure (CHF) experimental model in rats was created by permanent ligation of the left coronary artery. Rats were randomly divided into 3 groups: empagliflozin treated CHF group (n=11), untreated CHF group (n=11), control group with sham operation (n=9). Empagliflozin was administered in a dose 1 mg / kg / day for 3 months. Echocardiography was performed every month up to the end of the study. Sizes and volumes of the left ventricle (LV), LV ejection fraction, LV stroke volume and minute blood volume were measured. All rats were tested on a treadmill at the end of the experiment to evaluate physical endurance.

Results: CHF model was effective in both study groups, in a month after the surgery the rats of the first and the second groups had significantly lower ejection fraction and larger LV sizes than the rats of the control group. At the end of the study animals on empagliflozin treatment had a better exercise tolerance (maximum working time on treadmill 900 ± 110 s vs. 645 ± 110 s, p=0.004), higher minute blood volume at rest (80 ± 19 ml / min vs. 57 ± 19.4 ml / min, p < 0.020), bigger LV end-diastolic volume (0.50 ± 0.14 ml vs. 0.39 ± 0.08 ml, p=0.028) and bigger LV mass (1.98 ± 0.18 g vs. 0.69 ± 0.10 g, p=0.015), than the animals who did not receive treatment. In the course of the empagliflozin treatment an increase of a LV stroke volume, LV volume and minute blood volume were measured. All rats were tested on a treadmill at the end of the experiment to evaluate physical endurance.

Conclusions: Empagliflozin improved exercise tolerance and the LV functional performance in normoglycemic rats with CHF. Influence of empagliflozin on LV remodeling needs further investigation.

Changes in FS (A) and decorin (B)

changes in FS (A) and decorin (B)

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Serum decorin in ovine tachy-paced HF

<table>
<thead>
<tr>
<th>Decorin (pg/ml)</th>
<th>Baseline</th>
<th>Heart Failure</th>
<th>Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>873</td>
<td>2332±</td>
<td>1455±</td>
</tr>
<tr>
<td>Interquartile range</td>
<td>665-1348</td>
<td>1310-5901</td>
<td>975-4416</td>
</tr>
<tr>
<td>Range</td>
<td>297-2473</td>
<td>572-5887</td>
<td>805-6567</td>
</tr>
</tbody>
</table>

p=0.008 compared to baseline

Changes in FS (A) and decorin (B)

Changes in FS (A) and decorin (B)

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BASIC SCIENCE - THERAPEUTIC APPROACH

P632 Cardiac gene therapy with phosphodiesterases PDE2A and PDE4B in a mouse model of heart failure
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Purpose: While acute stimulation of β-adrenergic receptors (β-ARs) increases cyclic adenosine monophosphate (cAMP) and improves cardiac function, their chronic activation in heart failure (HF) is detrimental to the heart, by promoting deregulation of intracellular calcium handling and maladaptive remodeling. Multiple phosphodiesterases (PDEs) finely tune β-AR responses by degrading and compartmentalizing cAMP. PDE2A is increased in HF and blunts β-AR responses and the pro-hypertrophic effect of noradrenaline. In contrast, PDE4B is decreased in cardiac hypertrophy and knock-out mice for PDE4B are more susceptible to develop cardiac arrhythmias. Since chronic treatment with PDE inhibitors increases mortality in HF, we hypothesized that decreasing cAMP levels may have therapeutic effects.

Methods: We explored whether serotype 9 adenoviral associated viral vectors (AAV9) mediated cardiac overexpression of PDE2A or PDE4B could prevent maladaptive hypertrophy in a mouse model of chronic isoproterenol (iso) infusion (80 µg/kg/day during 2 weeks). Male C57Bl/6 mice were injected in the tail vein with AAV9 to increase PDE2A and PDE4B in the heart. Echocardiography allowed cardiac function exploration. PDE4B protein expression in heart extracts was measured by western blot. Heart sections (10 µm thick) were cut from paraffin-embedded specimens and stained with masson’s trichrome to quantify fibrosis.

Results: Six weeks after injection, mice showed a five-fold increase in PDE2A and PDE4B protein levels. In control mice injected with a Luciferase-AAV9, chronic iso treatment induced cardiac hypertrophy (N=10, p<0.01), fibrosis (N=8, p<0.01), and decreased ejection fraction (EF) measured by echocardiography by 31.6±3.5% (N=10, p<0.001). Overexpression of each enzymes did not prevent cardiac hypertrophy (N=10) but abolished the increase in fibrosis (N=9, p<0.05). More importantly, EF was preserved when either PDE2A or PDE4B were overexpressed in this pathological model.

Conclusions: Altogether, these results suggest that gene therapy with AAV9 encoding PDEs is a potential therapeutic approach for cardiac maladaptive hypertrophy.

P633 Acute and subacute functional effects of relaxin-2 on human mammary artery
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1UMR-S 1180, INSERM, Université Paris-Sud, Université Paris-Saclay, Châtenay-Malabry, France; 2Surgical Centre Marie Lannelongue, INSERM UMR-S999, La Pléiade Robinson, France

Funding Acknowledgements: Università Italo-Francese

Purpose: Despite classically associated with pregnancy, relaxin is a hormone with pleiotropic properties and an increasingly unveiled role in the pathophysiology of several cardiovascular diseases. Previous clinical trials have explored its therapeutic role on acute heart failure. However, the exact actions of relaxin on the endothelial cells of human vascular physiology, this project may have implications in the understanding of HMA’s physiology, an important conduct for coronary revascularization procedures.

Methods: We evaluated (10-10-10-5M; n=7). Immunofluorescence labelling of RXFP1 was performed along with labeling for CD31 (endothelial cells) and α-smooth muscle actin (smooth muscle cells). Functional responses are expressed as mean±standard error(%).

Results: After acute exposure to relaxin, no differences in the developed active tension were observed between relaxin or vehicle treated groups. Following 24h treatment with relaxin or vehicle, vascular viability and the vasococontractor effects of phenylephrine, endothelin-1 and angiotensin II were similar between groups. However, vessel rings treated with relaxin showed higher relaxation when compared to vehicle treated rings, both in response to acetylcholine (59.1±6.1% vs 44.2±6.2%; p<0.01) and nitroprusside (128.9±4.8% vs 118.7±5.1% p<0.05). The higher response to nitroprusside was preserved when treatment with relaxin followed endothelium removal (143.3±4.1% vs 132.8±3.3%; p<0.01). Immunofluorescence showed labelling for RFXP1 on smooth muscle and endothelial cells (see Figure).

Conclusion: Treatment with relaxin-2 for 24h potentiates HMA vasodilatation without interfering with the effects of several vasococontractors, and this effect is at least partially independent of the endothelium. We have also identified for the first time the presence of RFXP1 on the endothelium and smooth muscle cells of HMA. Besides shedding further light on relaxin’s role on human vascular physiology, this project may have implications in the understanding of HMA’s physiology, an important conduct for coronary revascularization procedures.

Expression of the RFXP1 receptor on HMA

P634 Microencapsulated insulin-like growth factor 1 improves cardiac function after experimental myocardial infarction in comparison to low-dose mesenchymal stem cells
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1Jesús Usón Minimal Invasive Surgery Centre, Endoluminal Therapy and Diagnosis, Cáceres, Spain; 2Jesús Usón Minimal Invasive Surgery Centre, Cáceres, Spain; 3Innocosfarma Pharmaceutical B.V., Groningen, Netherlands; 4Nanomi BV, Oldezaal, Netherlands

Funding Acknowledgements: European Commission FP7-HEALTH-2009-1.4-3, Grant Agreement 242208, RIC (RID1/0042/0025) and CIBER CV (IB16/110049)

Background: Mesenchymal stem cells (MSCs) have been demonstrated to ameliorate left ventricular remodeling in patients with ischemic cardiomyopathy, with some studies reporting better results after low cell dose administration. Nevertheless, regenerative cardiology is nowadays focusing on cell-less treatment strategies. Insulin-like growth factor-1 (IGF1) has been shown to possess angiogenic effects on endothelial cells. Its microencapsulation allows for sustained release over a specific time.

Purpose: The aim of the study was to evaluate and compare the effect of low-dose allogeneic MSCs and IGF1 loaded microspheres (MSPs) in a porcine myocardial infarction (MI) model.

Methods: Infarcted female pigs (90 minutes mid-LAD occlusion) received an intra-coronary (IC) injection of MSCs (3x10^6, n=7), IGF1 loaded MSPs (955g per MSP, 5x10^6 MSPs, n=8) or saline (CON, n=5) 48 hours after infarction. Safety was evaluated using clinically available tools (ECHO and TIMI flow). Cardiac function was studied by magnetic resonance (MR) before injection and at 10 weeks: Indexed end diastolic volume (EDV), indexed end systolic volume (ESVl), ejection fraction (EF) and percent of infarcted myocardium (TIMI).

Results: Injection was successful in all cases, in absence of major adverse cardiac events. Changes in ECG were seen in one pig belonging to the MSCs group. TIMI flow decreased in 2 animals from the MSCs group (TIMI 2, n=3 and TIMI 1, n=1), and none in CON. Evolution of cardiac function parameters is shown in the

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MSCs. dysfunction over time (limiting ventricular volumes) compared to CON or low-dose coronary flow on the short term after experimental MI. Nevertheless, IC admin-

significant differences were observed in any cardiac function parameter over time ± ESVi (55.39 ± 7.67% vs. 10.50 ± 3.00%), a reduction in %EDVi (37.30 ± 14.23% vs. 136.37 ± 38.11%L/m2, p = 0.003), and a limited dependence with no significant change to EDVi over time, while MSCs animals suffered a significant worsening in EDVi (91.30 ± 23.56L/m2 vs. 136.37 ± 38.11L/m2, p = 0.022) and ESVi (55.39 ± 18.44L/m2 vs. 66.55 ± 31.24L/m2, p = 0.022). No statistically significant differences were observed in any cardiac function parameter over time in the case of CON group.

Conclusion: Both the IC delivery of MSCs and IGF1 loaded MSPs could impair coronary flow on the short term after experimental MI. Nevertheless, IC admin-

concentrations of antioxidative proteins. In contrast to these findings, the Nnt-deficient RKIP-/- N and RKIP-/- J mice were subjected to transverse aortic constriction (TAC). In the myocardium, reverse-mode nicotinamide nucleotide transhydrogenase (Nnt) is the dominant source for ROS during pressure overload. Due to mutation of the Nnt gene, the C57BL/6J, but not the N-strain, is protected from oxidative stress.

Results: Myocardial fibrosis, expression of collagen Iα2 mRNA, K67 + fibroblasts and markers of oxidative stress such as 8-hydroxyguanosine positive fibroblasts were significantly increased in MK-SEW2871 group. The number of fibrocytes in the peripheral blood and bone marrow was also increased in MK-SEW2871/TAC group. The expression of the gene coding for RKIP, Patp1, was markedly higher in the N compared to the J mouse strain consistent with increased basal oxidative stress. In human left ventricular myocardium from both non-failing and failing hearts, RKIP-protein correlated negatively with the nuclear expression of Nrf2.

Conclusions: Under conditions of Nnt-dependent enhanced myocardial oxidative stress in response to pressure overload, RKIP plays a maladaptive role for fibrotic myocardial remodeling by suppressing the Nrf2-related beneficial effects.

Poster Session 1

P635
Pharmacological activation of sphingosine 1-phosphate receptor 1 (S1P1) enhances arteriolar and capillary function after myocardial infarction (MI)

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Background and purpose: Sphingosine 1-phosphate (S1P) is a lipid metabolite and a ligand of five G protein-coupled cell surface receptors S1P1 to S1P5. It has been shown that S1P1/S1P1 signaling played an essential role in vascular remodeling during development. However, it is unknown whether S1P1 regulates vascular remodeling and therefore influences cardiac function after myocardial infarction. We aimed to investigate the effect of pharmacological activation of S1P1 by SEW2871 in a mouse model of acute myocardial infarction.

Methods: We performed left anterior descending artery (LAD) ligation to induce acute myocardial infarction in mice. We treated operated mice with 5 mg/kg/day S1P1 agonist, SEW2871, significantly improved capillary function (figure) and reduced infarct size compared to sham and vehicle control groups (86.55 ± 23.50% vs. 136.37 ± 38.11%L/m2, p = 0.04). EDVi and ESVi were significantly lower in SEW2871 group vs. 60.23 ± 14.23% MI-SEW2871 group (P < 0.05). Mason's trichrome stain-

Figure. No differences were seen between groups in any MR-derived parameter before injection. At 10 weeks, however, ESVi was significantly lower in MI-SEW2871 group vs. 60.23 ± 14.23% MI-SEW2871 group (P < 0.05). S1pr1 agonist, SEW2871, significantly improved cardiac function and therefore influenced cardiac function after myocardial infarction. We aimed to investigate the effect of pharmacological activation of S1P1 by SEW2871 in a mouse model of acute myocardial infarction.

Methods: We performed left anterior descending artery (LAD) ligation to induce acute myocardial infarction in mice. We treated operated mice with 5 mg/kg/day S1P1 agonist, SEW2871, significantly improved capillary function (figure) and reduced infarct size compared to sham and vehicle control groups (86.55 ± 23.50% vs. 136.37 ± 38.11%L/m2, p = 0.04). EDVi and ESVi were significantly lower in SEW2871 group vs. 60.23 ± 14.23% MI-SEW2871 group (P < 0.05). Mason's trichrome stain-

Figure. No differences were seen between groups in any MR-derived parameter before injection. At 10 weeks, however, ESVi was significantly lower in MI-SEW2871 group vs. 60.23 ± 14.23% MI-SEW2871 group (P < 0.05). S1pr1 agonist, SEW2871, significantly improved capillary function (figure) and reduced infarct size compared to sham and vehicle control groups (86.55 ± 23.50% vs. 136.37 ± 38.11%L/m2, p = 0.04). EDVi and ESVi were significantly lower in SEW2871 group vs. 60.23 ± 14.23% MI-SEW2871 group (P < 0.05).

Conclusions: Our results demonstrate that activation of S1P1 enhanced arteri-

Evolution of cardiac function parameters

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P636
Rat kinase inhibitor protein regulates fibrosis depending on myocardial oxidative stress

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Funding Acknowledgements: DFG KA 4024/3-1; ADBJ 19981; HOMF 2016

Background: Myocardial fibrosis plays a central role during maladaptive cardiac remodeling. Quantitative Tract Locii (QTL) analyses in BXD recombinant mouse lines identified Rat Kinase Inhibitor Protein (RKIP) as marker of fibrosis.

Methods: To characterize the underlying signaling, 10-week-old C57BL/6 -RKIP-deficient (RKIP-/-) N and RKIP-/- J mice were subjected to transverse aortic constriction (TAC). In the myocardium, reverse-mode nicotinamide nucleotide transhydrogenase (Nnt) is the dominant source for ROS during pressure overload. Due to mutation of the Nnt gene, the C57BL/6J, but not the N-strain, is protected from oxidative stress.

Results: Myocardial fibrosis, expression of collagen Iα2 mRNA, K67 + fibroblasts and markers of oxidative stress such as 8-hydroxyguanosine positive fibroblasts were markedly increased in MK-SEW2871 group. The number of fibrocytes in the peripheral blood and bone marrow was also increased in MK-SEW2871/TAC group. The expression of the gene coding for RKIP, Patp1, was markedly higher in the N compared to the J mouse strain consistent with increased basal oxidative stress. In human left ventricular myocardium from both non-failing and failing hearts, RKIP-protein correlated negatively with the nuclear expression of Nrf2.

Conclusions: Under conditions of Nnt-dependent enhanced myocardial oxidative stress in response to pressure overload, RKIP plays a maladaptive role for fibrotic myocardial remodeling by suppressing the Nrf2-related beneficial effects.

P637
The impact of long-term phosphodiesterase 5 inhibition on right and left ventricular remodelling in chronic heart failure due to volume overload

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Background: Chronic inhibition of phosphodiesterase 5 (PDE5) prevents hypertrophy and dysfunction of pressure-overloaded heart, but its impact on volume-overload (VO) induced hypertrophy is unknown. It is also unclear whether right (RV) and left (LV) ventricle differ in their responses to chronic VO and antihypertrophic therapy.

Aim: To elucidate the effect of chronic VO on cardiac structure and function and to address the effect of PDE5i and ACEi in VO rat model due to aorto-caval fistula (ACF).

Methods: ACF/sham procedure was performed on 8-week-old male HanSD rats. ACF animals were randomized for PDE5i sildenafil (80 mg/kg, n=20); ACEi trandolapril (8 mg/kg) HZO, n=30 or placebo (n=30). After 20 weeks, echocardiography and pressure-volume analyses (Milar, AD-Instruments) were performed and animals sacrificed to obtain organ weights and tissue samples for qCNP assay. Separate rat cohort (n = 10 - 40/group) served for survival analysis.

Results: ACF led to marked eccentric LV and RV hypertrophy (by 70% and 150%) and reduced load-independent systolic function (end-systolic elastance, Ees, by 85% and 70%, figure). Although RV stroke work increased relatively more than...
Cancer cachexia (CC) is a complex syndrome, characterized by increased proteolysis, lipolysis and anorexia. Moreover, cardiac wasting associated with CC leads to poor prognosis, while both bisoprolol, a beta-1 selective beta blocker, and formoterol, a beta-2 agonist, have recently shown cardioprotective effects in this condition. Purpose: The aim of this study was to investigate the effect of espinolol, a non-selective beta blocker with beta-2 intrinsic sympathetic activity, on cardiac function and survival in a rat model of CC.

Methods: After intraperitoneal injection of 108 Yoshida AH-130 hepatoma tumor cells, Juvenile Wister Han rats were randomized to receive placebo, espinolol 0.3 mg/kg/day (LD) or 3 mg/kg/day (HD), body weight and body composition were assessed at baseline and day 14, and cardiac function was evaluated by echocardiography on day 11. Results: Espinolol improved survival (hazard ratio [HR] 0.29, 95% confidence interval [CI] 0.16-0.51, p < 0.001 for HD; HR 0.51, 95% CI 0.26-1.00, p = 0.051 for LD, vs. placebo) and preserved LV mass (170 ± 13.8 g, p < 0.001 for HD; 145.7 ± 10.4 g, p = 0.01 for LD, vs. 118.5 ± 16.9 g for placebo) and fat mass (12.0 ± 2.7 g, p = 0.02 for HD; 8.3 ± 1.7 g, p = 0.57 for LD, vs. 6.4 ± 3.3 g for placebo). In addition, espinolol increased heart weight (181 ± 49 g, p = 0.01 for HD : 145.7 ± 10.4 g, and -0.14 for LD vs. 118.5 ± 16.9 g for placebo), improved cardiac systolic function assessed by left ventricular ejection fraction (69 ± 3 %, p = 0.001 for HD; 59 ± 4 %, p = 0.13 for LD vs. 52 ± 2 % for placebo) and raised cardiac output (71 ± 8 mL/min, p = 0.001 for HD; 53 ± 10 mL/min, p = 0.29 for LD, vs. 42 ± 3 mL/min for placebo).

Conclusions: Espinolol dose-dependently prevented cardiac wasting as well as loss of skeletal muscle and adipose tissue, and improved survival in a rat model of CC. Espinolol can be a promising treatment option for cardio dysfunction associated with CC.

P639
Espinolol improved cardiac function and survival in a rat cancer cachexia model
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Background and aims: Cancer cachexia (CC) is a complex syndrome, characterized by increased proteolysis, lipolysis and anorexia. Moreover, cardiac wasting associated with CC leads to poor prognosis, while both bisoprolol, a beta-1 selective beta blocker, and formoterol, a beta-2 agonist, have recently shown cardioprotective effects in this condition. Purpose: The aim of this study was to investigate the effect of espinolol, a non-selective beta blocker with beta-2 intrinsic sympathetic activity, on cardiac function and survival in a rat model of CC.

Methods: After intraperitoneal injection of 108 Yoshida AH-130 hepatoma tumor cells, Juvenile Wister Han rats were randomized to receive placebo, espinolol 0.3 mg/kg/day (LD) or 3 mg/kg/day (HD), body weight and body composition were assessed at baseline and day 14, and cardiac function was evaluated by echocardiography on day 11. Results: Espinolol improved survival (hazard ratio [HR] 0.29, 95% confidence interval [CI] 0.16-0.51, p < 0.001 for HD; HR 0.51, 95% CI 0.26-1.00, p = 0.051 for LD, vs. placebo) and preserved LV mass (170 ± 13.8 g, p < 0.001 for HD; 145.7 ± 10.4 g, p = 0.01 for LD, vs. 118.5 ± 16.9 g for placebo) and fat mass (12.0 ± 2.7 g, p = 0.02 for HD; 8.3 ± 1.7 g, p = 0.57 for LD, vs. 6.4 ± 3.3 g for placebo). In addition, espinolol increased heart weight (181 ± 49 g, p = 0.01 for HD ; 145.7 ± 10.4 g, and -0.14 for LD vs. 118.5 ± 16.9 g for placebo), improved cardiac systolic function assessed by left ventricular ejection fraction (69 ± 3 %, p = 0.001 for HD; 59 ± 4 %, p = 0.13 for LD vs. 52 ± 2 % for placebo) and raised cardiac output (71 ± 8 mL/min, p = 0.001 for HD; 53 ± 10 mL/min, p = 0.29 for LD, vs. 42 ± 3 mL/min for placebo).

Conclusions: Espinolol dose-dependently prevented cardiac wasting as well as loss of skeletal muscle and adipose tissue, and improved survival in a rat model of CC. Espinolol can be a promising treatment option for cardio dysfunction associated with CC.

P640
Cardioprotective effect of LCZ696 versus valsartan on left ventricular remodeling in experimental model of chronic heart failure
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Introduction: The renin-angiotensin-aldosterone system (RAAS) plays a key role in the pathogenesis of chronic heart failure (CHF) and its inhibition improves cardiac function and survival. Consequences of RAAS activation are antagonized by endogenous natriuretic peptides. Sacubitril/valsartan (LCZ696) is a new drug that combines angiotensin receptor blocker valsartan (VAL) with sacubitril that inhibits breakdown of natriuretic peptides by neprilysin. The cardiac effects of LCZ696 on volume overload-induced CHF are unknown.

Purpose: To evaluate the effects of LCZ696 or VAL on left ventricular function and geometry in an experimental model of CHF indicated by volume overload from aorto-caval fistula (ACF) in rats.

Methods: CHF was induced by ACF in 26 male Sprague-Dawley (SD) rats at 8 weeks of age. Four weeks after ACF, administration of LCZ696 was started in 8 rats [ACF-LCZ group] in a standard dosage at 68 mg/kg/day and valsartan in 8 rats [ACF-VAL; at dose 31 mg/kg/day] for next 16 weeks. Other 10 ACF rats were administered with vehicle. The remaining 8 rats without ACF comprised a control group. At the age of the study protocol (20 weeks), the animals were killed in LV volume and anastomized, and echocardiography was performed using a 7.5 MHz probe (Vivid
7, GE). Left ventricular (LV) internal dimensions (LVdID), fractional shortening (FS), stroke volume (SV) and Ums (Um) were measured.

Results: In comparison to controls, untreated ACF group displayed marked LV dilation, (LVdID 6.2 ± 0.1 vs. 11.9 ± 0.5 mm, p < 0.01). Both SD groups treated with LCZ or VAL exhibited significantly lower LVdID (9.5 ± 0.5 mm and 10.1 ± 0.3 mm; respectively, p < 0.05). We also observed significantly reduced LV function (FS: 35.2 ± 1.1 vs. 59.9 ± 1.2 %, p < 0.01) and increased SV (1274 ± 164 vs. 225 ± 15 μl/beat, p < 0.01) in untreated ACF group compared to control. In both treated ACF groups, we observed an improvement in LV systolic function, where FS increased in ACF-LCZ (44.3 ± 1.5 %, p < 0.05) or in ACF-VAL (42.5 ± 2.1 %, p < 0.05) and SV significantly decreased in ACF-LCZ (757 ± 122 μl/beat, p < 0.05) and ACF-VAL (834 ± 68 μl/beat, p < 0.05). The Ums was significantly reduced in both ACF-LCZ (1844 ± 129 mg, p < 0.05) and ACF-VAL (1890 ± 58 mg, p < 0.05) compared to untreated ACF (2196 ± 52 mg). We did not observe any adverse effect during the treatments with VAL or LCZ at 20 weeks confirming the safety of these drugs in this model.

Conclusion: In this animal model of heart failure, both treated normotensive ACF groups (LCZ269 and VAL) showed significant reverse LV remodeling. However, we did not observe any additional effects of treatment on cardiac function with LCZ269 compared to VAL in short term follow-up. Prolonged treatment period is advised to verify cardioprotective benefits of LCZ269 vs. VAL.

Introduction: Diabetic cardiomyopathy is a consequence of diabetes mellitus (DM). Comparison of animal models of T1DM and T2DM may contribute to a deeper pathophysiological understanding of diabetic heart pathology.

Purpose: We aimed at comparatively investigate diabetic cardiomyopathy by left ventricular (LV) pressure-volume (PV) analysis and by the non-invasive speckle-tracking echocardiography (STE) in rat models of type-1 (T1DM) and type-2 DM (T2DM).

Methods: Rat models of T1DM (induced by 60mg/kg streptozotocin, n=7) and T2DM (32-week-old Zucker Diabetic Fatty rats, n=6) and corresponding control animals (n=5 and n=6, respectively) were compared. Echocardiography and LV PV analysis were performed. LV short-axis recordings were used for STE analysis. Global circumferential strain (GCS), peak strain rate values in systole (SRs), isotropic relaxation (SRiR) and early diastolic (SDi) were measured. LV contractility, active relaxation and stiffness were measured by PV analysis.

Results: In T1DM, contractility and active relaxation were deteriorated to a greater extent compared to T2DM. Correspondingly, STE described more severe systolic dysfunction in T1DM. Among diastolic STE parameters, SRIR was more decreased in T1DM, however, SVE referring to diastolic stiffness was more reduced in T1DM. In T1DM, SRI correlated to contractility, SVE or active relaxation, while in T2DM SVE was closely related to cardiac stiffness.

Conclusions: Diabetic cardiomyopathy is characterized by overt systolic dysfunction and impaired active relaxation in T1DM, while with increased diastolic stiffness in T2DM. STE corresponds to PV analysis by unveiling key differences between cardiac dysfunction caused by T1DM and T2DM.
Introduction: Current medications used to treat heart failure patients can reverse left ventricular hypertrophy to some extent but are still ineffective against the escalating epidemic of heart failure. New therapeutic strategies are needed to prevent heart failure development or induce heart failure regression. Unlike mammals, zebrafish possess the incredible ability to regenerate cardiac tissue. Thus, this model has been widely used to study cardiac regeneration. Yet, the usefulness of zebrafish to study heart failure progression and regression has not been reported. The aim of this study was to systematically characterize heart failure progression and regression in zebrafish to enable the discovery of new therapeutic targets for patients.

Methods: Eight to ten month-old wild-type AB male zebrafish were treated with phenylhydrazine hydrochloride (PHZ) to induce heart failure development (n = 100-130). Control fish were maintained under normal conditions (n = 20). After 5 weeks of treatment, PHZ was withdrawn and fish were followed for 2 weeks. Hearts were imaged in living fish by ultrasound to assess ventricle size and function. Functional capacity was evaluated in a dedicated swim tunnel. After sacrifice, hearts were collected either to follow tissue morphology and cellular changes or to generate transcriptomics profiles by microarray analysis.

Results: Five weeks of PHZ-treatment led to a significant increase in ventricle size (+33%) and ventricular wall thickness (+229%), and a decreased in heart rate (-11%), fractional shortening (-24%) and swim capacity (-29%) (all p < 0.05).

Expression of atrial and brain natriuretic peptides was upregulated (p < 0.05). Further, greater numbers of apoptotic and proliferative cells were found in the failing heart, and 2, 5 and 9 days post PHZ treatment (+p). N = 3 per time-point. PC: principal component.

Methods: The two tested scaffolds are made of decellularized human pericardium and decellularized porcine myocardium. Forty-eight pigs were distributed into 5 groups as follows: Pericardium + MI (Per/MI) (n = 17), Myocardium + MI (Myo/MI) (n = 8), Pericardium (Per-SHAM) (n = 4), Myocardium (Myo-SHAM) (n = 2), and Control-MI (n = 17). Left ventricular ejection fraction (LVEF), cardiac output (CO), stroke volume (SV), left ventricular end diastolic volume (LVEDV) and left ventricular end systolic volume (LVESV) were evaluated non-invasively using magnetic resonance imaging (MRI). Additionally, infarct size, fibrosis, and scaffold vascularization were explored by histopathology.

Results: Upon sacrifice one month after the intervention, MRI detected significant differences between 30 days of follow up and baseline among Per-MI, Myo-MI and Control-MI in LVEF (4.91 ± 1.86% vs. -7.98 ± 4.29% vs. 2.93 ± 4.45% (P < 0.01), and ESV (0.56 ± 1.21 mL vs. 8.89 ± 4.95 mL vs. 7.79 ± 2.76 mL; P < 0.046). At 30 days, significant differences between groups in LVEF (60.32 ± 1.76%) vs. 52.85 ± 2.22% vs. 50.55 ± 2.27% (P < 0.05), CO (2.82 ± 0.12 mL vs. 2.88 ± 0.16 mL vs. 3.33 ± 0.21 mL; P < 0.010), EDV (54.93 ± 2.84 mL vs. 66.97 ± 5.11 mL vs. 65.59 ± 2.9 mL; P < 0.038), and ESV (21.52 ± 1.28 mL vs. 32.25 ± 3.59 mL vs. 32.26 ± 1.18 mL; P < 0.01) were found. Left ventricular infarct size was similar between Per-MI, Myo-MI, and Control-MI animals (P = 0.293) (Figure 1). Correct adhesion of the implanted graft with subjacent myocardium after sacrifice was observed in all animals, and, upon sacrifice, scaffolds from Per-MI, Myo-MI, Per-SHAM, and Myo-SHAM animals showed neovessel incorporation. After fibrosis analysis in infarct zone, significant differences between Per-MI, Myo-MI, and Control-MI groups in collagen I (Col I) (P = 0.001), collagen III (Col III) (P = 0.001), collagen volume fraction (CVF) (P < 0.039), collagen I/colagen III ratio (Col I/Col III) (P = 0.050) were detected. Scaffold collagen deposition was also significantly different between Per-MI, Myo-MI, Per-SHAM, and Myo-SHAM in Col I (P = 0.019), Col III (P = 0.028), CVF (P < 0.001), and Col I/Col III (P = 0.024).

Conclusions: Human pericardial decellularized scaffold improved cardiac function in a pre-clinical model of MI. These positive results were confirmed by less fibrosis in infarct area, and also in the implanted scaffold. Moreover, the natural decellularized scaffolds, no matter origin, were well-integrated and re-vascularized after 30 days of follow-up.
Poster Session 1

P647
Insulin like growth factor 1-improved cardiac function after experimental infarction in swine is not related to enhanced angiogenesis

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Background: Insulin like growth factor 1 (IGF1) is known as one of the most promising growth factors for promoting cardiorepair, since it decreases ischemia-reperfusion damage and preconditioning effects. Intra coronary infusion of microencapsulated IGF1 allows for site specifically and sustained release of the therapeutic agent over a precise time, which could improve results with a single injection.

Purpose: We undertook this study to evaluate whether early administration of microencapsulated IGF1 could ameliorate or prevent adverse cardiac remodeling after experimental myocardial infarction (MI).

Methods: Female swine surviving a 90 minutes mid-LAD balloon occlusion received an IC infusion of saline (Group 1; G1, n=7) or IGF1 loaded micro-spheres (MSMPs) Group2: G2 3x10^6, n=4; Group 3: G3 5x10^6, n=4; Group 4: G4 5x10^6 + nitroglycerin, n=4) two days post-MI. IGF1 dose was 95ug per 10^6 MSMPs. Safety was determined by ECG, TIMI flow and troponin I (Tril) values. Cardiac function was evaluated by magnetic resonance (MR) before and 10 weeks post-injection (Infarct size BS), ejection fraction (EF), indexed end diastolic (EDVI) and systolic volumes (ESVI), treatment effect on EF, (EF, EDVI, ESVI, EDVI, ESVI, IS), (IS), At 10 weeks, TTC staining was performed and tissue samples were obtained from healthy myocardium, border and infarct zones for vascular density analysis with Isocell B4 immunostaining.

Results: ECG and Tril levels did not reveal significant changes, in any case. While TIMI flow did not alter in G1, it decreased in one pig from G2 (TIMI 2), one animal from G3 and 3 swine belonging to G4 (TIMI 1 or 2). EF improved over time in G3 (40.25 ± 8.12% vs. 54.13 ± 3.81%; p < 0.02) and G4 (25.43 ± 4.86% vs. 47.82 ± 10.26%; p < 0.021). Accordingly, EF was significantly higher in G3 (13.90 ± 8.88%) and G4 (22.38 ± 5.48%) compared to G1 (14.8 ± 3.73%) and G2 (21.51 ± 11.244%) (p < 0.018). At 10 weeks the increase in cardiac volumes was limited in G3 and G4, significantly so in the case of EDVI (G1: 121.70 ± 26.09mL/m2; G2: 109.99 ± 14.36mL/m2; G3: 85.86 ± 14.98 mL/m2; G4: 84.88 ± 15.7mL/m2; p = 0.042). G3 and G4 exhibited an improvement in ESVI (G3: 43.21 ± 9.42mL/m2 vs. 40.26 ± 4.16 mL/m2; G4: 61.16 ± 12.50mL/m2 vs. 47.33 ± 16.77mL/m2) over time, resulting in a trend towards lower systolic volumes compared to G1 (66.09 ± 15.74mL/m2 vs. 72.72 ± 27.18mL/m2) and G2 (64.21 ± 15.99mL/m2 vs. 64.99 ± 5.42mL/m2). TTC staining evidenced that the scar tissue was mixed with viable areas in G3 and G4, but less so in G1 and G2. Quantitative analysis of vascular density revealed no differences between groups.

Conclusion: In this experimental setting, a dose of 5x10^6 IGF1-loaded MSMPs was able to improve cardiac function and limit left ventricular remodeling despite an absence of angiogenesis. The IC infusion of IGF1-loaded MSMPs may impair coronary flow and caution must be exerted when considering clinical translation.

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Role of QSOX1 in cardiac adaptation to pressure overload

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QSOX1 has been identified as a diagnostic marker of heart failure (HFr), better than BNP in its gray zone in humans. Murine models have shown that the expression of QSOX1 is specifically induced in the heart during the ICA. Moreover, acute cardiac stress by injection of isoproterenol (ISO) combined with a “knock down” of QSOX1 abolishes the dysfunction of the treated animals, it was possible to demonstrate induction of QSOX1 at 12 days after rat aorta stenosis, correlated with ICA signs. The objective was to study the consequences of an invalidation of this gene in a model of pressure overload induced by aortic stenosis (TAC) in a murine model in order to better define the role of QSOX1 in cardiac function. The animal model uses 9 week-old male mice (C57BL/6JRj strain) strain W and QSOX1 -/- mice, having constricted thoracic aorta (TAC) for 10 days (n = 10 / group) and a control group Sham. A functional and anatomical exploration was performed by transthoracic echocardiography and quantitative phenotypic analysis by RT-qPCR and qualitative by Immunohistology.

In the basal state, QSOX1 -/- mice show signs of cardiomyopathy with alteration of the shortening fraction with some signs of endoplasmic reticulum stress and perivascular inflammation. After a TAC, the cardiac phenotype is substantially similar between the WT and QSOX1 -/- mice. On the other hand, the signs of coronary remodeling are more marked in the QSOX1 -/- mice. These preliminary results show that the expression of QSOX1 is important for a normal function of the heart and moreover it protects the myocardium and more particularly the coronaries against a stress linked to a sudden overload of pressure.

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NLRP3 inflammasome mediated mitochondrial damage in pressure overload-induced heart failure

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attracting more attention recently. We previously established an obesity-induced cardiomyopathy minipig model, and found greater lipid deposition around the heart of obese pigs. To elucidate the link between adipose tissue and cardiac injury induced by obesity, we studied the characteristics of adipose tissues (VAT, EAT and PAT) in our obesity-induced cardiomyopathy minipig model.

Materials and methods: Four-month-old Lee-Sung minipigs were randomly assigned to two groups: control diet (C) and Western diet (W), for a 5-month experimental period. Minipigs were sacrificed and the adipose tissues were isolated for analysis in the end of experiment.

Results: Compared with G group, W pigs exhibited dyslipidemia and cardiac fibrosis. W pigs deposited more VAT and PAT than C group, while W and C pigs deposited similar amount of EAT. The frequency of adipocyte size was equally distributed in PAT and EAT, whereas larger adipocyte size was found in VAT (area >7000 um2). C and W pigs exhibited similar fatty acid composition in EAT and PAT saturated fatty acids (SFA) > polyunsaturated fatty acids (PUFA) > monounsaturated fatty acids (MUFA). In the VAT of W pigs, higher proportion of MUFA and lower SFA were observed compared with those of the C pigs. Among tissue sites of W pigs, higher PUFA and lower ratio of SFA to PUFA were found in EAT and PAT than those in VAT, suggested that unsaturations in EAT and PAT form the mechanical flexibility to protect the coronary artery against the torsion induced by cardiac contraction. Triboharctic acid reactive substances (TBARS) was used as the marker of oxidative stress. Compared with C pigs, W pigs exhibited higher levels of TBARS in the blood and PAT, while no differences were found in the EAT. In the W pigs, the TBARS levels were PAT > VAT > EAT, demonstrating that systemic and local oxidative stress were induced in W pigs, and the local effect from PAT could not be ignored. Interleukin 6 (IL6) was applied as the inflammatory marker. Greater IL6 levels were found in the plasma, PAT and VAT of W pigs than those of C pigs. In the W pigs, PAT secreted more IL6 than VAT did. These results indicated a potential contribution of PAT to the cardiac inflammation.

Conclusion: PAT played a critical role in the obesity-induced cardiomyopathy via the induction of local oxidative stress and inflammation.
Introduction: The NLRP3 inflammasome, responsible for IL-1β and IL-18 matura-
tion, is involved in the pathophysiology of various cardiovascular diseases. However, the role of the inflammasome in pressure overloaded heart failure has never been studied.

Methods: Wild type and NLRP3 deficient C57BL/6J mice underwent transverse aor-
tic constriction (TAC) to induce pressure overload. Cardiac function and geometry was assessed using 3D echocardiography and left ventricular global longitudinal strain (LV GLS) was determined by speckle tracking. Tissue integrity and hypertrophy was determined using immunofluorescence. On left ventricular myocardial tissue, RNA sequencing for whole genome profiling and electron microscopy (EM) for abnormal mitochondrial morphology was performed. Quantification of abnor-
mal mitochondrial morphology was based on the percentage of mitochondria with reduced or abnormal lamellar structure.

Results: NLRP3 deficient mice showed less adverse remodeling after pressure over-
load: end systolic volume was lower (38±4±11mm3 vs 51.8±12mm³, p<0.001) and ejection fraction higher (42.1±11% vs 30.9±10%, p<0.001) compared to wild type mice 6 weeks after TAC. Already 3 weeks after TAC, NLRP3 defi-
cient mice showed improved systolic function by LV GLS compared to wild type (-15.9±4% vs -12.3±2% respectively, p<0.005). Hypertrophy was less pro-
nounced in the knock-out mice (average cardiomcyocyte size: 386±47um² vs 419±36um², p=0.056). Furthermore, RNA sequencing revealed increased expres-
sion of the mitochondrial respiratory chain in NLRP3 deficient compared to wild type mice 6 weeks after TAC. Preliminary data of mitochondrial numbers assessed by EM 10 weeks after TAC did not show any differences, however mitochondrial morphol-
ogy did seem to be less affected in the NLRP3 knock-out compared to wild type (93.2±2% vs 32±15% abnormal mitochondria, n=2, p=N5).

Conclusion: These data indicate a role for the NLRP3 inflammasome in adverse remodel-
ling and the pathophysiology of pressure overload-induced heart failure. A possible mechanism is inflammasome mediated mitochondrial damage. Further studies will have to confirm the influence of inflammasome activation on mitochon-
drial function in heart failure.

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Exosomes are involved in the transport of miR-21-5p and miR-222-3p in left ventricular remodeling post-myocardial infarction.

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Background: After myocardial infarction (MI), 30% of patients develop left ventric-
ular remodeling (LVR) that is difficult to predict in clinical practice and may lead to heart failure (HF) and death. Previous studies have shown that miR-21-5p and miR-222-3p are up-regulated in plasma (6.2, p=0.003; x103, p<0.0001 respec-
tively) and LV (x2.3 and x2.1, p=0.002 respectively) of HF rats at 2 months post-MI (induced by left coronary ligation), compared to sham-rats.

Purpose: Our main objectives were i) to identify cardiac cells involved in modula-
tion of miR-21-5p and miR-222-3p and ii) to determine the extracellular transporters (exosomes) of these miRNAs.

Methods: We used an in vitro model of cardiac cells: H9c2 cardiomyoblasts in which hypothyrosis was induced by isoproterenol, and neonatal rat fibroblasts. Exosomes from culture medium of both cell types were isolated by filtration-ultracentrifugation.

Results: The levels of miR-21-5p and miR-222-3p were not modulated in hypertro-
phied H9c2 compared to control H9c2, suggesting that the cardiomyocytes are not the sources of these miRNAs. Morphological characterization of the isolated vesicles by nanoparticle tracking analysis revealed an exosomal diameter of 115±3.8 nm (n=3), slightly overesti-
mated due to their aggregation observed by electron microscopy. Biochemical char-
acterization of isolated vesicles showed that they express the exosomal biogen-
esis marker CD63 but not CD9 or TSG101 suggesting a specific exosomal biochemi-
cal profile of cardiac cells. The isolated exosomes also express the YB-1 protein known to be a transporter of miRNAs. To validate the potential of cardiac exosomes as extracellular transporters of miRNAs, we quantified the levels of miR-21-5p and miR-222-3p in the exosomes isolated from H9c2 cardiomyoblasts and neonatal rat fibroblasts. The levels of miR-21-5p and miR-222-3p were 25% more expressed in exosomes isolated from fibroblasts compared to H9c2 cells, suggesting that fibrob-
lasts may be the main source of miR-21-5p and miR-222-3p in the circulation. In addition, miR-21-5p appeared to be 100 fold more expressed than miR-222-3p in exosomes derived from fibroblasts. Exosome membranes isolated from fibroblasts were labeled with a fluorescent dye: PKH67, and their integration in H9c2 cells was followed.

Conclusion: These results confirm the role of exosomes in the transport of miR-21-5p and miR-222-3p into the circulation. This preliminary data suggests their role in fibroblast-cardiomyocyte paracrine communication and underlines the poten-
tial of cardiac exosomal content as new biomarkers of LVR post-MI.
Introduction: Self-care, depression and anxiety are important patient reported outcomes (PROs) for heart failure (HF) patients and these PROs might be affected by disease management and/or telemonitoring. Previously no influence of the intervention on the primary outcomes (mortality, HF-readmission and health-related quality of life) in the IN TOUCH study was reported. However, patient-reported self-care, anxiety and depression were not analysed yet.

Aim: To assess whether telemonitoring (TM) and an Information Communication Technology guided disease management system (ICT-guided-DMS) had effect on self-care behaviour, anxiety and depression and to investigate factors contributing to changes in self-care.

Methods: In the IN TOUCH study 177 patients were randomized to ICT-guided-DMS or to TM + ICT-guided-DMS with a follow-up of nine months. Current analysis included 118 participants who filled the 9-item European Self-care Questionnaire (EHFScBS9) and Hospital Anxiety and Depression scale (HADS) (mean age 69 ± 11.5 years; 70% male; 81% in NYHA class III–IV; mean left ventricular ejection fraction (LVEF) 27.2 ± 9.9%). Chi-square, Student’s t test, Wilcoxon and Mann–Whitney tests were used. The association of study co-variates including age, quality of life evaluated by Minnesota Living with HF Questionnaire (MLHQF), NYHA functional class, NT-proBNP level, LVEF, HADS scores with the change in self-care was assessed using multivariable stepwise logistic regression analysis.

Results: The baseline level of self-care was significantly lower in the ICT-guided-DMS group (n = 60) compared to TM + ICT-guided-DMS group (n = 58, p = 0.023) as assessed by the total score of EHFScBS9. B. In the course of intervention self-care behaviour significantly improved in the ICT-guided-DMS group (p < 0.01), but not in TM + ICT-guided-DMS group. ICT-guided-DMS significantly improved the consulting behaviour subscore (p < 0.05). During the trial the prevalence of depression and anxiety decreased from 33.8% to 26.3% and from 25.4% to 22.9% respectively. Level of anxiety significantly decreased in the whole study group (p < 0.05), while statistical significance in the separate intervention groups. Self-care behaviour worsened in 46 participants (19 in ICT-guided-DMS and 27 in TM + ICT-guided-DMS group (p = 0.210). The following baseline factors were significantly associated with decreasing self-care behaviour from baseline to the end of study: physical subscale of MLHQF (OR 1.76, 95% CI 1.143 – 2.712, per 10 points, p = 0.05), LVEF (OR 0.75, 95% CI 0.587 – 0.959, per 5%, p < 0.05), NYHA class (OR 0.251, 95% CI 0.089 – 0.711, III versus II class, p < 0.05).

Conclusions: ICT guided disease management may improve patients’ self-care, specifically in the subscale consulting behaviour, and reduce anxiety, both with and without telemonitoring. Worse physical aspect of quality of life, lower ejection fraction and lower NYHA class were factors associated with poorer self-care.
Frailty is a common geriatric syndrome that embodies an elevated risk of catastrophic declines in health and function among older patients. Frailty’s occurrence may vary according to a number of factors and is more often in heart failure populations. AIM: to examine gender-related differences in the prevalence of frailty syndrome among patients with advanced heart failure which are treated by cardiac resynchronization (CRT).

Methods: The study included 106 consecutive patients over 60 years (average age 74.9 ± 6.3; 17% women) who underwent cardiac resynchronization therapy devices. All patients had EF < 35%, left bundle branch block and NYHA functional class ≥ 2. In all patients frailty was evaluated using the Tilburg Frailty Indicator. Analysis were performed in three domains: physical domain, psychological domain and social domain. Values ≥ 5 were recognized as frailty syndrome.

Results: In 75% of men and 87% of women, frailty syndrome was diagnosed (p = 0.7719). There were no statistically significant differences in the prevalence of frailty syndrome among men and women – exact results are presented below. Analysis of the influence of the ejection fraction of the value of TFI showed significant correlation (the higher value of frailty, the lower ejection fraction) for the entire population (r = -0.3083, p = 0.0013) and for the subgroup of men (r = -0.2794, p = 0.0084). There was no statistically significant correlation for women (r = -0.0468, p = 0.0093).

Conclusion: Patients with heart failure and implantable cardiac resynchronization are particularly vulnerable to the frailty syndrome presence. There are no gender differences in the prevalence of frailty syndrome. Higher intensification of frailty syndrome is related to reduced ejection fraction.
**Predictors of in-hospital mortality among hospitalized adult heart failure patients in the Philippines**

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**Introduction:** The distribution in subjects with CV events, but have a low level of evidence.

**Methods:** We performed a meta-analysis of prospective studies reporting on blood group and CV events. We searched for terms “ABO blood group” and “myocardial infarction, coronary artery disease, ischemic heart disease, heart failure, stroke, cardiovascular events, cardiovascular mortality and all-cause mortality,” and initially retrieved 531 articles. After exclusion of studies with diseased subjects and studies with inappropriate CV endpoints, 9 articles describing 11 prospective cohorts, that reported on CV morbidity and mortality in both O and non-O blood groups, remained.

**Results:** The total number of subjects included in all studies was 1,362,569, and they experienced 23,154 CV events. The odds ratio’s (OR, with 95% Confidence Intervals, CI) for subjects having non-O blood groups compared to O blood group for fatal coronary events, all coronary events and combined CV events were 1.00 (CI 0.85-1.18; p-value: 0.98), 1.09 (CI 1.06-1.13; p-value: <0.00001) and 1.09 (CI 1.06-1.11; p-value: 0.006), respectively. Several sensitivity analyses did not materially change the results.

**Conclusion:** Our meta-analysis shows that subjects carrying non-O blood group have an increased risk of (nonfatal) CV events, especially myocardial infarction. Underlying mechanisms may vary, although this increased risk has been attributed to a higher concentration of von Willebrand factor and dyslipidemia in subjects with non-O blood group. Further studies should address if the excess CV risk of non O blood group is amenable to treatment.

**Coronary events**

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**Real-world evidence on heart failure: findings from 25 thousand patients in a portuguese primary care database**

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**Background:** Heart failure (HF) is a major health problem in developed countries, accounting for a significant social and economic burden. Published estimates of costs associated with HF patients in the primary care setting are scarce.

**Purpose:** To determine the clinical and demographic characteristics of adult patients with a HF diagnosis in a Portuguese primary care comprehensive administrative database and to estimate the associated annual costs
was estimated to be about €550. The average annual cost per patient are either not diagnosed or not registered. HF patients are old, mostly population in a primary care setting. Surprisingly 70% of the expected number of which 54%, 40% and 6% was associated to medications, medical visits and hol abuse), and resource use in 2014 related to medical tests and cardiovascular diagnostic procedures, visits and cardiovascular or anticoagulant medication. Unit costs estimates were based on national sources.

**Methods:** Population-based study with real data covering a population of 3.6 million patients attending primary care services in a large health region in Portugal. All adult users coded for HF with at least one visit in 2014 were selected. We analyzed patients' characteristics, comorbidities (anemia, diabetes, hypertension, cerebrovascular disease, atrial fibrillation, ischemic heart disease, cardiomyopathies, valve disease, chronic obstructive pulmonary disease, pulmonary embolism, alcohol abuse), and resource use in 2014 related to medical tests and cardiovascular diagnostic procedures, visits and cardiovascular or anticoagulant medication. Unit costs estimates were based on national sources.

**Results:** We identified 25,337 patients, with an estimated HF prevalence of 1.4%. This is approximately 30% of number expected according to a previously conducted national community-based epidemiological survey. The difference may be explained by both underdiagnosis and underregistration. Patients with HF are mostly women (58%) and on average 77 ± 11 years old. The large majority of patients (93%) had at least one of the selected comorbidities present, 70% had 2 or more and 38% had 3 or more. About two thirds of patients (85%) had at least one medical test or diagnostic procedure done during 2014. Blood tests, echocardiogram, electrocardiogram and chest x-ray were performed in 61%, 16%, 14% and 11% of patients, respectively. The majority of patients (96%) had at least four office visits during one year. Angiotensin-converting enzyme inhibitor or angiotensin receptor blockers, beta-blockers, and aldosterone blockers were prescribed for 80%, 48% and 20% of patients, respectively. Only 12% of patients were prescribed all three drug classes. The average annual cost per patient was estimated at €532 ± 348, of which 54%, 40% and 6% was associated to medications, medical visits and medical tests or diagnostic procedures, respectively.

**Conclusions:** This study provides a characterization of patients with HF in a large population in a primary care setting. Surprisingly 70% of the number of patients are either not diagnosed or not registered. HF patients are old, mostly women and characterized by multimorbidity. The average annual cost per patient was estimated to be about €550.

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**999 Age- and gender-specific risks of all-cause mortality in patients with newly diagnosed heart failure: a population-based case-cohort study in Taiwan**

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**Background:** The age- and gender-specific risk of all-cause mortality for newly diagnosed heart failure (HF) patients (pts) comparing with general population is lacking. In Taiwan, the national health insurance (NHI) provides a population-based data with longitudinal follow-up for assessing the issue.

**Purpose:** We evaluated the relative risk (RR) of all-cause mortality between newly diagnosed HF pts and non-HF subjects.

**Methods:** The age- and gender-matched case-cohort study estimated the RR of all-cause mortality in HF pts by using all insured data between 2002 and 2013. By excluding prevalent HF pts in 2002, incident and new HF cases should have 3 or more. About two thirds of patients (85%) had at least one medical test or diagnostic procedure done during 2014. Blood tests, echocardiogram, electrocardiogram and chest x-ray were performed in 61%, 16%, 14% and 11% of patients, respectively. The majority of patients (96%) had at least four office visits during one year. Angiotensin-converting enzyme inhibitor or angiotensin receptor blockers, beta-blockers, and aldosterone blockers were prescribed for 80%, 48% and 20% of patients, respectively. Only 12% of patients were prescribed all three drug classes. The average annual cost per patient was estimated at €532 ± 348, of which 54%, 40% and 6% was associated to medications, medical visits and medical tests or diagnostic procedures, respectively.

**Conclusions:** This study provides a characterization of patients with HF in a large population in a primary care setting. Surprisingly 70% of the number of patients are either not diagnosed or not registered. HF patients are old, mostly women and characterized by multimorbidity. The average annual cost per patient was estimated to be about €550.

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**700 The demographic change in Germany: an analysis by the two leading causes of hospitalisation**

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**Background:** The demographic change, i.e., an increase in elderly people in the general population with an increase in comorbidities, is also reflected within the two leading causes for hospitalisation in Germany, which are “Delivery/Birth” (Z38) and “Heart Failure” (I50). We analyzed data available from the German Federal Statistical Office for both diagnoses from 2002 to 2015.

**Methods:** We used publically available databases for ICD-10-GM diagnoses in Germany and compared the two most common reasons for hospitalization.

**Results:** Data were available from 2002 to 2015 for heart failure and from 2004 to 2015 for birth. Hospitalization for birth increased by 1.55 %/year from 444,306 (2004) to 526,437 (2011) [p < 0.01]. Hospitalization for heart failure increased by 4.96 %/year from 260,803 (2004) to 444,632 (2015) [p < 0.01] effecting heart failure to become the most common cause for disease-related hospitalization in Germany. Should these trends continue, there will be more hospitalizations for heart failure than for birth from 2020 onwards.

**Conclusion:** The demographic change in Germany will lead to a greater need for comprehensive heart failure care, while the number of hospitalizations for birth only mildly increased at all. Some geographic areas might consider converting labour rooms into comprehensive heart failure clinics.
Background: Heart failure (HF) is an increasing cause of morbidity and mortality. Data of general public views about HF alone and in comparison with other chronic conditions are insufficient. The lack of basic comprehension of HF and self-care was confirmed in the vast majority in HF patients, which manifests itself in suboptimal outcomes in such patients.

Objectives: The aim of this study was to evaluate the changes in knowledge about HF of general population in Lithuania from 2013 to 2015.

Methods: A cross-sectional survey study was performed, by using translated questionnaire designed by the German Competence Network Heart Failure. Participants were asked to complete a questionnaire during European Heart Failure Awareness (EHFA) Day activities. Anonymous information was collected and analyzed keeping confidentiality of participant (no personal sensitive data was obtained). Scans of completed questionnaires were manually dedicated scanned on goal and automatively transferred into a database. Data collected during 2013 and 2015 EHFA Day activities in Lithuania were analyzed. The following questions were selected for analysis: patient’s gender, age and work experience in the medical area, answers to multiple-choice questions about treatment options, typical complaints and symptoms of HF. A chi-square test was used for comparison between 2013 and 2015 surveys results.

Results: A total of 1025 attendees in 2013 and 459 attendees in 2015 participated in surveys: 39% and 38.6% males, mean age 58.7 ± 6.7 and 55.4 ± 12.5 years, worked in medical area 15% and 21.4%, respectively. In 2013 survey 79% of attendees had heard about HF, meanwhile 65.9% of 2015 survey attendees had known the symptoms of HF. A chi-square test was used for comparison between 2013 and 2015 surveys results. Major number of 2015 survey participants assumed, that patients with HF were more frequently tired (66.5% vs. 55.2%, p < 0.001). The perception of HF as not normal symptom of old age also significantly increased from 31.8% to 37.1% (p < 0.001). Knowledge about available HF treatment options was similar at both time points: respondents marked pharmacotherapy in 76.6% and 70.6%, pacemaker in 49.9% and 49.9%, heart surgery in 47.7% and 47.5%, of cases in 2013 and 2015 surveys, respectively. Knowledge about available HF treatment options was similar at both time points: respondents marked pharmacotherapy in 76.6% and 70.6%, pacemaker in 49.9% and 49.9%, heart surgery in 47.7% and 47.5%, of cases in 2013 and 2015 surveys, respectively.

Conclusions: The substantial part of participants has reported basic HF knowledge during 2013 and 2015 EHFA Day initiatives, but there is still a room for improvement. Knowledge about HF symptoms and nature of the disease seems to be improving over last years. Activities on education and awareness in general population and in HF patients should be continued.

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New predictors of left ventricular hypertrophy in normotensive adults with preserved ejection fraction. Insights from an epidemiologic survey-SEPHER III

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On behalf of: SEPHER III TEAM

Funding Acknowledgements: ROMANIAN SOCIETY OF HYPERTENSION

Introduction: Left ventricular hypertrophy (LVH) is an important cause of heart failure with preserved ejection fraction (HFpEF), associated with age, blood pressure values and ponderal status even in normotensive subjects. Up to date, implications of sodium intake through volume overload, arterial stiffness and BP variability in the development of LVH development have less been addressed in populational studies.

Purpose: We aimed to evaluate the prevalence and new predictors of left ventricular hypertrophy (LVH) in normotensive adults with preserved ejection fraction enrolled in SEPHER III survey.

Methods: Adult subjects enrolled in SEPHER III survey were evaluated throughout two study visits by: anthropometric measurements, 3 sitting BP measurements per visit according to ESC-ESH guidelines, arterial stiffness measurements (with an oscilometric device), voilema measurements by transfemoral bioclip impedance, laboratory analysis (glucids, fasting plasma glucose, HbA1c, estimation on 24h sodium excretion), echocardiography. Normotensive state was defined as BP below 140/90 mmHg and lack of HF history or treatment. LVH was defined as indexed left ventricular mass (ILVM) > 95g/m2 in females and > 115 g/m2 in males.

Results: From a total of 1970 enrolled subjects we have identified 828 normotensive subjects with preserved EF (mean age 42.66 ± 16.79, 56.9% females). Mean ILVM values was 77.03 ± 27.31 g/m2. LVH was found in 11.4% of the sample (10.4% in males and 12.1% in females). Binary logistic regression adjusted for age and mean arterial pressure validated as independent predictors for LVH in normotensive adult subjects: smoking (OR 1.89; 95% CI for OR: 1.71-2.08), body mass index (OR 1.04; 95% CI for OR: 1.03-1.05), visceral obesity (OR 2.05; 95% CI for OR: 1.83-2.30), hypercoemia (OR 1.23; 95% CI for OR: 1.13-1.33), s.d. SBP (OR 1.02; 95% CI for OR: 1.01-1.03), PWV (OR 1.14; 95% CI for OR: 1.12-1.19), aortic pulse pressure (OR 1.03; 95% CI for OR: 1.02-1.03). The prediction model has 83.7% accuracy of predicting the presence of LVH in normotensive subjects. Correlation analysis revealed that PWV, s.d. SBP and arterial stiffness are directly correlated with estimated 24h sodium excretion (mean value: 198.56 ± 62.60mmol/day estimating a mean NaCl dietary intake of 11.62g/day).

Conclusions: Our study reveals that beyond well recognized determinants of LVH (age, BP values, obesity), increased arterial stiffness, central BP parameters, visit-to-visit BP variability and hypercoemia independently contributes to LVH development in normotensive adult subjects, stressing the need of adequate preventing strategies. More, the correlation between these new predictors of LVH with volume overload urge the reduction of dietary sodium intake in preventing new onset on HFpEF.

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Comorbidities in heart failure according to left ventricular ejection fraction: analysis of educational administrative data of a nationwide population

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1Hospital Clinic San Carlos, Heart Failure Unit, Madrid, Spain; 2Hospital Clinic: San Carlos, Cardiology Service, Madrid, Spain; 3University Hospital San Juan de Alicante, Cardiology Service, Alicante, Spain; 4University Hospital 12 de Octubre, Madrid, Spain; 5University Miguel Hernandez, Elche, Spain

Introduction: Comorbidities are an important issue in heart failure (HF) patients. Traditionally, it is thought that they are more relevant in HF with preserved ejection fraction (HFpEF) than in reduced one (HFrEF), but both are present in HF patients. We present the prevalence of comorbidities in HF patients according to the left ventricular ejection fraction in a whole country (Spain, 46.77 millions population).

Methods: All the discharges from Spanish hospitals corresponding to 2012-2013 with a primary diagnosis of HF, according to the ICD-9-CM classification, were analyzed. The classification includes: systolic, diastolic, systolic and diastolic, hypertensive disease and not specified HF. For this analysis we only consider systolic (HF-ref) and diastolic (HF-pEF). Some of the most relevant comorbidities was considered.

Results: 400,861 hospital admissions were recorded, 77,652 with HF as a primary diagnosis (HF-ref 64% and HF-pEF 36%). The basal characteristics and main comorbidities of the patients are included in table 1.

Conclusions: According to the results of this Spanish administrative database, both HF-ref and HF-pEF have a similar profile with a relevant prevalence of comorbidities, with slight differences in some of them. However, the poor codification of HF at discharge could limit these results.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HF-ref</th>
<th>HF-pEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>74.1</td>
<td>78.5</td>
</tr>
<tr>
<td>Men</td>
<td>65.7</td>
<td>36.7</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>36.7</td>
<td>20.5</td>
</tr>
<tr>
<td>Arterial Hypertension</td>
<td>59.1</td>
<td>64.6</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>38.5</td>
<td>41.3</td>
</tr>
<tr>
<td>Ictus</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>32.5</td>
<td>30.6</td>
</tr>
<tr>
<td>COPD</td>
<td>17.3</td>
<td>15.9</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>0.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Dementia and senility</td>
<td>14.0</td>
<td>17.4</td>
</tr>
<tr>
<td>Functional disability</td>
<td>3.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td>66.9</td>
<td>76.3</td>
</tr>
<tr>
<td>Advanced cancer</td>
<td>1.2</td>
<td>1.7</td>
</tr>
<tr>
<td>Trauma in the last year</td>
<td>2.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Table 1. Distribution of comorbidities (%) according to left ventricular ejection fraction.
Prediction of heart failure in asymptomatic type 2 diabetics: an 8 year prospective study following cardiac CT angiography

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Funding Acknowledgements: European Foundation for the Study of Diabetes

Background and Aims: Heart failure (HF) is a severe complication of diabetes mellitus (DM) but prospective data regarding risk of HF in DM and the role of coronary artery disease (CAD) is limited.

Purpose: To identify clinical and cardiac CT angiographic (CTA) findings for prediction of hospitalization for HF or cardiovascular death (HF-CVD).

Methods: Baseline CTA was performed in 735 diabetics aged 55-74 years (51.2% women) with no history of CAD and serum creatinine <1.4 mg/dL. Chamber volumes, coronary artery calcium (CAC), coronary atherosclerosis and stenosis and clinical data were examined for prediction of HF-CVD events over 7.3-9.3 years based on time to event analysis.

Results: CVD-HF occurred in 41 of 735 subjects (5.6%) (31/600, 5.2% of subjects with full CTA data). HF occurred mostly in subjects without prior myocardial infarction (19/23, 82.6%) and preserved LV contraction. Independent predictors of HF-CVD were left/right atrial volume >1 (p <.0001), microvascular disease (p <.0001) and systolic blood pressure (p =.0003) model C-statistic 0.792 (95% CI: 0.756-0.824).

Conclusions: In asymptomatic diabetics followed for 7-9 years: HF-CVD was independently predicted by hemodynamic (systolic blood pressure), anatomic (LA/RA volume ratio) and microvascular (retinopathy, microalbuminuria) factors but not by CAD.

Baseline Predictors of HF-CVD

<table>
<thead>
<tr>
<th>Baseline variable</th>
<th>HF-CVD (N=41)</th>
<th>No HF-CVD (N=694)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of DM (years)</td>
<td>13.5±3.6</td>
<td>9.9±7.4</td>
<td>.004</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>148.6±21.1</td>
<td>137.7±19.0</td>
<td>.0004</td>
</tr>
<tr>
<td>Albuminuria (&gt;30mcg/mg creatinin)</td>
<td>23 (56.1%)</td>
<td>112 (16.1%)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Retinopathy</td>
<td>13 (31.7%)</td>
<td>111 (16.0%)</td>
<td>.011</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>8.5±2.0</td>
<td>7.4±1.9</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>CAC score (Agatston Units)</td>
<td>148 (40, 490)</td>
<td>55 (1, 324)</td>
<td>.004</td>
</tr>
<tr>
<td>Left/right atria volume &gt;1</td>
<td>22 (71.0%)</td>
<td>187 (32.9%)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Total coronary artery plaque volume (mm³) (median, quartiles)</td>
<td>241 (80, 648)</td>
<td>139 (22, 411)</td>
<td>.550</td>
</tr>
</tbody>
</table>

CAC=coronary artery calcium

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Cardiomyopathy: the right treatment when things go wrong?

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Case: A 69-year-old female presented with acute chest pain and breathlessness. An electrocardiogram demonstrated anterior ST elevation and lateral T wave changes. Serum troponin levels were elevated at 487ng/ml. Coronary angiography showed smooth, unobstructed vessels. Echocardiography demonstrated apical thinning and akinesia with hyperkinesia of the basal segments consistent with tako tsuno cardiomyopathy. Left ventricular ejection fraction was 39% with normal right ventricular function. Within 24 hours of admission the patient developed persistent hypotension with pulmonary oedema on chest radiography. Despite treatment with intravenous diuretics, dobutamine, noradrenaline and intra-aortic balloon pump (IABP) counterpulsation, there was no improvement and advanced mechanical circulatory support was considered. Repeat echocardiography demonstrated persistent left ventricular systolic dysfunction with moderate mitral regurgitation and flow acceleration in the left ventricular outflow tract (LVOT) due to obstruction from systolic anterior motion (SAM) of the mitral valve (Figure). Obstruction of the LVOT was felt to be the principal mechanism of poor cardiac output, exacerbated by inotropes and IABP support. Weaning of these therapies was accompanied by a subsequent reduction in LVOT gradient on repeat echocardiography. The patient improved haemodynamically and biochemically following cessation of all support after 2 days. Problems: 1) Recognition of LVOT obstruction due to SAM in tako tsuno cardiomyopathy as a contributor to low cardiac output and haemodynamic instability. 2) Despite significant impairment of left ventricular systolic function and low cardiac output, inotropes and IABP counterpulsation have deleterious effects on haemodynamic status in this setting. Discussion: LVOT obstruction occurs in approximately 20–30% of tako tsuno cardiomyopathy cases and is associated with reduced cardiac output and cardiogenic shock. Bedside echocardiography is diagnostic. The mechanism is through SAM of the mitral valve apparatus from compensatory hypercontractile function of the left ventricular basal segments. LVOT obstruction should be considered in the setting of cardiogenic shock or persisting haemodynamic instability despite inotrope therapy. Inotropic agents increase sympathetic activation and myocardial contractility, thus exacerbating LVOT obstruction. Greater flow acceleration through the LVOT can worsen SAM, causing further LVOT obstruction. Inotropes and IABP counterpulsation should therefore be avoided in this setting. Conclusion: LVOT obstruction is a cause of reduced cardiac output and cardiogenic shock complicating tako tsuno cardiomyopathy. Inotropes and IABP support can precipitate clinical deterioration and should therefore be avoided.

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Treatment of patient with acute heart failure due to acute idiopathic giant cell myocarditis using ECMO

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Introduction and case description: Acute idiopathic myocarditis presents a challenging case for cardiologist often having dramatically fulminant course. Giant cell myocarditis may progress in days to weeks leading to heart failure in 75% of cases. In regard of high rate of refractoriness to conservative treatment, the use of circulation assisting technologies is highly suggestive. Patient 23 years of age was admitted to our hospital with diagnoses of acute myocarditis and reduced systolic function of left ventricle (EF=18%). On initial examination he presented with dyspnea in rest, lower extremities edema and asciates. No causing factors were found. The disease was felt to acute onset 10 days before. Clinical manifestations were fatigue and drowsiness, dyspnea after walking for 50m. Leg edema and asciates developed by the end of the first week after the symptoms onset. The patient was admitted to the local hospital and on 5th day of treatment he was referred to our Clinic due to worsening of heart failure and lack of response to conservative treatment.

ECG: low voltage, sinus irregular rhythm with HR 100-116 bpm; supraventricular extrasystols; incomplete blockade of right bundle branch.

Echocardiography: end-diastolic volume (EDV) = 100 ml; end-systolic volume (ESV) = 85 ml, stroke volume (SV) = 25 ml, left ventricle ejection fraction (LV EF) = 18%. Polyspositional myocardial biopsy shows idiopathic giant cell myocarditis. Brain natriuretic peptide was elevated (1891,6 pg/ml). After two days of conservative treatment with maximum inotropic support, VA ECMO was considered. Beside routine heart failure medications, immunosuppressant therapy was indicated and consisted of cyclosporine 50 mg twice daily and prednisolone with day dosage of 45 mg. ECMO support lasted for 15 days with improving in LV EF from initial 16% to 28% on weaning moment. Patient assessment when discharged shows relative improvement in all investigations. Echocardiography: EDV – 90 ml, ESV – 60%, LV EF – 30%, systolic pressure in right ventricle – 30 mmHg, minimal amount of pleural effusion.

Discussion: Treatment strategy for patients with myocarditis should be guided by etiology, features of clinical course, presence and severity of heart failure. The key point of treatment is hemodynamic correction which is similar to therapeutic approaches for heart failure due to LV dysfunction. Thus, inotropes (dobutamine) is recommended. Failure to support hemodynamics with inotropes suggests consideration of ECMO or mechanical assist devices. These procedures reduce myocardial stress and improve contractile function of myocytes. The main goal of ECMO support is the bridge-to-recovery or the bridge-to-transplant strategy of treatment. Conclusions. ECMO shows effective support in patients with acute idiopathic giant cell myocarditis with fulminant progression in course of heart failure and should be considered as a part of the bridge-to-transplant strategy in such cases.

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Wet, cold and hypertensive: solving the puzzle with levosimendan

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Acute heart failure is defined as rapid onset or worsening of symptoms and/or signs of HF. The clinical scenario is one of great heterogeneity, either in primary etiology, cause of decompensation or hemodynamic profile presented. Therapeutic options are tailored to each patient and influenced by local expertise, given the absence of a standardized approach. We present the case of a 52 years-old female patient with late-onset anthracycline cardiomyopathy. She was admitted due to worsening fatigue, with symptoms at rest, and increasing weight within the previous week.
Physical examination was characterized by hypertension with 160/90mmHg, sinus tachycardia with 100bpm (QRS < 120ms), S1 S2 96%, cold extremities with capillary refill time >2s, absence of pulmonary rates and lower leg pitting edema as well as ascites. The patient’s condition had been worsening in the last 12 months despite appropriate therapy with Ramipril 10mg/day, Carvedilol 50mg/day and Eparanolactone 50mg/day. In spite of being treated with furosemide 180mg/day, congestive features were frequently present. The patient had also a history of severe resistant hypertension, submitted to renal denervation therapy 6 months before current hospitalization. Transthoracic echocardiogram showed a dilated left ventricle, ejection fraction of 26% and global longitudinal strain -5.3%, with estimated cardiac output of 3.3 L/min. E/e’ ratio of 29 and left atrium volume of 58L/m2 suggesting elevated filling pressures. Right ventricle dysfunction with TAPSE of 13mm, and PSAP of 65mmHg with dilated inferior vena cava. An unusual finding was the presence of elevated arterial pressure, with systolic pressure persistently above 180mmHg, even with additional therapy with NTproBNP 30mg/day 4C and Clonidine 150mg 4id (usual therapy). To define heart transplant eligibility and detail the haemodynamic profile, the patient underwent right heart catheterization with mean PAP of 25mmHg, mean PCWP of 18mmHg, cardiac output of 3.1 L/min (Fick method), PVR of 1.6 Wood and SVR of 3019.4 dynes/sec/cm-5. Being Levosimendan a potent inotrope, it was kept on the patient’s therapy. Known to increase systemic and pulmonary resistance and increase cardiac output, a pulse of Levosimendan was successfully administrated. In the following week, the patient reported improved fatigue, changing from NYHA IV to NYHA II, and decreased leg swelling and ascites. Arterial hypertension also decreased. Echocardiographic showed improved biventricular function as summarized in table 1. This case illustrates an unusual hemodynamic presentation, where "well-od" profile occurred together with severe hypertension and very high systemic vascular resistance. Levosimendan obtained a good response, probably due to its arterial and venous vasodilator potency, reinforcing the important role of this drug in the setting of acute heart failure.

Table 1. Echocardiographic Assessment

<table>
<thead>
<tr>
<th>Admission</th>
<th>pre-Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ejection Fraction (%)</td>
<td>26</td>
</tr>
<tr>
<td>Global Longitudinal Strain (%)</td>
<td>5.3</td>
</tr>
<tr>
<td>Cardiac Output (L/min)</td>
<td>3.3</td>
</tr>
<tr>
<td>E/e’ ratio</td>
<td>29</td>
</tr>
<tr>
<td>Left Atrium Volume (mL/m2)</td>
<td>58</td>
</tr>
<tr>
<td>Mitral Annular Systolic Excursion (mm)</td>
<td>13</td>
</tr>
<tr>
<td>PSAP (mmHg)</td>
<td>65</td>
</tr>
</tbody>
</table>

709 MitraClip for papillary muscle rupture in patient with acute heart failure

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Papillary muscle rupture is a devastating and potentially lethal mechanical complication of myocardial infarction that can lead to severe mitral regurgitation (MR) and acute heart failure. An 85 year old woman presented, after several days, to a district hospital with symptoms and signs of myocardial ischemia. The ECG showed a recent anterior STEMI and the patient underwent emergent coronary angiography and revascularization of a totally occluded intermediate (ramus) artery with a drug eluting stent. Echocardiography showed akinetic anterolateral wall with an estimated left ventricular ejection fraction of 40%. On day three post revascularization the patient developed acute pulmonary edema and cardiogenic shock. A transesophageal study revealed partial rupture of the anterolateral papillary muscle (table, column 1). The patient was discharged home a week later after an uneventful postoperative period. At the 6 month follow up she is clinically well with no re-admissions for heart failure. The case highlights the critical role of edge to edge repair with the MitraClip in patients with acute ischemic mitral regurgitation and refractory heart failure, who are not candidates for surgical repair.

710 LCZ696 as a bridge to candidacy to valve surgery in patients with advanced heart failure with reduced ejection fraction: a case report

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2San Luca Hospital of Milan, Milan, Italy
3Clinical Institute Humanitas Gavazzeni, Bergamo, Italy

Background: Valvular heart disease (VHD) can impair prognosis significantly in patients affected by heart failure (HF), but these patients are often denied surgery due to excessive operative risk. Even if no data have been published so far on this topic, LCZ696 (sacubitril/valsartan) might improve cardiac function in subjects affected by HF with reduced ejection fraction (HFrEF) and VHD, possibly lowering operative risk and allowing eligibility to valve surgery.

Case report: A 76-year-old man was first diagnosed with HFrEF due to anthracyclines-related cardiotoxicity in 2013. Despite optimal medical treatment for HF and cardiac resynchronization therapy, his clinical conditions slowly worsened (NYHA class III), alongside a gradual worsening of a previously mild aortic and functional mitral regurgitation. In September 2015, an echocardiogram detected a dilated ventricle, a severe reduction of EF, pulmonary hypertension and severe mitro-aortic regurgitation (table, column 1). The patient was then referred for valve surgery, but he was deemed ineligible due to an exceedingly high risk (EuroSCORE II 14.05%). Therefore, palliative infusions of levosimendan and furosemide were started, with mild benefits. In January 2016, we introduced LCZ696, uptitrating the dose to 200 mg b.i.d. over 3 months. In the following months, the patient showed a progressive clinical improvement, reporting resolution of dyspnea (NYHA I) and reduction of diuretic dose. In June 2016 (table, column 2), we observed an overall improvement of cardiac performance and a reduction of mitral regurgitation; aortic regurgitation was unaffected. In October 2016, the hemodynamic burden of valve defects increased again (table, column 3), with a progressive worsening of his clinical conditions; thus, the surgical option was re-evaluated. This time, the pre-operative risk was judged acceptable (EuroSCORE II 5.94%); therefore, the patient underwent aortic valve replacement and mitral valve annuloplasty. In November 2016, the patient was discharged in NYHA class I-II, with good function of the aortic prosthetic valve, no residual mitral valve regurgitation and stable EF (table, column 4).

Discussion: Beneficial effects of LCZ696 on patients with HFrEF are well known from trials, but experience in clinical practice is still limited. This is the first report on the use of LCZ696 as a “bridge to candidacy”, to improve the clinical conditions of a patient, aimed at lowering his predicted operative risk and making him eligible to heart surgery. Thus, LCZ696 administration may pave the way to a new therapeutic approach to patients with advanced HF and VHD, granting larger improvement in prognosis and quality of life than traditional strategies.
Clinical Case Corner 2—The horizon in pharmacological therapies, interventions & device

Effects of LCZ696 on cardiac function

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Ejection Fraction (%)</td>
<td>20%</td>
<td>46%</td>
<td>45%</td>
<td>38%</td>
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<tr>
<td>End-diastolic volume (mL)</td>
<td>348</td>
<td>218</td>
<td>275</td>
<td>230</td>
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<td>Pulmonary Artery Pressure (mm Hg)</td>
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<td>Systolic Pressure (mm Hg)</td>
<td>150</td>
<td>140</td>
<td>130</td>
<td>120</td>
</tr>
<tr>
<td>Mitral regurgitation + + + +</td>
<td>+ +</td>
<td>+ + + +</td>
<td>+ +</td>
<td>+ +</td>
</tr>
<tr>
<td>Aortic Regurgitation</td>
<td>+ + + +</td>
<td>+ + + +</td>
<td>+ +</td>
<td>+ +</td>
</tr>
<tr>
<td>NT-pro BNP (ng/L)</td>
<td>2007</td>
<td>633</td>
<td>2147</td>
<td>1501</td>
</tr>
</tbody>
</table>

Cardiac ultrasound data and NT-pro BNP values at different times during follow-up

Introduction: Pump thrombosis (PT) remains a devastating complication of left ventricular assist devices (LVADs). To date, there are no guidelines or consensus regarding the management of PT.

Case Report: A 53 y/o male with nonischemic cardiomyopathy underwent Heart-Ware LVAD placement as a bridge to transplantation. 6 months post implantation, he presented PT which was successfully treated with thrombolytics. He now presents with dark urine, haptoglobin < 14 mg/dL, plasma free hemoglobin 99.1 mg/dL, INR 2.8 and lactate dehydrogenase (LDH) 1,304 u/L. He was hospitalized, started on eptifibatide and unfractionated heparin with improvement of his symptoms and LDH. He remained in the hospital as a status 1A exception on the heart transplant list due to PT. On day 36 of his hospital stay, he presented a third episode of PT which was treated with integrilin. He did not improve and required tissue plasminogen activator (tPA) plus vasopressors. His RAMP study showed inadequate left ventricular unloading in spite of increased speeds. Due to failure to medical therapy, he underwent pump exchange with a HeartWare LVAD via left thoracotomy complicated by cardiacogenic shock, respiratory failure and acute kidney injury. He had a chest CT angiography that did not showed thrombus but it did showed that his outflow graft had a 90 degree angle turn posteriorly which may represent a site of obstruction. It was decided that stenting was associated to a moderate risk of stroke which may preclude his heart transplant. He was weaned off vasopressors and had a slow recovery. On day 80, he presented a fourth episode of PT. His prognosis was guarded and at this time he was not a candidate for pump exchange. He was started on tirofiban drip which was unsuccessful. Then, tPA was administered but he continued to deteriorate. He received a second bolus of tPA and became hypotensive followed by pulpless electrical activity refractory to supportive measures. He was declared moribund.

Problem and Discussion: This case highlights the difficulty of managing PT in spite of aggressive therapeutic measures. Therapeutic strategies currently available include medical or surgical therapy. Some series have reported success rates of medical therapy of 33-50% with mortality rates of 13-40%. Pump exchange can be considered a highly morbid procedure has demonstrated low early mortality and low complication rates. There is no head to head trial comparing these strategies. The optimal therapy for patients with PT has not been fully clarified in spite of its increasing incidence in the LVAD population.

Conclusion: The treatment of PT is a complex and challenging medical dilemma. At present, it is unclear what is the appropriate treatment for this morbid condition. The choice of initial therapy depends on patient’s characteristics, surgical candidacy and mostly on the center’s philosophy based on their experience. Further studies are needed to elucidate which strategy is the most effective and less morbid.

Role of imaging in patients with a left ventricular assist device implanted

Introduction: Left ventricular assist devices (LVADs) have revolutionized the treatment of advanced heart failure and LVAD implantation has become a class IIA recommendation in therapy in patients with refractory heart failure. A significant number of LVAD recipients have major complications in the first year after the implant, most commonly related to thrombosis/hemorrhage or infections which occur in almost 35% of the patients. Lower rates of infections have been reported for the newer devices, such as HeartWare.

Case Description: This is the case of a 43-years-old man with a history of ischemic cardiomyopathy, severe systolic dysfunction of the left ventricle with an ejection fraction of 20%, implantable cardioverter-defibrillator (ICD) and multiple episodes of decompensated heart failure who became a LVAD recipient (continuous-flow Heart-Ware device) as a bridge-to-transplantation therapy (9 months prior). The patient presents in the emergency department with signs and symptoms of right ventricular (RV) dysfunction: jugular venous distention (JVD=19 cm), hepatomegaly and perihilar edema. Systolic blood pressure (SBP) at admission was difficult to assess due to the continuous flow of the device; he also presented with fever, tachycardia and sweating for the last 2 weeks. Chest x-ray showed a large mediastinum, the ICD and the LVAD inflow cannula (Figure 1); initial blood tests assessed leukocytosis with a white blood cell count (WBC) of 16352/µL, a reactive protein of 80 mg/mL with a high value of the procalcitonin (p-10 ng/mL), suggesting an infectious process; we also mention the International Normalized Ratio (INR) of 4.7. The patient was admitted in the Intensive Coronary Care Unit (ICCU) and echocardiography, both transesophageal and transthoracic and transesophageal (Figure 2), revealed a large mass in the anterior mediastinum which compressed the right ventricle with preserved RV systolic function. Computed tomography (CT) scan confirmed the transesophageal echocardiography (TEE) findings and provided more accurate anatomical reports towards the driveline and the inflow cannula (Figure 3). Serial blood cultures have been grown and we obtained positive results for Gram-negative pathogens (Pseudomonas aeruginosa). Due to
the urgent situation and the high value of the INR, we decided to perform evacuatory puncture in the fifth right intercostal space with the extraction of a quantity of 600 ml of sero-hemorrhagic fluid. The clinical status of the patient improved significantly immediately after the procedure, ETE showing decompression of the right ventricle (Figure 5). The patient received intravenous antibiotics (ertapenem and meropenem) according to the highest minimum inhibitory concentrations (MIC) for 6 weeks. At the end of the antibiotic treatment the inflammatory blood tests were normalized. The patient remains a candidate for heart transplantation (HTX) without compromising the possibility of performing sternotomy.

**Discussions:** Right ventricle systolic dysfunction after LVAD implantation has multiple mechanisms, most of them caused by RV contractile dysfunction, but in this case the signs and symptoms of RV dysfunction were produced by extrinsic compression. Mediastinal masses can be the consequences of haemorrhage or systemic infections and distinguishing between them may be clinically challenging. The case is illustrative for managing a difficult complication after LVAD implantation and it should be done to conserve the HTX future option.

### 714 Percutaneous paravalvular leak closure for aortic regurgitation after transcatheter aortic valve implantation

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Paravalvular leaks (PVL) are well-recognized sequelae of transcatheter aortic valve implantation (TAVI) with important prognosis impact and difficult management. We present a case of an 87 years patient, underwent transfemoral Corevalve Evolut R 29 complicated with complete atrioventricular block with pacemaker implantation. Immediate post-TAVI transthoracic echo (TTE) show a mild anterior leak. One year after procedure patient was referred with progressive shortness of breath and recent onset heart failure symptoms, NYHA III. At TTE two PVL were evident one anterior and other posterior globally quantified as moderate, although with severe limitations by this method. Cardiovascular magnetic resonance (CMR) was made to accurately quantify PVL severity, with a regurgitant fraction quantification of 27% (Figures 1A and B). Patient was select to percutaneous treatment with the use of real-time echocardiography. Pre-procedure transthoracic echocardiogram (TTE) confirms the severity of the regurgitation and helps to describe leaks: one moderate on a posterior position at 1 o’clock and other smaller anterior at 5 o’clock (Fig 1 C and D), together conditioning severe aortic paravalvular regurgitation. Leak repair was made with TTE guidance (Fig 1 E plug at posterior leak arrow) and anterior leak (Fig 1 F by Amplatzer Vascular Plug) devices were deployed, resulting in abolition of the posterior aortic leak and minimal residual anterior leak (Fig 1 G and H). Patient remains in NYHA II with significant improvement of symptoms. Presumably a new CMR should be performed 6 months after the procedure to assess the result of intervention.

**Conclusion:** Paravalvular leaks is a major problem for transcatheter aortic valve therapy and multiple treatments are possible for severe cases. Percutaneous paravalvular leaks closure after TAVI should be considered as a treatment option for severe paravalvular leaks.

### 715 A rare case of heart failure: localized paracardial effusion after cardiac surgery achieving cardiac compression with focal constrictive pericarditis and mitral stenosis

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The interest in this case lies in the difficulty of diagnosing the main cause of heart failure and the importance of the interpretation of different imaging techniques to get to the resolution of the case. A 70-years-old male with a medical history of aortic valve substitution with mechanical prosthesis for severe aortic regurgitation, new onset of atrial fibrillation and hepatic cirrhosis, was subjected to our attention for heart failure with bilateral ankle oedema and dyspnoea. Electrocardiogram showed atrial fibrillation and signs of left ventricular hypertrophy. Laboratory tests showed increased natriuretic peptides and chest X ray demonstrated mild pleural effusion. Transthoracic echocardiogram confirmed normal function of aortic prosthesis; hypertrophic left ventricle with thickening of the posterior wall (Fig 1A) and normal systolic function; right ventricle dilatation with mild pulmonary hypertension. We noted an extrinsic mass pressing the infero-lateral wall (Fig 1A, B, C arrows) with mitral valve prolapse and mitral moderate stenosis (Fig 1 D). The suspect was a cardiac compression for the presence of septal bounce, borderline respiratory variation of the mitral peak E velocity of 20% (Fig 1E); dilatation of caval and hepatic vein (Fig 1F); increased left atrium and initial signs of ventricular interdependence on M-mode view of the septum and infero-lateral wall (Fig 1G). The patient was subjected to thoracic CT that confirmed an inhomogeneous mass with pericardial thickness and calcification (Fig 1H). To better define the characteristics of the mass, CMR was executed. It showed a localized chronic pericardial effusion (Fig 1 I, L, M, stars) compressing the lateral wall of the left ventricle with an asymmetric hyper trophy (Fig 1 I, L, M, stars) and causing anterior mitral leaflet prolapse. Then we saw a thickening of the pericardium (3-4 mm) with calcification in particular in the basal inferior and lateral segments. Finally, on real time cine sequences we noted a flattening of the interventricular septum, with signs of ventricular interdependence (Fig 1N). The patient was treated with diuretics with a period of benefit. During the follow up, he died for a severe sepsis due to mitral valve endocarditis. Analyzing the case, the possible causes of heart failure in this patient could be a dysfunction of the bioprosthes, the onset of atrial fibrillation, liver cirrhosis, diastolic dysfunction secondary to ventricular hypertrophy, mitral stenosis, constrictive pericarditis. Probably in this case more elements have contributed to the development of heart failure. However it seemed predominant, also in relation to a predominant right heart failure, focal constrictive pericarditis. Constrictive pericarditis is a condition in which a thickened, scarred, inelastic, and often calcified noncompliant pericardium limits diastolic filling of the ventricles. The etiologies are diverse, including cardiac surgery. In patients with suspected constriction, imaging tests can focus on diagnostic information, including pericardial thickness, interventricular dependence, other associated abnormalities (valvular, myocardial, or coronary artery disease). On the basis of its ability for comprehensive morphologic assessment of the heart as well as the pericardium and hemodynamic characteristics, echocardiography remains the initial imaging test, and can provide a definite diagnosis of constrictive pericarditis for most patients. In those situations in which echocardiographic findings are equivocal, additional imaging testing (CT or CMR) is needed to make the diagnosis with more confidence. In some patients, hemodynamic cardiac catheterization may be necessary to establish the diagnosis.
Plasma based cBIN1 correlates with myocardial health in HFpEF patients

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Introduction: Heart failure with preserved ejection (HFpEF) is an elusive pathological entity due to lack of diagnostic tools or evidence-based therapies. It accounts for half of the heart failure burden worldwide. Key underlying pathophysiological mechanism in heart failure has been shown to be abnormal calcium regulation. We postulated that a newly found molecular player, Bridging Integrator 1 and particularly its cardiac isoform cBIN1, could be the long-sought marker of myocardial health. cBIN1 is a membrane scaffolding protein which organizes the T-tubule dyads - essential players in calcium cycling.

Methods: The studied cohort (referred to as HFpEF) consisted of 52 patients with various forms of cardiomyopathy with preserved left ventricular (LV) ejection fraction (EF) and stable chronic heart failure symptoms. The comparator cohort included 104 age and sex matched healthy volunteers. IRB approval and full informed consent was obtained from all participants. cBIN1 concentration was determined with a cBIN1 specific ELISA which involved mouse monoclonal anti-cBIN1 exon 17 as capture antibody and a HRP-conjugated exon 13-specific detection antibody. The assay above has been previously validated in our lab. Detailed patient characteristics were obtained per chart review. The HFpEF patients were followed retrospectively for a minimum of 1 year post cBIN1 lab draw or until their most recent clinic visit, whichever is longer.

Results: Plasma cBIN1 levels are substantially reduced in the HFpEF population with a median of 1.62 ng/mL as compared to 10.24 ng/mL in the healthy cohort. Unlike pro-BNP which shows a wider variation in the sick patient cohort, cBIN1 appears to be a better diagnostic test as demonstrated by higher positive and negative predictor value per receiver operator curve. Half of the HFpEF patients had an echocardiogram (TTE) performed within 3 months of cBIN1 draw. LV mass as estimated by standard TTE parameters showed an inverse correlation with cBIN1 and no correlation with pro-BNP, cBIN1 correlated well with NYHA class of symptoms and severity of diastolic dysfunction. In addition, cBIN1 level of less than 1.6 was found to be a good prognostic indicator of worse outcomes as shown by the Kaplan Meyer curves of cardiovascular hospitalizations.

Conclusion: cBIN1 is a crucial player in myocardial calcium signaling and it also appears to be a promising new marker for myocardial health. In the current cohort of 52 patients with preserved ejection fraction it performed as well as pro-BNP and showed a better inverse correlation with LV hypertrophy. Additionally cBIN1 < 1.6 appears to be a good prognostic indicator of worse clinical outcomes.
Background: The occurrence of edema is poorly correlated with cardiac filling pressure in heart failure patients with reduced ejection fraction (HFrEF). Other factors than increased capillary hydrostatic pressure might also determine the occurrence of extracellular edema. Large networks of glycosaminoglycans (GAGs) in the interstitial help to regulate water homeostasis. Factors present in HFrEF might increase GAG density and sulphation, leading to interstitial GAG-network dysfunction and fluid accumulation.

Objectives: The aims of this study are to demonstrate in HFrEF patients 1) that interstitial GAG density is increased, 2) that GAG-networks can become dysfunctional contributing to interstitial fluid accumulation and the clinical presentation of edema, and 3) that there is a link between GAG dysfunction and the renin-angiotensin-aldosterone system (RAAS).

Methods: Two punch biopsies of the skin of the lower leg were obtained in healthy subjects (n=18) and HFrEF patients (n=29). Left venricular ejection fraction (32 ±10%). Alcian blue staining and immunostaining for the angiotensin II type 1 receptor was performed. After obtaining tissue water content (TWC), total interstitial GAG (Uronic Acid (UA)) and sulphated GAG (sGAG) density were quantified with ELISA techniques. A venous blood samples, clinical investigation and echocardiography were simultaneously obtained.

Results: Significant higher interstitial GAG density and sulphation was observed in HFrEF patients compared to healthy controls (UA: 13.1±4.2 vs 9.6±1.6 mg/mg; p <0.0001; sGAG: 15.9±5.9 vs 10.1±1.2 mg/mg; p=0.0021) and in HFrEF patients with versus without presence of lower extremity edema (Table 1). In healthy subjects TWC was stable over a range of interstitial GAG density. In contrast, there was a strong correlation between TWC and UA in HFrEF patients (Figure 1A). Expression of the angiotensin II type 1 receptor was found on dermal cells responsible for GAG synthesis. Moreover, use of ACE-inhibitors/ARB is associated with significantly lower levels of interstitial GAGs in HFrEF patients (Figure 1B and C).

Conclusion: Intestinal GAG-concentration is increased in HFrEF patients compared to healthy control subjects, and correlated with tissue water content and clinical signs of volume overload. Expression of the angiotensin II type 1 receptor was demonstrated on dermal cells. ACE-inhibitors/ARB use is associated with lower levels of interstitial GAGs. A better appreciation of the intestinal compartment might improve current management of volume overload in HF.

<table>
<thead>
<tr>
<th></th>
<th>HFReF without edema (n = 13)</th>
<th>HFReF with edema (n = 16)</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td>Skin biopsy - TWC</td>
<td>4.9±0.9</td>
<td>6.5±3.0</td>
<td>0.001</td>
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<tr>
<td>(ml/mg)</td>
<td>sGAG (ug/mg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UA (ug/mg)</td>
<td>13.3±3.1</td>
<td>17.9±6.8</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>10.9±2.5</td>
<td>14.8±4.5</td>
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</table>

sGAG: sulphated GAG, TWC: Tissue water content; UA: uronic acid

Figure 1: Forest Plot
endomyocardial biopsies (EMB). However, this method is limited by procedural risk and therefore not ideal for the monitoring of response to treatment. Cardiac magnetic resonance (CMR) T1 mapping has recently been shown to allow accurate ECV measurement in various cardiac diseases. Thus far it has not been investigated whether CMR-ECV accurately measures ECV in CA.

Methods: Between July 2011 and December 2016, 21 CA patients were enrolled in our study. All patients underwent EMB and CMR for invasive and non-invasive ECV quantification. EMBs were stained with modified Trichrome (n = 21). Additionally, immunohistochemically stained samples (Immunohisto-ECV) were quantified with T1 mapping using TissueFAxS software in Trichrome stained (Histo-ECV) as well as in immunohistochemically stained samples (Immunohisto-ECV). ECV by CMR was quantified with T1 mapping using the Modified Look-Locker Inversion recovery (MOLLI) sequence (MOLLI-ECV). Spearman’s correlation and Bland-Altman plots were used for correlation analysis and assessment of agreement.

Results: The study population consisted of 7 (33.3%) wild-type transthyretin and 14 (66.6%) light chain CA patients. Median Histo-ECV was 50.2% (IQR: 37.9 – 59.8), median Immunohisto-ECV was 48.4% (IQR: 41.7 – 59.2), MOLLI-ECV was strongly correlated with Histo-ECV (r = 0.774, p < 0.001, Fig. 1A) and Immunohisto-ECV (r = 0.814, p < 0.001, Fig. 1C). Additionally, MOLLI-ECV showed good agreement with Histo-ECV (Fig. 1B) as well as Immunohisto-ECV (Fig. 1D).

Conclusion: MOLLI-ECV accurately reflects the amount of amyloid deposited within the myocardium. In CA patients, ECV by CMR has the potential of becoming a monitoring tool for new therapeutic agents.

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Significant functional mitral regurgitation affects left atrial function and determines clinical status and pulmonary hypertension in HFrEF patients

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Functional mitral regurgitation (FMR) is a well-known prognostic factor in patients with HFrEF. Similarly, the left atrial function and the pulmonary hypertension are determinants of outcomes and clinical status in this setting. Aim of this study is to explore the possible interplay between those factors.

Methods: 117 patients with HFrEF, sinus rhythm and FMR were studied with echocardiography. Patients dichotomized based on the presence of SFMR (3-4 +). LA volumes were measured at three time-points and the different components of LA function were thus calculated (See Figure 1). The deformation indices were calculated using 2D speckle-tracking.

Results: Patients with SFMR displayed: worse clinical status, larger LV and LA volumes and more impaired LA reservoir and contractile function. LAF was inversely correlated with NYHA class and sPAP. Univariate and multivariate linear regression analysis showed severe FMR, TLAEF and LV filling pressures as predictors of PH, while LA contractile function and the presence of PH were independent predictors of NYHA class.

Conclusions: Our data suggest that the presence of SFMR seems to affect LA reservoir and contractile function HFrEF patients, independently of LVEF. SFMR and the LA dysfunction may play a complimentary role in determining PH and functional impairment in this population.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>All patients (n = 117)</th>
<th>No SFMR (n = 46)</th>
<th>SFMR (n = 71)</th>
<th>P</th>
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<tbody>
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<td>Age (y)</td>
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<td>NYHA class</td>
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<td>LAVI (ml/m²)</td>
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<td>LVEDVI (ml/m³)</td>
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<td>120.6±39.0</td>
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<td>LVEF (%)</td>
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<td>31.9±9.2</td>
<td>29.0±8.5</td>
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<td>E/E’ ratio</td>
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<td>14.0±5.9</td>
<td>20.5±7.3</td>
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<td>sPAP (mmHg)</td>
<td>42.9±14.2</td>
<td>35.8±9.6</td>
<td>47.6±14.8</td>
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<td>TAPSE (mm)</td>
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<td>16.6±3.9</td>
<td>16.7±3.2</td>
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<td>Reservoir LAEI (%)</td>
<td>78.2±52.1</td>
<td>95.1±52.4</td>
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<td>Pump LAEF (%)</td>
<td>24.5±11.7</td>
<td>28.2±12.1</td>
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<td>TLAEF (%)</td>
<td>40.4±13.3</td>
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<td>36.7±12.6</td>
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<td>Reservoir strain</td>
<td>11.8±5.8</td>
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<td>Pump strain</td>
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Refractory electrical storm rescued by venoarterial extracorporeal membrane oxygenation

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Introduction: Electrical storm refers to a state of cardiac electrical instability characterized by multiple episodes of ventricular tachycardia or ventricular fibrillation within 24 hours despite antiarrhythmic drugs or device-related therapies (defibrillation or anti-tachycardia pacing) and for which overall mortality was 22-82% in previous series. Triggering factors for this condition include worsening heart failure, early postoperative period, electrolyte abnormalities, and myocardial ischemia. Since Venoarterial extracorporeal membrane oxygenation (VA-ECMO) can be used as a rescue therapy in this setting, we reviewed our experience and assessed the outcomes of patients who received VA-ECMO for refractory electrical storm in our center.

Method: We retrospectively collected demographic, pre ECMO, post ECMO data and in-ICU mortality of patients who received VA-ECMO for refractory electrical storm in our 26-bed intensive care unit from March 2007 to March 2015.

Results: Of the 1286 VA-ECMO patients treated in our ICU during the study period, 38 had ECMO for refractory electrical storm after a median time of 24 (8-168) hours. Median age, SAPS II and SOFA scores at admission were 58 (49-62) years, 80 (55-87) and 13 (11-15), respectively. Electrical storm was secondary to myocardial infarction in 26 (89%) patients. Cannulation was performed during and after cardiac arrest in 5 (13%) and 17 (45%) patients, respectively. Overall ICU survival was 47%
one patient got a heart transplant and one a left ventricular assist device). Survivors spent 5 (4–10) days on ECMO, 14 (9–25) days in ICU and 52 (34–59) days in hospital. Patients discharged alive from the ICU had lower body mass index, lower SOFA score before ECMO and at day 1 and received less inotropes in the 24h following cannulation (p = 0.02). No difference was identified between alive and deceased patients regarding pre-ECMO anti-arrhythmic treatments and number of electrical shocks.

**Conclusion:** Refractory electrical storm is a very severe condition that might be rescued by VA-ECMO support. The 47% ICU survival rate we observed in this series parallels that of other cardiogenic shock populations rescued by VA-ECMO. Earlier ECMO support in the course of the disease might allow a rapid decrease in inotrope doses and less organ failures, which were both associated with more favorable outcomes.
Background and purpose: The extracellular signal-regulated kinases 1 and 2 (ERK1/2) have a central role in cardiac hypertrophy. This involves ERK1/2 dimerization, a trigger for an autophosphorylation of ERK1/2 at threonine 188 (eERK1/2BB), which was shown to induce pathological hypertrophy. However, it is well known that ERK1/2 are essential for cardiac myocyte protection from cell death. Therefore, it is needed to selectively interfere with the hypertrophic ERK1/2 function. Here, we investigated, the ERK dimer interface as potential strategy for selective ERK1/2 inhibition.

Methods: To evaluate the impact of monomeric ERK on cardiac integrity, we used the dimerization-deficient ERK2Δ174-177 mutant and a peptide that interferes with ERK dimerization. Cardiomyocyte size, ERK1/2 activity and target activation by Western blot, TUNEL positive cells and ERK localization using confocal microscopy were analyzed. Mice with cardiac overexpression of ERK2Δ174–177 (ERK2Δ174–177-tg) were generated and characterized in response to transverse aortic constriction (TAC) or running wheel exercise. An adenosine-associated virus serotype 9 (AAV9) vector construct was used to evaluate the peptide.

Results: Monomeric ERK2Δ174–177 significantly reduced hypertrophic response to phenylephrine (PE) stimulation in neonatal rat cardiomyocytes (NRCM) but, interestingly, did not exacerbate cardiomyocyte death in contrast to ERK1/2 inhibition by PD98059. Similarly in vivo, ERK2Δ174–177 overexpression attenuated the hypertrophic response to TAC and did not increase apoptosis compared to controls. Moreover, cardiac function of ERK2Δ174–177-tg was well preserved; and even after doxorubicin-based cardiomyopathy, speed of contraction and relaxation were indistinguishable to control mice. In addition, mRNA levels of collagen and brain natriuretic peptide (BNP) were significantly reduced in ERK2Δ174–177-tg compared to controls. In contrast to TAC, a physiological stimulus, i.e. running exercise, did not impair cardiac growth in ERK2Δ174–177-tg.

As monomeric ERK2 seems “safe” for the heart, we generated a peptide that interferes with ERK dimerization to test the impact of ERK dimers. In line with our hypothesis, the peptide prevented eERK1/2BB and nuclear translocation of ERK2. In NRCM, the peptide also reduced pERK1/2BB and led to an attenuated hypertrophic response to PE compared to control cells. Of note, the peptide neither impaired ERK1/2 activation nor cardiomyocyte survival, but efficiently inhibited nuclear ERK target phosphorylation. The potency of the peptide in vivo was investigated in TAC-induced heart failure: AAV9-mediated gene transfer protected from pathological cardiac hypertrophy, an increase of heart failure markers and impaired cardiac function and even decreased cardiomyocyte apoptosis compared to control mice.

Conclusion: These data indicate that the ERK interface is a promising target for decreased cardiomyocyte apoptosis compared to control mice. In addition, the peptide reduced hypertrophic response to TAC and did not increase apoptosis compared to controls. Interestingly, did not exacerbate cardiomyocyte death in contrast to ERK1/2 inhibition by PD98059. These results indicate that PKAI plays a previously unsuspected role in cardiac excitation-contraction coupling and identify RIIa as a critical buffer of C subunits in the heart.

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The dimer interface of ERK1/2 provides a potential strategy for selective inhibition of pathological cardiac hypertrophy

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Heart failure (HF) is a major health problem in which excessive activation of β-adrenergic receptors (β-AR) and the cAMP-dependent protein kinase (PKA) are critically involved. PKA is a heterotetramer of two regulatory (R) and two catalytic (C) subunits and comprises two subtypes, PKAI and PKAII, defined by the nature of their regulatory subunits, RI and RII respectively. Whereas PKAI is thought to play a key role in β-AR-regulation of cardiac contractility, the function of PKAII remains unclear. To address this question, we generated mice with cardiomyocyte-specific and conditional invalidation of the Prkar1a gene, encoding for the RIIb subunit of PKA, the predominant constituent of PKAI in the heart. Tamoxifen injection (40 mg/kg/day during 2 days) in 8 weeks old mice resulted in >70% decrease in RIIb protein without modification of other RIIa subunits. In Langendorff-perfused heart preparations, spontaneous heart rate was similar whereas basal LV pressure and maximal rate of contraction, as well as maximal rate of relaxation were increased >3-fold in mutant (RIIb KO) versus wild type (WT) mice (N=9 in each group, p<0.05). In paced hearts (650 bpm), β-AR stimulation with isoproterenol (ISO) increased cardiac contraction >3-fold in WT versus 1.5-fold in RIIb KO. Basal L-type Ca2+ current density was increased in ventricular myocytes from RIIb KO and β-AR stimulation (ISO, 30 nM, 15s) increased cardiac contraction >3-fold in WT and >1.5-fold in RIIb KO. Basal L-type Ca2+ current density was increased in ventricular myocytes from RIIb KO and β-AR stimulation (ISO, 30 nM, 15s) was decreased by >50% (p<0.05, n=38 cells for WT and 40 for RIIb KO). The relaxation phase of Ca2+ transients was accelerated, along with a 3-fold increase in PLB phosphorylation at Ser16 (PKA site) in RIIb KO myocytes. With age, RIIb KO mice developed a dilated cardiomyopathy with depressed ejection fraction, massive interstitial fibrosis, cardiac dilatation, and pulmonary congestion which eventually led to death in 50% of RIIb KO mice at 50 weeks (versus 0% in WT, p<0.01). These results indicate that PKAI plays a previously unsuspected role in cardiac excitation-contraction coupling and identify RIIb as a critical buffer of C subunits in the heart.

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Hypercontractile heart and delayed cardiomyopathy in mice with cardiac-specific ablation of the Flt1/pha subunit of cAMP-dependent protein kinase

I Bedioune1, F Karam1, A Varini1, M Gandon-Renard1, P Lechene1, D Mioka2, P Mattei1, G Picous1, J Leroy2, C Strabakis2, JJ Mercader1, JP Benatar1, AM Gomez1, R Fischmeister1, G Vandecasteele1, Gandorff-perfused heart preparations

Young investigator Award: Basic Science and Translational Science

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813 Supercomplex-dependent improvements in mitochondrial function with the mitochondria-targeting peptide elamipretide

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Funding Acknowledgements: National Institutes of Health R01 HL123647, Steath BioTherapeutics

Background: Elamipretide is a novel mitochondria-targeting peptide currently being investigated in several heart failure clinical trials. This peptide has shown efficacy in improving bioenergetics in explanted failing human heart and across pre-clinical models of heart failure. In spite of these promising findings, the mechanism of action is not fully understood. Electron transport chain proteins typically aggregate into functional ‘supercomplexes’. Supercomplex formation is postulated to directly influence mitochondrial ROS production, and decreased supercomplex formation has been observed in several cardiac pathologies.

Purpose: Determine whether elamipretide preserved supercomplex-dependent bioenergetics and lowered ROS emission in cardiac mitochondria.

Methods: Mitochondrial supercomplexes were isolated from post-ischemic rat left ventricle, extracted from the blue-native PAGE gel, and placed in a high-resolution functional ‘supercomplex’. Supercomplex formation was not impaired in post-ischemic mitochondria, and there was no discernible effect of elamipretide on complex IV-dependent respiration. In separate studies, measurement of mitochondrial ROS production was comprehensively determined using elamipretide concentrations ranging from 1μM to 10μM.

Results: Mitochondrial supercomplex density was significantly lower in post-ischemic hearts compared to control (3231 ± 374 vs. 3300 ± 153 AU, respectively; P < 0.05), and preserved with elamipretide (3258 ± 173 AU). Complex I-dependent respiration was significantly reduced in supercomplexes isolated from post-ischemic mitochondria (complex I-dependent respiration decreased to 48% ± 8% of control, P < 0.05). Elamipretide treatment significantly improved complex I-dependent respiration to 85% ± 24% of normoxic control. Complex IV-dependent supercomplex respiration was not impaired in post-ischemic mitochondria, and there was no discernible effect of elamipretide on complex IV-dependent respiration. In separate studies elamipretide significantly reduced mitochondrial production of ROS from complex I. Complex I-mediated ROS production was 5.10 ± 0.13 nmol/mg in untreated mitochondria, and reduced with 1μM (4.16 ± 0.05nmol/mg), 100pM (3.65 ± 0.05nmol/mg), and 10pM (3.53 ± 0.04nmol/mg) elamipretide (P < 0.05 for 1μM-10pM). No effect was observed on complex I-dependent ROS production with 1pM elamipretide.

Conclusions: Elamipretide preserved supercomplex integrity, resulting in improved electron transport chain function and reduced emission of ROS. These data highlight the therapeutic potential of this peptide to lower mitochondrial ROS production and improve bioenergetics in cardiac pathology.

814 Accumulation of 5-oxoproline in myocardial dysfunction and the protective effects of OPLAH

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Introduction: In response to heart failure (HF), the heart reacts by returning to a more fetal-like gene profile, which is thought to take place by repressing adult and re-expression of fetal genes.

Purpose: In this study we set out to further characterize the fetal-like gene program in HF, and investigate whether identified genes can serve as therapeutic targets.

Methods: and Results: Genes associated with the fetal-like gene program were shown to be expressed during cardiac development, while repressed in cardiac pathological models. In HF, and investigate whether identified genes can serve as therapeutic targets.

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Results: Genes associated with the fetal-like gene program were shown to be expressed during cardiac development, while repressed in cardiac pathological models. In HF, and investigate whether identified genes can serve as therapeutic targets.

Conclusion:Relative to sex matched wild-type littermates, the ERR alpha (ERR alpha) transgenic mice showed a 60% reduction in OPLAH expression and thereby increasing oxidative stress. OPLAH levels in cultured cardiomyocytes were manipulated by adenoviral transfection of short-hairpin RNA directed at OPLAH or human OPLAH over-expression (PLAH). A decrease in OPLAH lead to a 2-fold increase in oxidative stress, while over-expression displayed a cardio-protective effect. To test the in vivo physiological effects of OPLAH over-expression, aMHC-OPLAH (TG) mice were developed and exposed to IR injury. The TG mice had less oxidative stress upon myocardial infarction and smaller infarct size, ultimately resulting in an improved cardiac function, assessed by cardiac MPI and invasive hemodynamic measurements (Fig 1). Furthermore, the increase in oxidative stress observed in the wild-type (WT) littersmates upon cardiac injury was linked to elevated levels of tissue and plasma 5-oxoproline, measured by LC-MS. Interestingly, when measured in a large cohort of HF patients, elevated plasma levels of 5-oxoproline were associated with an impaired outcome (Fig 2).

Conclusions: Collectively these data describe the identification of OPLAH, a novel fetal cardiac gene involved in myocardial infarction, and its substrate 5-oxoproline as a putative novel circulating biomarker for HF.

815 Investigation of myocardial sarcosodynamics and myocardial sarcosomic protein alterations in a rodent model of physiological hypertrophy

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Funding Acknowledgements: National Research, Development and Innovation Office (NKFIH) of Hungary (K 120277)

Background: In contrast with pathological myocardial hypertrophy, long term exercise-induced cardiac enlargement is associated with functional amelioration. Thus understanding the cellular and molecular processes leading to physiological hypertrophy induced by exercise training might provide a novel therapeutic approach to prevent or treat heart failure.

Purpose: We aimed at determining left and right ventricular (LV and RV) cardiac sarcomeric modifications at cellular and molecular levels in a rat model of athlete’s heart and additionally, examining the reversibility of the observed alterations.

Methods: Young rats were divided into control (Co) and exercised (Ex) groups. Trained rats swam 200 min/day for 12 weeks. To investigate reversibility, detrained rats remained sedentary for 8 weeks after completion of the training protocol. LV morphometry was examined by echocardiography, while in vivo hemodynamic properties were provided by LV pressure-volume analysis. Force assessments on isolated permeabilized cardiomyocytes and molecular biological measurements (qRT-PCR, Western blot) were applied to reveal underlying mechanisms.

Results: Echocardiographic and post mortem measured organ weight data confirmed training-induced cardiac hypertrophy, while pressure-volume analysis revealed increased LV contractility in exercised hearts. The Ca2+ -activated force production of isolated cardiomyocytes was improved (Factive: LV 28.0 ± 1.4 kN/m² Ex vs. 15.8 ± 0.8 kN/m² Co, P < 0.05; RV 16.8 ± 1.1 kN/m² Ex vs. 12.1 ± 1.0 kN/m² Co, P < 0.05) along with increased Ca2+ sensitivity and rate constant of force redevelopment in trained rats. Ca2+-independent passive tension did not differ between the groups. Exercise training did not affect myocardial gene expression of α- and β-myosin heavy chain (MHC). Cardiac troponin I phosphorylation was decreased (tTN relative phosphorylation level: LV 0.66 ± 0.06 Ex vs. 1.00 ± 0.02 Co, P < 0.05; RV 0.65 ± 0.05 Ex vs. 1.00 ± 0.03 Co, P = 0.05), whereas the phosphorylation of titin and cardiac myosin binding protein-C was not altered in physiological hypertrophy. Complete reversibility of the observed alterations was detected in detrained rats.

Conclusions: Exercise-induced hypertrophy is associated with increased Ca2+-activated force and Ca2+ sensitivity of force production of LV and RV cardiomyocytes, which might be associated with hyperphosphorylation of cardiac troponin I. Cellular and molecular alterations regressed completely after 8 weeks of detraining.
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Biomarker profiling in heart failure with mid-range ejection fraction

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Background: Recently the ESC created a new classification of heart failure (HF) according to left ventricular ejection fraction (LVEF): reduced (HFREF) when LVEF is <40%, mid-range (HFMREF) when LVEF is between 40% and 49%, and preserved (HFPEF) when LVEF is >50%. The intermediate group of HFREF has been less studied in the past.

Purpose: We sought to explore a panel of biomarkers in patients with HF based on 2016 ESC-HF classification and assess whether they have different prognostic value in HFMREF.

Patients and methods: 1069 patients were included in the study (age 66±12.8 years, 72% male, 51% of ischemic aetiology, mean LVEF 33.5±13.3, 36% with diabetes mellitus). Serum concentrations of NTproBNP (N=1030), high-sensitivity troponin T (hs-TnT) (N=883), ST2 (N=814), Galactin-3 (N=811), Neprilysin (N=1069), and soluble transferrin receptor (sTfR) (N=794) were measured in consecutive ambulatory HF patients followed during 4.9±2.8 years (6.6±2.3 for alive patients). All-cause and cardiovascular death and the composite all-cause death or HF-related hospitalization and CV death or HF-related hospitalization were assessed.

Results: Biomarkers levels according to ESC HF classification are shown in the table. NTproBNP in HFREF patients was significantly lower than in HFMREF patients and was similar in HFPEF patients. In contrast, and remarkably, all the other biomarkers were similar between HFREF and HFPEF patients. On the other hand, ST2 and Cystatin-C were significantly lower in HFMREF patients than in HFPEF patients and Galactin-3 and ST3R also tended to be lower, without achieving statistical significance.

Conclusions: Although the biomarker levels were similar between HFMREF and HFPEF patients, from a multi-biomarker point of view HFMREF seems quite similar to HFREF except for NTproBNP that was lower.

Blood concentration of biomarkers

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>HFMREF (1) (n=134)</th>
<th>HFMREF (1) (n=134)</th>
<th>HFPEF (3) (n=135)</th>
<th>P (1-2)</th>
<th>P (1-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTproBNP, ng/L</td>
<td>1389 (986-3176)</td>
<td>1008 (316-2497)</td>
<td>956 (117-2241)</td>
<td>0.02</td>
<td>0.88</td>
</tr>
<tr>
<td>hs-TnT, ng/L</td>
<td>22.5 (10.8-38.6)</td>
<td>21.2 (9.4-41.2)</td>
<td>23.8 (11.5-41.6)</td>
<td>0.64</td>
<td>0.55</td>
</tr>
<tr>
<td>ST2, ng/ml</td>
<td>37.5 (30.4-49.4)</td>
<td>37.1 (29.1-48.8)</td>
<td>44.4 (32.3-57.3)</td>
<td>0.62</td>
<td>0.02</td>
</tr>
<tr>
<td>Galactin-3 ng/mL</td>
<td>16.1 (13.2-21.5)</td>
<td>16.1 (12.1-23.9)</td>
<td>19.2 (13.6-25.9)</td>
<td>0.75</td>
<td>0.07</td>
</tr>
<tr>
<td>hs-CRP, mg/L</td>
<td>3.53 (2.75-7.99)</td>
<td>3.02 (1.21-9.59)</td>
<td>4.77 (1.69-9.27)</td>
<td>0.99</td>
<td>0.34</td>
</tr>
<tr>
<td>Cystatin-C, mg/L</td>
<td>1.30 (1.07-1.73)</td>
<td>1.32 1.02-1.69</td>
<td>1.55 (1.20-2.08)</td>
<td>0.82</td>
<td>0.01</td>
</tr>
<tr>
<td>Neprilysin, ng/ml</td>
<td>0.63 (0.38-1.10)</td>
<td>0.68 (0.38-1.32)</td>
<td>0.74 (0.44-1.62)</td>
<td>0.44</td>
<td>0.39</td>
</tr>
<tr>
<td>STIR, ng/L</td>
<td>3.60 (2.80-4.60)</td>
<td>3.55 (2.9-4.68)</td>
<td>4.00 (3.20-5.28)</td>
<td>0.80</td>
<td>0.08</td>
</tr>
</tbody>
</table>

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Cardiac123I-mIBG scintigraphy as a gatekeeper for ICD implantation?

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Aim: Chronic heart failure (CHF) is a life-threatening disease, partly due to sudden cardiac death (SCD). Implantable cardioverter defibrillators (ICD) for primary prevention of SCD have improved overall survival of CHF patients. However, a high percentage of patients never receives appropriate ICD therapy. This prospective multicentre study evaluated whether cardiac sympathetic activity assessed by planar 123I-mIBG scintigraphy could optimize selection for ICD implantation.

Materials and Methods: 135 stable CHF subjects (age 64.5±9.3 years, 79% male, LVEF 25±6%) referred for ICD implantation for primary prevention in 13 European institutions were enrolled. All subjects underwent planar and SPECT 123I-mIBG scintigraphy. Planar images were acquired at 15 minutes (early) and 4 hours (late) after administration of 123I-mIBG. Early and late heart-to-mediastinum (H/M) ratio, 123I-mIBG washout (WO) and late summed scores were calculated. Cross-calibrated phantom study-data were used to correct for different gamma-camera-collimator use. The primary endpoint was appropriate ICD therapy. The secondary endpoint was the combined endpoint of all first cardiac events: appropriate ICD therapy, progression of heart failure (HF) and cardiac death.

Results: During a median follow-up of 32 months (6-68 months), 24 subjects (17.8%) experienced a first cardiac event (appropriate ICD therapy [12], HF progression [6], cardiac death [6]). The combination of late H/M ratio [HR 0.461 (0.281-0.757)] and LVEF [HR 1.052 (1.021-1.084)] was significantly associated with freedom of appropriate ICD therapy (p<0.001). Late H/M ratio was independently associated with the combined endpoint [HR 1.135 (0.935-1.017), p=0.001].

Conclusion: Planar myocardial 123I-mIBG-derived late H/M ratio and LVEF were associated with freedom of appropriate ICD therapy. In addition there was a significant association between late H/M ratio and the combined endpoint. Therefore, 123I-mIBG scintigraphy seems to be able to optimize the selection of CHF subjects who might benefit from ICD implantation.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>HR (95% CI)</th>
<th>X2</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freedom of appropriate ICD therapy</td>
<td>LVEF Late H/M</td>
<td>1.052 (1.021-1.084)</td>
<td>17.542</td>
</tr>
<tr>
<td></td>
<td>ICD therapy</td>
<td>0.461 (0.281-0.757)</td>
<td></td>
</tr>
<tr>
<td>Combined endpoint</td>
<td>Late H/M ratio</td>
<td>0.135 (0.035-0.517)</td>
<td>10.136</td>
</tr>
</tbody>
</table>

Multivariate Cox regression analysis for freedom of appropriate ICD therapy and combined endpoint of first cardiac events

818
Enhanced insulin clearance in advanced non-diabetic heart failure

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Funding Acknowledgements: Supported by Grants GA15-14200S (GAČR) and 16-27496A (IJVCR)

Background: The relevance of impaired glucose homeostasis intrinsically caused by heart failure (HF) are poorly understood. The goal of the study were to examine glucose regulation in non-diabetic (DM) patients with advanced HF and to analyze pancreatic β-cell secretory function.

Methods: 140 advanced HF patients without known DM and 21 sex-, age- and BMI-matched controls underwent body composition (DEXA) and oral glucose tolerance (OGTT) assessment with measurements of insulin, glucagon, glucagon-like peptide (GLP-1) and pro-insulin split product C-peptide in 0, 60, 90 and 120 min.

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Lifelong arrhythmic risk stratification in arrhythmogenic right ventricular cardiomyopathy: distribution of events and impact of periodical reassessment

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Funding Acknowledgements: We deny any relation with the industry and any source of financial support

Aims: The arrhythmic risk stratification of Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC) remains controversial. We evaluated the long-term distribution of life-threatening arrhythmic events assessing the impact of periodical risk reassessment.

Methods: Ninety-eight ARVC patients with no previous major ventricular arrhythmias were retrospectively analyzed. Patients were assessed at baseline, at 22 (interquartile range [IQR] 16–26), 49 (IQR 41–55) and 87 months (IQR 90–108). The primary endpoint was a composite of sudden cardiac death, ventricular fibrillation, sustained ventricular tachycardia or appropriate implanted cardioverter-defibrillator intervention. During a median follow-up of 91 months (IQR 34–222) 28 patients (29%) experienced the composite endpoint. The median time for the primary event was 35 months (IQR 18–86 months), and 39% of events occurred beyond 49 months of follow-up. History of syncope (HR 4.034; 95%CI, 1.488 to 11.185; p value=0.005), premature ventricular contractions (PVC) (HR 2.761; 95%CI 1.120–6.807; p value=0.027) and right ventricular fractional area change (RVFAC) (HR 0.945; 95% CI (0.906–0.985); p value=0.008) were found as independent predictors at baseline multivariate model. Nevertheless, when the prognostic impact of each variable was reassessed over time only NSVT (HR 3.282; 95%CI, 1.122 to 9.598, p value=0.023) and RVFAC (HR 0.351, 95%CI, 0.157 to 0.780; p value=0.010) remained independent predictors throughout the whole follow-up.

Conclusions: In our cohort of ARVC patients only NSVT and RVFAC maintained their independent prognostic impact in predicting arrhythmic events during the long-term follow-up. Periodical reassessment of risk in these patients is strongly recommended.
Amyloidosis is a disease caused by infiltration of tissues by an amyloid protein. The most frequent cardiac amyloidosis are light chain (AL) amyloidosis, hereditary transthyretin (TTR-T) and wild transthyretin (w-TTR).

**Objective:** Describe baseline clinical, biological, echocardiographic characteristics and prognostic of patients referred for cardiac amyloidosis in the Amyloidosis expert center.

**Methods:** From 2010 to July 2016, all patients referred to the expert center of our Hospital for suspected cardiac amyloidosis were included. Baseline demographic, clinical, laboratory and ultrasound characteristics were recorded and patients were followed-up for major events including death, cardiac transplantation and left ventricular assistance implant. Results: Of the 342 patients referred for suspicion of CA, 502 had confirmed CA of whom162 had AL amyloidosis, 203 h-TTR and 141 w-TTR. CA were men in 60%, the median age was 69 years w-TTR amyloidosis were older (83 [79;87], $p<0.001$) and more men (86%, $p<0.001$) than the two other types of CA, NYHA III-IV dyspnea was more frequent in AL amyloidosis (80%) and w-TTR (64%, $p<0.001$) compared to h-TTR, while neurological symptoms were more predominant in h-TTR (62% $p<0.001$). Creatinine, NT-proBNP, troponin were higher in AL amyloidosis and w-TTR ($p<0.001$) than in h-TTR. w-TTR amyloidosis had thicker Interventricular septum thicker, lower LVEF, higher global strain E/A and E/Ea ratios than the two other types of CA ($p<0.001$). Due to follow-up 137 major events occurred. Median follow-up was 228 (36) months. The survival without major event was 59% for AL amyloidosis, 79% for w-TTR, 81% for h-TTR versus 88% for patients without amyloidosis ($p<0.001$). In multivariate analysis, only NYHA class III-IV, hyponatremia, elevation of creatinine, troponin and NTproBNP were independent prognostic factors ($p<0.001$).Conclusion: Cardiac amyloidosis is more frequent than initially thought, with very different layouts.

**Background:** Strenuous exercise such a marathon race might induce an increase of the blood concentrations of some cardiac biomarkers usually measured for diagnosis and prognosis prediction of heart diseases. However the behavior of different cardiac biomarkers around a marathon race in both genders has not been well elucidated.

**Objective:** 1) To assess baseline, just after the marathon race and 2 days after the race blood concentrations of NTproBNP, hs-TnT and ST2; 2) Try to find some relationship between the observed changes and demographic and performance characteristics.

**Subjects and methods:** 79 subjects (72.2% men), with a mean age of 39.6 years (70.9% ≥ 35 years) were studied. Three blood samples were obtained: 24-48 hours before the race, in the immediate hours after the race and 48 hours after the race.

**Results:** Baseline data: hs-TnT blood levels tended to be higher in women ($p=0.07$). Only NTproBNP correlated with age ($p=0.007$), hs-TnT ($p=0.01$) correlated with weekly training hours and inversely correlated with the real time for completing the race ($p=0.009$). No biomarker correlated with the years of training. Biomarkers' dynamics: Blood levels of the three cardiac biomarkers significantly increased during the race (Table, $p<0.001$ for all), NTproBNP and ST2 decreased by similar pre-race values 48 hours after the race, while hs-TnT blood levels decreased but their remained higher than those pre-race (Table, $p<0.001$). Relationship with biomarker dynamics: We found higher increase of hs-TnT in women ($p=0.03$). We did not find any significant relationship between increase in the studied biomarkers and age or years of training. We found inverse relationship between weekly training hours and ST2 increase ($p=0.007$), and direct relationship between race time and hs-TnT ($p<0.001$) and ST2 ($p=0.052$) increase. In multivariable linear regression analyses including age, sex and those variables with a p-value ≤0.10 in the correlation analyses, race time remained independently associated with ST2 ($p=0.031$) and hs-TnT ($p<0.001$) increase. Conclusions: cardiac biomarkers significantly increased during a marathon race in amateur runners. Such increase reached abnormal values for hs-TnT and ST2, and was significantly associated with worse athlete performance.

**Purpose:** Our goal was to evaluate the additional prognosis value provided by pre-operative BNP combined to EuroSCORE II regarding inhospital mortality after cardiac surgery.

**Methods:** In a prospective cohort of 2209 patients, we validated the performance of EuroSCORE II and a combined model (EuroSCORE II with preoperative BNP). Multivariable logistic regression analysis was used to assess adjusted odd-ratios (OR). Discrimination performance was evaluated using receiver-operator-characteristics analysis area under curve (ROCAUC). Inter-model comparison was performed using the net reclassification index (NRI).

**Results:** Inhospital mortality rate was 4.8%. EuroSCORE II had a ROC AUC of 0.81; 95%CI 0.77-0.85, $p<0.0001$; however there were significant differences between predicted and observed mortality ($p<0.0001$). Elevated BNP (above 100 ng/l) was an independent risk factor of inhospital mortality (2.9% vs. 6.5%, adjusted OR 1.83; 95%CI 1.17-2.87, $p=0.008$). The combined model had a ROC AUC of 0.81; 95%CI 0.78-0.85, $p<0.001$. BNP reclassified 1180 (53.4%) patients. Moreover, BNP significantly improved risk stratification of EuroSCORE II with an NRI of 0.24; 95%CI 0.11-0.38, $p<0.001$.

**Conclusion:** Preoperative BNP improved the predictive capabilities of EuroSCORE II. Half the patients were reclassified; those with elevated BNP had a theoretical risk multiplied by 1.88 regarding inhospital mortality after cardiac surgery.
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Acute right heart failure in thyroid storm: warranting early thyroidectomy
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Introduction: Thyroid storm may manifest in acute right ventricular failure due to elevated pulmonary vascular resistance. A heightened catecholamine state is central to the disease and its cardiac manifestations. We discuss the presentation and management of a patient with idiopathic dilated cardiomyopathy and acute decompensated right heart failure due to thyroid storm.

Description: A 44-year-old man known to have idiopathic dilated cardiomyopathy presents with heart failure exacerbation requiring LVAD procedure. His peri-operative stay is complicated with atrial fibrillation and hyperthyroidism. This is followed by thyroid storm intra-operatively. He developed acute RV failure with intractable ventricular arrhythmias during surgery requiring a temporary RV assist device insertion with emergent thyroidectomy. Questions and Problems: 1. The treatment of atrial fibrillation in bi-ventricular failure sets a challenge due to the pathophysiology of hyperthyroidism in the setting of cardiogenic shock. 2. Should RV afterload reduction be considered in those patients? 3. Inotropic support of bi-ventricular failure in light of a heightened catecholamine state (hyperthyroidism) sets another challenge and requires aggressive measures earlier. 4. The optimal time of LVAD surgery is not studied in patients with hyperthyroidism. Is thyroidectomy warranted before the LVAD in high risk patients?

Discussion: The initial management of hyperthyroidism and thyroid storm is central to all the cardiac manifestation and should be dealt with promptly. The evidence of thyroid hormone suppression may not help prevent a thyroid storm, and so, the time of surgery should not be linked to the levels of thyroid hormones. Digoxin and beta blocker requirements for treatment of atrial fibrillation may be higher due to increased drug metabolism. In cardiogenic shock, the use of beta-blockers in those patients should be used cautiously. In hyperthyroidism, pulmonary hyperten-
sion occurs due to elevated pulmonary vasculature resistance. The role of pulmonary vascular vasodilators should be contemplated in acute event of RV failure. Inotropic support of bi-ventricular failure in the setting of a catecholaminergic state (hyperthyroidism) may be counterproductive and increases the risk of arrhythmias. An earlier bridge through ECMO may stabilize the patient prior to LVAD surgery and thyroidectomy.

Conclusion and Implications: Thyroid storm must always be suspected in refrac-
tory cases of cardiac arrhythmia, new onset right sided heart failure or worsening left heart failure. The RV is expected to fail in hyperthyroid states due to the pulmonary vasculature physiology. An ECMO bridge to LVAD is warranted due to the com-
plicated state of heightened catecholaminergic release. We suggest early ECMO followed by combined surgery of LVAD and thyroidectomy with or without a tempo-
rary right sided mechanical assist device.

825
It is possible to avoid an ICD implantation with empagliflozine?
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Introduction: We report a case of a 67-year-old female with diabetes mellitus and nonischemic dilated cardiomyopathy. She was being treated with ramipril 10 mg once daily, bisoprolol 10 mg once daily, eplerenone 25 mg once daily, furosemide 40 mg daily and metformine 850 mg three times daily. Her functional class was II of classification of New York Heart Association (NYHA), and had suboptimal metabolic control, with 7.5% of Hemoglobin A1c (Hba1c), her Body mass index (BMI) was 33.5. We decided introduce another oral antidiabetic to improve Hba1c, we choose empagliflozine due to possible benefits in heart failure (HF) situation, as we learned with is ’s clinical trial. She received 10 mg once daily, and one month later 25 mg of empagliflozine once daily. 4 weeks later, she improved her functional class, with no symptoms of heart failure, and lower level of natriuretic peptides. We revaluated the decision of implantable cardioverter defibrillator (ICD) new indicating the ICD due to symptoms of HF, so we refusèd the implant of ICD. 3 months later, she has no admissions due to heart failure and better metabolic control, with 6.7% of Hba1c. Conclusions and implications for clinical practice: Sodium-glucose co-transporter 2 (SGLT2) inhibitors are a new class of diabetic medications indicated for the treatment of type 2 diabetes which had shown benefits in heart failure situation and development of this issue. We present a case with improvement in HF situation and metabolic control, being possible the indication for ICD therapy.

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Simultaneous anterior and inferior ST segment elevation during hypoglycemia: myocardial infarction or Tako-tsubo cardiomyopathy?
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Introduction: Simultaneous ST-segment elevation in the precordial and inferior leads is a rare ECG finding. In literature this aspect is associated to the presence of an occlusion of a “wrapped” left anterior descending artery (LAD) below the first diagonal branch, so to a LAD that perfuses at least one-quarter of the inferior wall. Tako-tsubo cardiomyopathy (TTC) manifests with a clinical scenario mimicking acute myocardial infarction (AMI) and several cases of TTC associated with obstructive coronary artery disease have been reported. We present a case of ST segment ele-
vation occurred during hypoglycemia in which the differential diagnosis between of AMI and TTC results particularly challenging. Case report. An 85-year-old female patient presented to the Emergency Department for pulmonary edema associated with high arterial blood pressure. A routine ECG performed one year ago was completely normal. She had a history of diabetes and hypertension and experienced a severe hypoglycemic episode (glucose 20 mg/dl) two days before. She did not report chest pain episodes. The ECG at the admission showed negative T waves in the precordial leads and slightly negative T waves in the peripheral leads (fig. 1). The echocardiogram demonstrated moderate reduction of the left ventricular ejection fraction due to akinesia of the apical segments and moderate mitral regur-
gitation. The pulmonary edema resolved with non invasive ventilation, nitrates and diuretics. The Troponin T (TnT) arose until 267 ng/l (normal value < 14 ng/l) in six hours and then decreased. Two days later, during the night, the patient pre-
sented a new hypoglycemic episode (glucose 40 mg/dl) severely symptomatic for dyspnea and profuse sweating. She did not report chest pain. The ECG during hypo-
glycemia showed ST-segment elevation from V2 to V6, in DII, DIII and aVF (fig. 2) that only partially resolved after normalization of glucose level and resolution of symptoms. The echocardiogram showed severe reduction of the left ventricu-
lar ejection fraction (25%) due to akinesia of the apical segments (fig. 3). The TnT following this episode continued its descending trend (from 119 ng/l) before the episode, to 98 and 94 ng/l three and six hours respectively after the episode). The patient underwent coronary angiography which showed an ulcerated lesion of the left main branch and a subocclusion of the proximal “un-wrapped” LAD (fig. 4), treated with two drug eluted stents. After two days the echocardiographic left ventricular function markedly improved. The ECG at discharge presented negative T waves in the precordial leads. Conclusion. Our case report shows that AMI and TTC are often difficult to distinguish and that the presence of CAD should not be considered an exclusion criteria at all for the diagnosis of TTC, but symptoms, instrumental and biochemical data should be carefully evaluated to formulate the correct diagnosis.
Metabolic cardiomyopathy with heart failure: a late, reversible complication of bariatric surgery

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Introduction: Dilated cardiomyopathy (DCM) is characterized by cardiac enlargement and impaired left ventricular systolic function, mostly caused by coronary artery disease, which may be effectively treated with myocardial revascularization techniques. However, besides other generally progressive aetiologies of DCM, such as the idiopathic form, there are also reversible causes of DCM, including those secondary to arterial hypertension and alcoholism or to metabolic-nutritional imbalances, such as those operating in the present case. Case presentation: We report the case of a 74 years old woman, referred to the University Hospital of Parma because of progressive dyspnoea and peripheral oedema lasting from three months. In her clinical history, almost 30 years before the onset of the symptoms, she underwent a jeuno-ileal bypass surgery for severe obesity, with consequent 40 Kg weight loss. First clinical examination showed an undernourished (body mass index 16.8 Kg/m2), symptomatic subject with marked peripheral oedema and resting dyspnoea. Blood pressure levels were low (82/59 mmHg). ECG showed a sinus tachycardia with non-specific intraventricular conduction delay and flattened T-waves in the left precordial leads. An early echocardiogram demonstrated a left ventricular dilation with severe systolic dysfunction (end-diastolic diameter 60 mm; ejection fraction 22%) and severe functional mitral regurgitation (MR) (Fig. 1). Coronary angiogram excluded significant coronary artery disease. Laboratory blood tests showed: normal renal function, markedly reduced values of the main serum electrolytes (2.1 mEq/L potassium; 0.76 mEq/L ionized calcium; 6.8 mg/dL magnesium; 1.4 mg/dL inorganic phosphorus) and of the albumin (1.9 g/dL); significant anaemia (8.7 g/dL haemoglobin) and depletion of iron, folate and Vitamin D; a marked increase of the C-reactive protein (CRP 20 mg/L); and also a mild increase of the liver function. NT-ProBNP was raised at 2770 ng/L and troponin was negative. On the assumption of a malabsorption syndrome as the cause of dilated cardiomyopathy resulting in congestive heart failure, the patient received transfusion of 3 red blood cell units and a three-weeks’ lasting intravenous supplementation of potassium, magnesium, calcium, phosphorus, iron and vitamins, with early clinical and laboratory improvement. Then a sustained oral supplementation was initiated and continued after discharge from the Hospital. She also received pharmacological therapy with beta-blocker and angiotensin-receptor blocker (ARB), while loop diuretic treatment, initially needed to control oedema and dyspnoea, was permanently discontinued. At the follow-up the patient felt progressively better with significant improvement of the functional class (NYHA – from IV to I). Serial echocardiographic exams showed a left ventricular ejection fraction rising to 35% within one month, with downgrading of MR to a moderate degree, and to 65% after eight months, with complete regression of left ventricular dilation (51 mm end-diastolic diameter) and a further recovery of MR to a mild degree. Conclusions: This observation reports a rare case of bariatric surgery induced metabolic cardiomyopathy, which completely regressed after correction of nutritional abnormalities.

An unusual cause of dilated cardiomyopathy

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Introduction: A 36-year-old female with no significant previous medical history presented to the outpatient clinic complaining of progressive shortness of breath (NYHA III-IV) and weakness for 4 months. No recent history of cold, diarrhea or any other symptom. Blood pressure was 149/94 mmHg and she was not tachycardic. Signs of congestion were noted (fleld bilateral lung rales and peripheral oedema). She also presented exophthalmos and reported weight gain in the last months of frank predominance. No alcohol or other toxins consumption. Description of the problem, procedures: Electrocardiography showed sinus rhythm with no ischemic signs. Chest radiography revealed cardiomegaly and increased pulmonary vascularity. Blood test evidenced a normal hemogram, kidney and liver function. NT-ProBNP was raised at 2770 ng/L and troponin was negative. Echocardiogram evidenced a dilated left ventricle with severe systolic dysfunction (EF 19%), no segmental abnormalities or valvulopathies, were noted. Cardiac magnetic resonance confirmed the diagnosis and showed no fibrosis areas. Optimal medical treatment for dilated cardiomyopathy was initiated. Questions, problems or possible differential diagnosis: Facing the diagnosis of dilated cardiomyopathy potential causes of systolic dysfunction such as ischemic heart disease, myocarditis or infiltrative myocardiopathy were rule out. With the initial suspicion of possible thyroid alteration, the patient was referred to Endocrinology. Thyroid function was normal, but plasma and urinary cortisol levels were high, the dexamethasone suppression test showed an abnormal response suggesting an adrenal alteration. Abdominal CT scan confirmed the presence of an adrenal adenoma. Laparoscopic surgical intervention was initially performed, which was complicated by haemorrhagic shock after 48 hours due to a splenic laceration requiring laparotomy and spleenectomy. The patient was discharged 8 days after surgery. Over the following months, left ventricular dilation and ejection fraction progressively improved till almost normal values (Figure 1 A and B: chest X ray before-after surgery; C and D: cardiac-MRI before-after surgery). Answers and discussion: Cushing’s syndrome is an uncommon but potentially reversible cause of dilated cardiomyopathy, most often reported in patients with hypercortisolism arising from an adrenal adenoma. After adenoma excision, our patient presented a significant clinical improvement. Left ventricular diameters reduced till normal values, although mild left ventricle sphericity and borderline EF (50%) is still present 24 months after surgery. She is currently in NYHA I.

Conclusions and implications for clinical practice: Dilated cardiomyopathy and left ventricular failure are rare presentations of Cushing’s syndrome. It is important to consider this diagnosis because cardiomyopathy can be reversed following successful treatment of Cushing’s syndrome, as shown in our patient.
Diabetes, deafness and hypertrophic cardiomyopathy: Is it just a coincidence?

A 45 year-old white female with past history of diabetes mellitus (diagnosed at a very early age) and sensorineural deafness that required cochlear implant, was first diagnosed in 2007 of a non-obstructive hypertrophic cardiomyopathy. The same year, an ablation of three accessory pathways due to Wolff-Parkinson-White syndrome was performed. During follow-up she progressively developed asymptomatic left ventricular systolic dysfunction and in 2012 during an in-hospital admission secondary to a third-degree atrio-ventricular block that required implantation of a definite pacemaker, an echocardiogram was performed revealing severely depressed left ventricular systolic function. In 2015 she was admitted at our center because of acute heart failure. On physical examination, blood pressure was 80/50 mmHg and heart rate was 77 bpm. Heart sounds were rhythmic with no murmurs and pulmonary auscultation revealed bilateral rales at lung bases. NT-proBNP levels rose up to 6903 ng/ml. An electrocardiogram showed ventricular paced rhythm and an echocardiogram revealed severe left ventricular systolic dysfunction and moderate right ventricular systolic dysfunction. Intravenous diuretics were initiated but ACE inhibitors had to be interrupted due to hypotension. She also required conventional analgesics to treat frequent headaches. During hospital admission inquiry of family history was especially striking, as three out of her seven sisters were also diabetic and wore a cochlear implant, therefore suggesting a hereditary disorder. Considering her cardiovascular history (non-obstructive hypertrophic cardiomyopathy and cardiac conduction abnormalities), symptoms such as headaches, hearing impairment and early type 2 diabetes, a mitochondrial disease was suspected. A genetic study was requested revealing mitochondrial mutation in the MT-TL1 gene encoding tRNA, changing adenine to guanine at position 3243 of the mtDNA (m.3243A>G). The diagnosis of MELAS syndrome was then established and the patient was discharged after seven days with low-dose of bisoprolol, eplerenone, oral furosemide and nutritional supplements. During follow-up, an up-grade to TRC-D was scheduled and completion of a cardiac rehabilitation program achieved. Nevertheless, she continued to be on NYHA class III, being then admitted to hospital, our patient was discharged in well condition with slight symptoms and also difficulties to correct the main cause of disease.

Contrast CT of the chest: no data for pulmonary embolism (PE). Excess fatty tissue, compressive atelectasis of posterior segments.

Ultrasound of lower limbs: lymphedema, no data for thrombosis.

Central venous pressure: 280mmH2O. In 3 days after hospitalization, respiratory acidosis increased, we found increasing of potassium, creatinine, breath disorders appeared.

CPAP-BIPAP ventilation has been started. We marked elevation of plasma renin and low level of aldosterone/renin relation. Description of the problem. The main problem of this case was a 3rd degree obesity and non-specific symptoms of acute decompensated heart failure, in a combination with adrenal insufficiency, diabetes mellitus, chronic anemia and severe respiratory acidosis, as well as PE symptoms and also difficulties to correct the main cause of disease. Answers and discussion. First of all, our main goal of the treatment was weight correction and correction of respiratory acidosis with support of effective breathing. In cooperation with dietologists we prescribed optimal diet and in 3 weeks, she lost 22 kg. We started CPAP-BIPAP lung ventilation, and the problem of acidosis and hypercapnia was solved. Renal function in this case improved in 48-72 hours after correction of acidosis, and potassium level decreased to normal ranges accordingly. In a month after admission to hospital, our patient was discharged in well condition with slight symptoms of dyspnea and normal ranges of SpO2, BP, HR, pH, creatinine and renin levels. NT-proBNP decreased significantly, but still was elevated. In 4 month of follow up, the patient adheres to a diet and has 148kg.

Conclusion: Importance of comorbidities in heart failure prognosis is well known, but sometimes the value of their impact is crucial and the only way to improve cardiac function and regress HF symptoms is a successful treatment of main causes.

Main hemodynamic and lab parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP (mmHg)</td>
<td>100/65</td>
</tr>
<tr>
<td>HR (bpm)</td>
<td>64</td>
</tr>
<tr>
<td>CVP (mmH2O)</td>
<td>280</td>
</tr>
<tr>
<td>RBC</td>
<td>2,9</td>
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<tr>
<td>Hb (g/dL)</td>
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<tr>
<td>Potassium (mEq/L)</td>
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<td>Plasma renin (ng/mL)</td>
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<tr>
<td>pH</td>
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<tr>
<td>Alkaline phosphatase (U/L)</td>
<td>7,22</td>
</tr>
<tr>
<td>CRP (mg/dL)</td>
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</tr>
</tbody>
</table>

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Over-correction of symptomatic hyponatremia in chronic HF that required specific therapeutic adjustments against possible osmotic demyelination syndrome. An apparently counterintuitive approach.

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Introduction: Hyponatremia (serum Na⁺ < 135 mEq/L) in chronic heart failure (CHF) is associated with reduced survival and can be accompanied by various neurological symptoms, including postural instability, gait disorders, attention deficit and increased risk of falls, especially if values of ≤ 116 mEq/L are attained. Moreover, patients with CHF and chronic hyponatremia are more likely to develop complications from rapid sodium repletion, such as osmotic demyelination syndrome (ODS).

Case description: A female 74-year-old patient presented to the emergency department with a CHF clinical picture, coupled with new onset neurological symptoms. In particular, the patient had problems of her motor function, i.e., inability to walk with staggering posture, and her speech was difficult to understand. Clinical history and diagnosis. The patient was smoker and slightly obese. She suffered from chronic alcoholism and chronic atrial fibrillation. She had been treated with a bioprosthetic valve five years earlier for mitral stenosis-insufficiency. Moreover, along with usual therapy for CHF (digoxin, enalapril, carvedilol, warfarin), she was taking some drugs known to stimulate the arginine-vasopressin secretion, such as a thiazide (one tablet/day of hydrochlorothiazide 50 mg plus amiloride 5 mg), and an antidepressant drug belonging to the class of SSRIs (fluoxetine, 10 mg/day). The serum Na⁺, measured on admission, was 98 mEq/L. Based on this laboratory finding and neurological picture as well as the negative results of CT scan of the brain and electromyography, the diagnosis of symptomatic hyponatremia in CHF patient was made. Therapy and clinical outcome: A correction of the low serum Na⁺ was programmed. It was planned that the upper limit for the speed of correction should not have exceeded 6 mEq/L per day (NaCl 2 M, i.e., 11.6% NaCl, 10 ml vials; 5 vials in electric syringe, 7.5 ml/h, plus furosemide 20 mg as a slow IV bolus twice daily). However, after 72 h, serum Na⁺ rose to 126 mEq/L, i.e., a value much higher than the expected target. Subsequently the patient developed marked dysarthria, with slowed slurred speech, which was regarded compatible with the initial stage of the osmotic demyelination syndrome (ODS). Thus, the administration of furosemide and hypertonic saline (HSS) was discontinued and the patient was treated with hypotonic solutions (NaCl 0.45%) and subcutaneous desmopressin (a synthetic analog of arginine-vasopressin), at doses of 2 micrograms more times a day for some days.

After ten days in hospital, the patient was discharged in NYHA class II, after retrieval of her normal serum sodium levels together with complete regression of the neurological disorders. This was presumably caused by the loss of the stimulating effect on arginine-vasopressin secretion by the fluoxetine, that had been stopped, along with the discontinuation of the thiazide diuretic. In this case, chronic hyponatremia required a well-tailored correction because a high speed of Na⁺ correction could instead be burdened by the risk of ODS.

Conclusions: Considering that even moderate grades of hyponatremia can cause symptoms (dullness, reduced level of attention, postural instability, etc.), hyponatremia occurring during CHF should be systematically treated with appropriate pharmacologic approach while paying attention not to elicit ODS.
RAPID FIRE 3 – ACUTE HEART FAILURE – FROM DIAGNOSIS TO PROGNOSIS

The changing non-cardiovascular comorbidity profile of patients hospitalized with heart failure: Insights from the Get With The Guidelines-Heart Failure registry

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Funding Acknowledgements: Get With The Guidelines American Heart Association (AHA) research grant and a AHA Strategically Focused Research Network grant

Introduction: Co-morbid conditions are frequent among patients hospitalized for acute heart failure (HF). There is increasing recognition that non-cardiovascular (CV) comorbidities impact the outcomes of patients with HF. We assessed trends in non-CV comorbidities over time regarding the (1) the prevalence; (2) the total burden; and (3) the association with in-hospital outcomes among patients admitted with HF.

Methods: Using data from the GWTG-HF registry from 2005 to 2014, we assessed 6 key non-CV comorbidities (chronic obstructive pulmonary disease [COPD], anemia, diabetes, renal disease, obesity [BMI ≥ 30 kg/m2], and depression). We evaluated the association between the number of non-CV comorbidities (0, 1, 2, and ≥3) with in-hospital mortality and length of stay (LOS).

Results: We analyzed 207,884 HF patients with hospitalizations. 18% of patients had 0 non-CV comorbidities, 30% had 1, 27% had 2, and 25% of patients had ≥3. Patients with increasing numbers of non-CV comorbidities were younger and more likely to have HF with preserved ejection fraction. Over 9 years, there was an increase in the prevalence of all non-CV comorbidities over time (figure). There was an increase in the proportion of patients with ≥3 non-CV comorbidities over time (figure). Patients with an increasing number of non-CV comorbidities were at an increased risk of in-hospital mortality and length of stay > 4 days (table).

Conclusion: The increasing burden of non-CV comorbidities among patients hospitalized with HF over time reflects a shift in the profile of patients with HF. Strategies to manage and treat the growing burden of non-CV comorbidities will be required and should be included in the delivery of in-hospital HF care pathway.

<table>
<thead>
<tr>
<th>Number of non-CV comorbidities</th>
<th>Mortality Adjusted odds ratio (95% CI); p-value</th>
<th>Length of stay &gt; 4 days Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td></td>
<td>1.09 (1.00-1.12); p = 0.04</td>
<td>1.16 (1.12-1.19); p = 0.0001</td>
</tr>
<tr>
<td>1</td>
<td>1.32 (1.21-1.43); p = 0.0001</td>
<td>1.32 (1.27-1.36); p = 0.0001</td>
</tr>
<tr>
<td>≥3</td>
<td>1.54 (1.39-1.72); p &lt; 0.0001</td>
<td>1.67 (1.50-1.75); p &lt; 0.0001</td>
</tr>
</tbody>
</table>

Background: A single measurement of NT-proBNP, either at admission or discharge of a hospitalization for acute decompensated HF (ADHF), has been reported to provide equal prognostic information for patients with either reduced (HFREF) or preserved (HFpEF) ejection fraction. However, HFREF patients have lower absolute NT-proBNP levels and less evidence for prognostically relevant medication. Therefore, the change in NT-proBNP levels is expected to be of lesser magnitude in HFREF.

Purpose: We assessed the change in NT-proBNP levels in HFPEF versus HFREF, stratified for baseline levels. We readdressed the prognostic significance of NT-proBNP changes compared to levels at admission and discharge, in both groups.

Methods: This study is a pooled individual patient data-analysis assembled from 7 prospective cohorts comprising 1131 patients. The endpoint was all-cause mortality within 180 days after discharge. NT-proBNP levels were measured at admission and discharge. Patients with LV EF ≥45% were categorized as HFREF (n = 319), and those with < 45% as HFREF (n = 812). Percent NT-proBNP reduction from baseline levels was calculated for HFREF versus HFpEF, each stratified for admission NT-proBNP categories. Contributions to prognosis of admission and discharge NT-proBNP levels (in four categories) and of relative NT-proBNP reductions (in three categories) were assessed in both groups by Cox regression analysis.

Results: Patients with HFREF had significantly lower median NT-proBNP levels than those with HFREF both at admission (4432 pg/mL, p ≤ 0.001) and at discharge (2148 pg/mL, p ≤ 0.001). All-cause 180-day mortality was non-significantly lower in patients with HFREF compared to patients with HFREF (12% versus 16%, p = 0.13). Within each NT-proBNP quartile at admission, HFREF responded with a similar percent reduction in NT-proBNP as HFREF. A ≤30% percentage reduction in NT-proBNP carried similar 180 day mortality risks for HFREF and HFREF (HR 3.72, 95% CI 1.39-9.97; HR 4.62, 95% CI 2.64-8.08, respectively), adjusted for admission NT-proBNP levels and other known predictors. Similar pattern was found, with somewhat lower HR’s, for a ≤30% percentage reduction adjusted for NT-proBNP values at discharge (HR 2.94, 95% CI 0.89-7.37; HR 2.19, 95% CI 1.21-3.95, respectively). Finally, we showed that particularly for HFREF patients the value of the risk estimates increased after adding the reduction...
percentage to increasing absolute NT-proBNP levels, while for HFREF patients this effect remained modest.

Conclusions: For patients hospitalized for ADHF, a change in NT-proBNP during hospitalization determines prognosis in HFPEF and HFREF alike, and these changes in NT-proBNP are also equally possible. For absolute NT-proBNP levels HR’s apply for both HFPEF and HFREF patients following the concept of the lower the better; adding information of change in NT-proBNP is particularly of influence on the prognostic information of absolute levels in HFPEF patients.

**878** Bio-ADM: a novel marker of congestion in patients with acute heart failure

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University of Groningen, University Medical Center Groningen, Groningen, Netherlands; 2Clinical University Hospital Lozano Blesa, Servicio de Medicina Interna, Zaragoza, Spain; 3Sphingotec, GmbH, Heidelberg, Germany; 4National Heart and Lung Institute, Royal Brompton and Harefield Hospitals, Imperial College, London, United Kingdom; 5University of Brescia, Brescia, Italy; 6Momentum Research Inc., Durham, United States of America; 7Brigham and Women’s Hospital, Boston, United States of America

**Objectives:** We studied the potential role of plasma biologically active adrenomedullin (bio-ADM), as a marker of congestion in AHF. In addition, we evaluated bio-ADM’s added prognostic value on top of predefined models and clinically assessed congestion.

**Methods:** Plasma bio-ADM was evaluated at baseline, days 2 and 7 in 1562 patients admitted for AHF (enrolled in the PROTECT cohort). Clinical congestion was assessed using a composite score (ranging from 0 to 9) encompassing peripheral edema, orthopnea and jugular venous pressure.

**Results:** Median [IQR] baseline bio-ADM level was 44.1 pg/mL [25.9-82.7] (compared to healthy subjects, median: 20.7 pg/mL, 99th percentile: 43 pg/mL). Amongst a large number of clinical and biochemical variables, bio-ADM had the strongest association with clinically assessed congestion (OR=1.76, 95%CI: 1.56-1.99; p<0.001) and bio-ADM was the strongest predictor of the presence of significant residual congestion at day 7 (OR=1.87, 95%CI: 1.62-2.17; p<0.001). In patients with residual congestion at day 7, bio-ADM levels remained high while BNP levels decreased. At day 7, bio-ADM was an independent predictor of 60-day heart failure rehospitalization on top of predefined predictors and clinically assessed congestion at day 7 (HR=1.30, 95%CI: 1.04-1.63; p=0.019), while BNP was not.

**Conclusions:** In patients hospitalized for AHF, plasma bio-ADM is strongly associated with clinically assessed congestion and an independent predictor of early rehospitalization.

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Funding Acknowledgements: Sanofi

**Background:** Natriuretic peptides (NP) are used clinically to aid in the diagnosis of heart failure (HF) and considered for monitoring clinical status in patients with this syndrome. The timing of any such changes prior to a HF hospitalization (HFH) remains less well explored. We implemented a novel statistical approach to better characterize temporal changes of NP prior to HFH.

**Methods:** B-type natriuretic peptide (BNP) and N-terminal prohormone B-type natriuretic peptide (NT-proBNP) were measured in 5450 patients with type 2 diabetes and a recent coronary event in the ELIXA trial (NCT0147256). Measurements were done at baseline and at weeks 24, 78, and 108; patients were included in the present analysis if they had measurements at both baseline and 24 weeks with no intervening HFH. To characterize potentially non-linear temporal changes in NP levels preceding adjudicated HFH, we utilized all measurements available prior to HFH in a post-hoc, retrospective repeated-measures analysis using restricted cubic splines, with non-HFH patients as a control group. NP values are summarized using geometric means at various time points prior to HFH.

**Results:** During a median follow-up of 26 months, 151 patients (3%) experienced HFH. Patients who experienced HFH had higher baseline NP levels compared to patients without HFH (BNP [334 pg/mL vs. 101 pg/mL, p<0.001]; NT-proBNP [862 pg/mL vs 304 pg/mL; p<0.001]). Geometric mean levels of patients who did not experience HFH declined slowly with time (Figure). In those who experienced a HFH, NP levels remained relatively constant until about 6 months prior to HFH, and subsequently increased approximately two-fold by the time of HFH (BNP: 478 pg/mL vs 304 pg/mL; p<0.001). NP values are summarized using geometric means at various time points prior to HFH.

**Figure:**

- **Geometric mean concentrations:**
  - NT-proBNP (panel B) before HFH – blue line, compared with patients with no HFH (panel A).
  - NT-proBNP (panel B) before HFH – black line, compared with patients with no HFH – black line (no HFH: n=5299, HFH: n=151).

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**879** Increases in natriuretic peptides precede heart failure hospitalization in patients with a recent coronary event and type 2 diabetes

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**Background:** Natriuretic peptides (NP) are used clinically to aid in the diagnosis of heart failure (HF) and considered for monitoring clinical status in patients with this syndrome. The timing of any such changes prior to a HF hospitalization (HFH) remains less well explored. We implemented a novel statistical approach to better characterize temporal changes of NP prior to HFH.

**Methods:** B-type natriuretic peptide (BNP) and N-terminal prohormone B-type natriuretic peptide (NT-proBNP) were measured in 5450 patients with type 2 diabetes and a recent coronary event in the ELIXA trial (NCT0147256). Measurements were done at baseline and at weeks 24, 78, and 108; patients were included in the present analysis if they had measurements at both baseline and 24 weeks with no intervening HFH. To characterize potentially non-linear temporal changes in NP levels preceding adjudicated HFH, we utilized all measurements available prior to HFH in a post-hoc, retrospective repeated-measures analysis using restricted cubic splines, with non-HFH patients as a control group. NP values are summarized using geometric means at various time points prior to HFH.

**Results:** During a median follow-up of 26 months, 151 patients (3%) experienced HFH. Patients who experienced HFH had higher baseline NP levels compared to patients without HFH (BNP [334 pg/mL vs. 101 pg/mL, p<0.001]; NT-proBNP [862 pg/mL vs 304 pg/mL; p<0.001]). Geometric mean levels of patients who did not experience HFH declined slowly with time (Figure). In those who experienced a HFH, NP levels remained relatively constant until about 6 months prior to HFH, and subsequently increased approximately two-fold by the time of HFH (BNP: 478 pg/mL vs 304 pg/mL; p<0.001). NP values are summarized using geometric means at various time points prior to HFH.

**Figure:**

- **Geometric mean concentrations:**
  - NT-proBNP (panel B) before HFH – blue line, compared with patients with no HFH (panel A) and NT-proBNP (panel B) before HFH – black line, compared with patients with no HFH – black line (no HFH: n=5299, HFH: n=151).

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The continuous conundrum of hyponatremia in acute heart failure: from depletion to dilution, different phases for different outcomes

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Background: Hyponatremia is the most common electrolyte abnormality found in hospitalized patients with acute heart failure (AHF) and is related to poor prognosis.

Purpose: In this study we compared dilutional versus depletional hyponatremia (defined on the basis of hematocrit values) in terms of congestion and renal dysfunction; we also investigated the two pattern respect to short/long term outcome.

Methods: This was a retrospective single center study including subjects, with a primary diagnosis of AHF screened from Diur-HF trial. Serum creatinine, blood urea nitrogen (BUN), serum electrolytes and B-type Natriuretic Peptide (BNP) were assessed with 24 hours from admission and at discharge at a central laboratory. We categorized hyponatremia in dilutional (serum sodium < 135mEq/L with hematocrit values < 35%) and depletional (serum sodium < 135mEq/L with hematocrit values ≥35%). Congestion score was evaluated considering five principal signs and giving for each sign 1 point (third heart sound, pulmonary rales, jugular venous stasis, hepatomegaly, and peripheral edema). Patients were followed for six months and composite outcomes were considered the sum of death or rehospitalization for AHF.

Results: Our definitive sample consisted of 233 AHF patients, and hyponatremic patients were 68.27%. Patients had dilutional hyponatremia and 41 patients had depletional hyponatremia. Patients with dilutional hyponatremia showed lower serum levels of admission hematocrit ([30 versus 40.4 ± 8 versus 6%], p < 0.001), admission hemoglobin ([10.0 ± 1.1 versus 13.0 ± 1.4 versus 12.2 ± 2.0 g/dL, p < 0.001], admission potassium ([3.8 ± 0.5 versus 4.0 ± 0.5 versus 4.1 ± 0.5 mEq/L, p = 0.04]) and EF ([33.8 ± 8 versus 35.13 versus 38 ± 12%], p = 0.04). Mean furosemide home daily dosage was higher in patients with dilutional hyponatremia respect to patients with dilutional hyponatremia and patients with normal serum sodium levels ([181 ± 26 versus 176 ± 21 versus 150 ± 46 mg/die, p < 0.001]). Univariate and multivariable Cox regression model evaluating 60 days death or rehospitalization showed that dilutional hyponatremia was related to poor outcome (HR 2.64 [1.40-4.98], p = 0.003. M-HR 2.17 [1.08-4.37], p = 0.03). Univariate analysis for 180 days death or rehospitalization, univariate analysis demonstrated that both dilutional hyponatremia (HR 2.17 [1.32-3.55], p = 0.002) and depletional hyponatremia (HR 1.71 [1.11-2.62], p = 0.01) were related to poor prognosis; multivariable analysis confirmed the same trend.

Conclusions: Our findings showed that dilutional hyponatremia could be defined as the last phase of AHF with severe clinical congestion and diuretic resistance. Depletional hyponatremia represented the previous phase respect to dilutional hyponatremia reflecting better outcome and clinical status.

Clinical characteristics and predictors of one-year outcomes in patients hospitalized for heart failure: results from the Polish part of the ESC-HF-Pilot and ESC-HF-LT Registries

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Introduction: The Heart Failure (HF) Association of the European Society of Cardiology (ESC) created the Heart Failure Pilot Survey (ESC-HF Pilot) and Heart Failure Long-Term Registry (ESC-HF-LT) which are prospective, multicentre, observational registries aimed to evaluate the clinical profile, pharmacotherapy and one-year outcomes of HF patients in the European countries.

Purpose: The aim of the study was to compare the clinical characteristics and one-year outcome, as well as predictors of mortality and hospital readmissions in patients hospitalized for HF enrolled in the ESC-HF-Pilot or ESC-HF-LT Registry.

Methods: The analysis included hospitalized Polish patients enrolled in the ESC-HF-Pilot Registry and in the phase I of the ESC-HF-LT Registry. The primary endpoint (PE) was all-cause death at one year, while the secondary endpoint (SE) was composed of all-cause death or rehospitalization for worsening HF at one year.

Results: The total Polish cohort of both Registries included 2,019 patients. The final analysis comprised 1,415 inpatients, 650 from the ESC-HF-Pilot and 765 from the ESC-HF-LT Registries. The PE was reached by 209 of the 1,361 patients (15.4%). In the ESC-HF-Pilot Registry the PE occurred in 89 of the 650 patients (13.7%), whereas in the ESC-HF-LT Registry the PE occurred in 120 of the analyzed 711 patients (16.9%; p = 0.11). The SE occurred in 423 of the 1,172 patients (36.1%), including 201 of the 509 patients from the ESC-HF-Pilot Registry (39.5%) and 222 of the 663 patients from the ESC-HF-LT Registry (33.5%; p = 0.04). The independent predictors of PE in the total population from both registries were older age, chronic obstructive pulmonary disease (COPD), higher New York Heart Association (NYHA) class at admission, lower serum sodium at admission, support of inotropics during index hospitalization, lower systolic blood pressure (SBP) at discharge, higher heart rate at discharge, and amiodarone at discharge. The prescription of beta-blockers at discharge was associated with significantly decreased mortality. The independent predictors of SE were diabetes, myocardial infarction, NYHA class at admission, lower serum sodium at admission, lower serum potassium at admission, support of inotropics during index hospitalization, use of diuretics intravenously during index hospitalization and lower SBP at discharge.

Conclusions: The results of the present study reveal, that patients hospitalized for HF remain at high risk for adverse outcomes, including death and HF rehospitalization. The recent progress in diagnosis and treatment of HF changes the patients’ clinical profile and frequency of HF readmission.

Hospitalization for heart failure in stable coronary artery disease outpatients: determinants, role of interim myocardial infarction, and prognosis

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On behalf of: CORONOR registry group

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Background. There is a lack of recent data on incidence, correlates, and prognosis associated with the development of heart failure (HF) in patients with stable coronary artery disease (CAD).

Objectives: To analyze the risk of hospitalization for HF, together with relevant associated factors, and related mortality, in stable CAD outpatients.

Methods: The multicenter CORONOR registry enrolled 4,184 unselected outpatients with stable CAD (ie myocardial infarction (MI) and/or coronary revascularization <1 year previously). Five-year clinical follow-up was achieved for 3,781 (89%) of the 3,781 patients who had no history of hospitalization for HF at inclusion.

Results: Hospitalization for HF occurred in 6.1% of the patients at 5-year and was a powerful predictor of mortality in a time-dependent analysis (age and sex adjusted HR = 7.62 [6.0-9.68]; P < 0.001). Six variables were independently associated with hospitalization for HF: left ventricular ejection fraction (LVEF), age, diabetes mellitus, atrial fibrillation, history of hypertension, and low estimated glomerular filtration rate. As most patients had a normal LVEF at inclusion (mean = 59 ± 10%; 86% with LVEF ≥ 50%), although low LVEF was a strong predictor of hospitalization for HF, a majority of them (82%) occurred in patients with preserved LVEF. Interim MI was strongly associated with hospitalization for HF (HR=3.63 [2.17-6.08]; P < 0.0001) but was a relatively rare circumstance (7.6% of the patients hospitalized for HF).

Conclusions: HF development remained relatively frequent in patients with stable CAD and was associated with a high risk of mortality. Although the LVEF at inclusion was a strong predictor of HF, we emphasized that the majority of cases of HF occurred in patients with preserved LVEF at inclusion and without an interim MI.
Background: Acute heart failure syndromes (AHFS) can be classified into heart failure (HF) which presenting for the first time (de novo) or acutely decompensated chronic HF (AD-CHF). We compared the differences between de novo HF and AD-CHF regarding their clinical features and prognosis.

Method: We evaluated the AHFS patients hospitalized in ten regionally-representative tertiary university hospitals who registered in the Korean Acute Heart Failure (KorAHF) Registry from March 2011 to February 2014.

Results: Among the 5,625 patients who were registered at KorAHF Registry, 2,944 patients (52.3%) were classified as de novo HF and 2,681 patients (47.7%) were classified as AD-CHF. AD-CHF patients were older, more often women, and more likely to have hypertension, diabetes, ischemic heart disease, chronic kidney disease and atrial fibrillation. Regarding precipitating factors, infection, renal failure, anemia or bleeding, noncompliance and recent addition of negative inotropic drugs were predominant in AD-CHF, whereas ischemic event, severe hypertension, excessive alcohol or illicit drug use and endocrine abnormalities were predominant in de novo HF. AD-CHF patients showed lower serum sodium and hemoglobin, higher blood urea nitrogen and serum creatinine, and higher B-type natriuretic peptide level. De novo HF patients showed higher LV EF, smaller LV and diastolic dimension and LA size, and lower LV systolic pressure. Although the use of renal replacement therapy was comparable, de novo HF patients were more frequently supported by mechanical ventilator and mechanical assisting device including IABP, PCPS and AD-CHF patients used inotropes more frequently. While in hospital mortality was comparable between two groups (0.5% in AD-CHF vs. 4.6% in de novo HF, P = 0.396), 1-year mortality was significantly higher in AD-CHF patients (22.3% vs. 13.9%, P < 0.001). In multivariate analysis for 13 risk variables including age, sex, and brain natriuretic peptide, the hazard ratio for the mortality was increased in patients with AD-CHF (Figure).

Conclusion: Independent of other key prognostic variables, AD-CHF had significantly worse prognosis than de novo HF. They also showed many differences in clinical presentation, risk factors and laboratory values. Better understanding on these differences between de novo HF and AD-CHF is needed to improve outcomes for AHFS.

Introduction: Distinctive clinical, echocardiographic and biochemical features of chronic heart failure with preserved and reduced ejection fraction (HFPEF and HFREF) are well known, yet insights into the presentation of acute HFREF and ADHF are scarce.

Objectives: This study aimed at characterizing acute HFPEF (defined as left ventricular [LV EF ≥ 40%], HFREF [LV EF < 40%] and acute dyspnea of non-cardiac origin, with special emphasis on congestion, right ventricular (RV) and kidney dysfunction at admission.

Methods: Included patients derived from MEDIA-DHF (NCT02446327), investigating diagnostic and prognostic potential of echocardiographic measurements and biomarkers of congestion (MR-proANP and sCD146) in the initial, early presentation (< 4 h of admission) of acutely decompensated heart failure (ADHF) and acute non-cardiac dyspnea.

Results: One hundred and forty-six patients with acute dyspnea were included in the study: 101 ADHF patients (82 classified as HFREF, 41 as HREF, with [LV EF 50% [40-60] and 29% [20-33] respectively) and 45 with dyspnea of non-cardiac origin [LV EF 60% [54-65]). At admission, clinical characteristics were similar in ADHF and non-cardiac dyspnea patients, yet echocardiographic analysis of congestion, RV and LV systolic and diastolic function as well as biochemical analysis of kidney function, inflammation, fibrosis, cardiac substrate and congestion differentiated between ADHF and non-cardiac dyspnea. Apart from indices of LV systolic function, HFPEF and HFREF patients presented similar echocardiographic alterations at admission, including comparable RV dysfunction (TAPSE 17 mm [14-20] and 17 mm [15-21] respectively, p > 0.05) and comparable signs of hemodynamic congestion (enlarged inferior vena cava and right atrium), except for a larger left atrium in HFREF (29 ± 8 cm²) compared to HFPEF (25 ± 7 cm²; p = 0.015). HFPEF and HFREF had similarly elevated plasma levels of MR-proANP and sCD146 that were both associated with poor outcome. Furthermore, HFPEF and HFREF had similar impairment of eGFR though parameters of congestion associated with kidney dysfunction in HFREF (eGFR and surface right atrium: r = -0.547, p = 0.0428; eGFR and TVC diameter: r = -0.559; p = 0.0016), yet not in HFPEF (eGFR and surface right atrium: r = -0.132; p = 0.6274; TVC diameter: r = 0.034; p = 0.8957).

Conclusion: In acute conditions, HFPEF and HFREF presented in a comparable state of hemodynamic congestion, with similarly altered RV and kidney function. The circulating biomarkers MR-proANP and sCD146 were reliable markers of global congestion as well as one-year prognosis in AHFS.
with pseudo-WRF (11%) and those without WRF (27%). P < 0.0005. The occurrence of true WRF was an independent predictor of all-cause mortality (hazard ratio [95% confidence interval]: 4.43 [2.09-9.42], P = 0.0001). Conclusions: In patients with AHF, only true WRF identifies those with extremely high risk of death whereas development pseudo-WRF does not affect long-term outcome.

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Functional mitral regurgitation predicts short-term adverse events in acute heart failure patients with reduced left ventricular ejection fraction

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Background: Functional mitral regurgitation (FMR) is a common finding among patients with acute heart failure (AHF) and reduced left ventricle systolic function (LVSF). However, the short-term prognostic impact of FMR at discharge in AHF remains unclear. We aimed to evaluate the association between the severity of FMR and short-term adverse outcomes following a hospitalization for AHF.

Methods: We prospectively included 1180 consecutive patients with LVSF discharge with a diagnosis of AHF. Of these, 242 patients (20.4%) with organic mitral valve disease, congenital heart disease or aortic valve disease were excluded, leaving the study sample in 938 patients. FMR was assessed semi-quantitatively by colour Doppler analysis of the regurgitant jet area and its severity categorized as: a) none or mild (grade 0), b) moderate (grade II) or severe (grade III or IV). The primary end-point was the composite of all-cause mortality and rehospitalization at 90 days. Multivariate analyses were performed using Cox proportional hazards models.

Results: At discharge, 533 (56.8%), 253 (26.9%) and 152 (16.2%) patients showed none-mild, moderate and severe FMR, at 90-day follow-up, 161 patients (17.2%) either died or were readmitted (112 patients). Rates of the composite endpoint were higher for patients with moderate and severe FMR as is shown in figure below. After multivariable adjustment, compared to patients with none or mild FMR, those with moderate and severe FMR had a significantly higher risk of reaching the endpoint [HR=1.50; 95% CI: 1.04 – 2.17; p<0.023, respectively].

Conclusion: FMR is a dynamic condition among patients with AHF and LVSF. According to our results, more than mild FMR present at discharge identify a subgroup of higher risk of adverse clinical outcomes at short-term.

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High serum bilirubin is associated with short-term mortality following a myocardial infarction complicated by heart failure and/or left ventricular systolic dysfunction

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Objective: Higher serum bilirubin has been associated with poorer prognosis in patients with heart failure (HF). We examined the association between serum bilirubin and clinical outcomes in patients with clinical signs of HF and/or left ventricular systolic dysfunction (LVD). Methods: 7467 patients from the High-Risk MI Database Initiative (which merged the datasets of the CAPRICORN, EPHEBUS, OPTIMAAI and VALIANT trials) with an available baseline total bilirubin concentration were studied. The association between baseline bilirubin concentration and cardiovascular mortality, hospitalization for HF and all-cause mortality was assessed using Cox proportional hazards models.

Results: The mean baseline total bilirubin concentration was 12 ± 7 μmol/l and was above the normal range (>17.1 μmol/l) in 1053 (14.1%) patients. In multivariable analysis, with adjustment for baseline characteristics (demographic, co-morbidity, Killip score, left ventricular ejection fraction and laboratory variables), patients with bilirubin >17.1 μmol/l were at significantly higher risk for 90-day cardiovascular mortality (HR=1.45, CI=1.14-1.86, p = 0.003), cardiovascular mortality or hospitalization for HF (HR=1.26, CI=1.05–1.51, p = 0.02) and all-cause mortality (HR=1.51, CI=1.20-1.91, p < 0.001). The addition of bilirubin in the survival model was associated with a significant improvement in reclassification to predict cardiovascular mortality (continuous net reclassification improvement=6.4%, CI=0.7-9.6%, p = 0.04).

Conclusions: In MI patients complicated with HF and/or systolic dysfunction, bilirubin concentration is an independent predictor of mortality and improves risk stratification. This low-cost routinely available biomarker may improve risk assessment in this population.

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CHADS2-T2 - a new risk score to predict acute decompensated heart failure in patients with atrial fibrillation

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Background: Atrial fibrillation (AF) is a frequent comorbidity in patients with heart failure (HF). Currently, there are several tools for prediction of acute decompensated heart failure (ADHF).

Purpose: We aimed to evaluate the prognostic value of two new scores (CHADS2-T2 and CHADS2-VASc-T2) based on well-known AF stroke risk scores, in the prediction of ADHF in patients with AF at 12-month follow-up.

Methods: 2181 consecutive patients with AF who were evaluated in our Emergency Department (ED) in a 12 month period were included retrospectively in our study. Among them, 423 patients were admitted for in-hospital management. We evaluated medical charts in order to calculate AF stroke scores at discharge: CHADS2, CHADS2-VASc and ATRIA Score. We added 2 points if there was a documented troponin I exceeding the 99th percentile of the reference population: CHADS2-T2 and CHADS2-VASc-T2. Primary outcome was the incidence of ADHF 12 months after discharge.

Results: We included 348 patients who were successfully discharged and who had at least one troponin I measurement during hospital admission (mean age of 71.8 ± 0.7 years, 39.4% males). In receiver-operating characteristic (ROC) analysis (Figure 1A), CHADS2-T2 score performed better than other scores in predicting ADHF (CHADS2 – c-index 0.702, p < 0.001; CHADS2-T2 – c-index 0.740, p < 0.001; CHADS2-VASc – c-index 0.662, p = 0.001; CHADS2-VASc-T2 – c-index 0.721, p < 0.001; ATRIA Stroke – c-index 0.652, p = 0.002). A CHADS2-T2>2 (Figure 1B) had a sensitivity of 85.7% (CI 95%: 71.5-94.6%) and a specificity of 53.5% (CI 95% 46.6-59.3%) for prediction of ADHF at 12-month follow-up.

Conclusions: The new CHADS2-T2 score is an easy and simple tool with high sensitivity, which can predict the risk of ADHF in patients with AF.

Scores and Risk of ADHF

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Prognostic impact of right ventricular function in acute heart failure

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Background: Acute decompensated heart failure (ADHF) is a major health problem worldwide. Prognostic stratification in the acute phase remains challenging despite several scores combining demographic, clinical and laboratory parameters have been proposed. Left ventricular (LV) systolic function is not generally a major determinant of outcome and in large registries the prognosis did not clearly diverged among patients with reduced or preserved ejection fraction (EF). On the other hand, right ventricular (RV) function is emerging as a strong outcome predictor in chronic HF but was not previously evaluated in ADHF setting.

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Rapid Fire 3–Acute heart failure–From diagnosis to prognosis

Purpose: In the present study we sought to evaluate the impact of RV dysfunction on 2-years survival in a large cohort of patients admitted for ADHF and to assess the short-term in-hospital evolution of RV function after appropriate treatment.

Methods: We retrospectively screened all consecutive patients admitted for ADHF in our Department from January 2009 to December 2014. RV systolic function was assessed on echocardiography < 24 h from admission and at discharge (median time 8 days). RV dysfunction was defined by a TAPSE < 16 mm and/or a RV fractional area change <35%. The primary endpoint was 2-years all-cause mortality.

Results: Globally, 560 patients with available RV function assessment were included. Mean age was 69 ± 12 years, 70% were males and 49% were ischaemic. Mean systolic blood pressure (SBP) at admission was 128 ± 26 mmHg, mean creatinine and median BNP values were respectively 1.36 ± 0.64 mg/dl and 776 (95% CI 707-845) pg/ml. RV function was impaired in 241 patients (43% of the overall cohort). In these patients non-ischaemic etiology of HF was more frequent (54% vs 41% of ischaemic, p < 0.002). They were younger (age 68 ± 14 years vs 72 ± 10, p < 0.001) with a lower rate of comorbidities. SBP at presentation was lower (120 ± 23 vs 133 ± 27 mmHg, p < 0.001). RV dysfunction was more frequent among patients with reduced LVEF (56%) compared to patients with mid-range EF (20%) and preserved EF 40-49% vs EF >50%, p < 0.001). In the univariate analyses urea (p < 0.03), diabetes (p = 0.004), SBP at presentation (p < 0.006), and ST2 (p < 0.004) were associated with 30-days HF-related re-hospitalization and, NTproBNP showed borderline results (p = 0.07), whereas diabetes (p = 0.04), Barthel index (p = 0.01), ST2 (p = 0.004) and ST2 (OR 1.27 [1.08-1.48], p = 0.004), ST2 (OR 1.41 [1.03-1.93], p = 0.03) were the only independent variables associated with 30-days HF-related rehospitalization and also with the composite end-point (female sex OR 2.24 [1.08-4.48], p = 0.04), Barthel index OR 1.27 [1.08-1.48], p = 0.004, and ST2 (OR 1.41 [1.03-1.93], p = 0.03) were the only independent variables associated with 30-days HF-related rehospitalization and also with the composite end-point (female sex OR 2.22 [1.11-4.43], p = 0.02, Barthel index OR 1.30 [1.12-1.50], p < 0.001, and ST2 OR 1.60 [1.20-2.13], p < 0.001). The clinical model including age, sex, diabetes, urea, and Barthel index obtained an AUC of 0.67 [95% CI 0.58-0.76] for the risk prediction of HF-related rehospitalization. Adding NTproBNP, ST2 or both biomarkers, the results were 0.71, 0.72 and 0.73 respectively. For the risk prediction of the composite end-point the clinical model including the same variables plus Barthel index obtained an AUC of 0.69. Adding NTproBNP, ST2 or both biomarkers, the results were 0.73, 0.73 and 0.75 respectively.

Conclusions: In ADHF right ventricular function rather than LV ejection fraction showed an impact on prognosis. Larger prospective studies are needed to confirm our preliminary data and to assess the effect of targeted supportive therapy for RV function in this specific setting.

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Early post-discharge ST2 and NTproBNP for predicting 30-day heart failure readmission in a very old and co-morbid population with predominately HFpEF

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Background: Heart failure (HF) is associated with a high rate of readmissions within 30 days post-discharge. This figure is even higher in the old and co-morbid patients, mainly affected from HFpEF. Attempts to predict short-term outcome in such population have not been particularly successful. Data on biomarkers in such especial population are scarce.

Purpose: To assess the usefulness for predicting 30-day outcome of early post-discharge blood levels of ST2 and NTproBNP in a very old and co-morbid HF population.

Methods: Blood sample were obtained at first visit in the specific HF Clinic shortly after discharge from a HF-related hospitalization (mean 4.9 ± 2 days). HF-related rehospitalization and the composite end-point all-cause mortality or HF-related rehospitalization were the primary end-points.

Results: 522 patients (57.1% women, mean age 82 ± 8.7 years, 25% older than 88 years) were included. Mean LVEF (available in 390 patients) was 58.8% ± 14. Main aetiology were: hypertensive (40%), ischemic (29%) and valvular (13%). Diabetes, anaemia and renal failure were present in 53%, 65% and 79% respectively. Mean Barthel index was 70 ± 25 and mean Charlson index was 5.6 ± 2.2. 30-days HF-related re-hospitalization occurred in 36 patients (6.9%), death in 13 (2.5%) and the composite end-point in 45 (8.6%). In the univariate analyses urea (p < 0.05), diabetes (p = 0.003), Charlsion index (p = 0.004) and ST2 (p = 0.005) were associated with 30-days HF-related rehospitalization, and NTproBNP showed borderline results (p = 0.07), whereas diabetes (p = 0.04), Barthel index (p = 0.01), ST2 (p = 0.004), and NTproBNP (p = 0.001), and ST2 (p = 0.001) were associated with the composite end-point. In the multivariable analyses female sex (OR 2.24 [1.03-4.82], p = 0.04), Barthel index (OR 1.27 [1.08-1.48], p = 0.004), and ST2 (OR 1.41 [1.03-1.93], p = 0.03) were the only independent variables associated with 30-days HF-related rehospitalization and also with the composite end-point (female sex OR 2.22 [1.11-4.43], p = 0.02, Barthel index OR 1.30 [1.12-1.50], p < 0.001, and ST2 OR 1.60 [1.20-2.13], p < 0.001). The clinical model including age, sex, diabetes, urea, and Barthel index obtained an AUC of 0.67 [95% CI 0.58-0.76] for the risk prediction of HF-related rehospitalization. Adding NTproBNP, ST2 or both biomarkers, the results were 0.71, 0.72 and 0.73 respectively. For the risk prediction of the composite end-point the clinical model including the same variables plus Barthel index obtained an AUC of 0.69. Adding NTproBNP, ST2 or both biomarkers, the results were 0.73, 0.73 and 0.75 respectively.

Conclusions: In a very old and co-morbid population with mainly HFpEF, early post-discharge blood levels of ST2 performed better than NTproBNP for the risk prediction of 30-days HF-related rehospitalization and for the composite end-point including all-cause mortality. The inclusion of both biomarker in a predictive model improve C-statistics for both end-points.
Poster Session 2: Acute Heart Failure

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Immune-mediated inflammation and acute left ventricular failure in myocardial infarction

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Background: Myocardial infarction (MI) is the most common cause of acute left ventricular failure (ALVF) and cardiogenic shock. Our previous studies have revealed dramatically elevated levels of circulating pro-inflammatory cytokines and anti-connective tissue antibodies in MI patients.

Purpose: the investigation was to assess the relationship between circulating markers of immune-mediated inflammation and ALVF in the setting of MI.

Methods: 215 pts with determined MI were included in the investigation. ALVF was diagnosed in 32 (14.88%) pts on the basis of the clinical and echocardiography data. The levels of pro-inflammatory cytokines (TNF-α, IL-1β, IL6, ACA) and anti-connective tissue antibodies (ACTA); antibodies against collagen (ACA), hyaluronic acid (AHA) and chondroitin sulfate (ACSA) were measured by ELISA in sera samples from MI pts and 50 controls.

Results: The serum levels of TNF-α, IL-1β, IL6, ACA, AHA and ACSA were significantly higher in MI pts than in controls. The most prominent abnormalities were revealed dramatically elevated levels of circulating pro-inflammatory cytokines and ACTA in MI groups with ALVF and without.

Conclusion: Obtained data show that ALVF in MI is associated with dramatically increased levels of key pro-inflammatory cytokines and ACTA. This phenomenon can be concerned as reflection of the severity of myocardial damage in MI. Assessment of the serum pro-inflammatory cytokines and anti-connective tissue antibodies can be used for diagnostic and prognostic purposes.

P897

The chloride theory, a unifying hypothesis for renal handling and body fluid distribution in heart failure pathophysiology

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Background: A unifying hypothesis for heart failure (HF) pathophysiology based on serum biochemical solute(s) has yet not been developed.

Purpose: Chloride is an established key electrolyte for tubuloglomerular feedback and subsequent body fluid reabsorption in the kidney. Elucidation of the involvement of chloride in body fluid distribution under transition of HF status will contribute to the development of a unifying hypothesis of HF pathophysiology.

Methods: Data from 47 HF patients that experienced worsening and subsequent recovery of HF were analyzed. Blood tests included peripheral blood and serum albumin/solutes (sodium/potassium/chloride/urea nitrogren/creatinine), Relative change in the plasma volume (%PV) was determined by the Strauss method based on the Chloride theory, a unifying hypothesis for renal handling and body fluid distribution in heart failure pathophysiology.

Results: (1) Worsening HF—When divided into two groups based on the median %PV, the clinical feature of the expansion group (%PV range 11%–36%; n=24) included a lower incidence of crackles (13 vs 52%; p<0.005) and a tendency toward preserved renal function defined by a decrease in serum creatinine (83% vs 57%; p=0.06) in comparison with the non-expansion group (%PV range -19% to 10.8%); n=23). Multivariate logistic regression analysis revealed an independent association between the increase in %PV and the increase in the serum chloride concentration from stability to worsening HF (OR:12.5, 95%CI1.86-82, p<0.009).

(2) Recovery after HF therapy—Multivariate regression analysis demonstrated an independent association between preserved %PV and an increased or preserved serum chloride concentration after conventional diuretic therapy (OR:8.71, 95%CI1.30-63.5, p=0.032).

Conclusions: The present study propose a unifying hypothesis of HF pathophysiology based on the “chloride theory” (Figure). This hypothesis is the first to unify the two main platforms of the body fluid processing organs through one key electrolyte, chloride, in both 1) the kidney, which reabsors body fluid via main control by the renin-angiotensin-aldosterone system, and 2) the body, an organ with dynamic body fluid storage in the intracellular, intravascular, and interstitial compartments.

P898

Risk factors and outcomes of hospital-acquired heart failure in medical patients with no pre-existing cardiac dysfunction

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Background: Heart failure (HF) is a common complication in hospitalized patients with known cardiac dysfunction and associated with higher mortality and longer hospital stay. Little is known about new-onset, hospital-acquired or iatrogenic HF in patients with no pre-existing cardiac dysfunction. This study aims to study risk factors, impacts of fluid balance, and outcomes of hospital-acquired HF in patients with no pre-existing cardiac dysfunction.

Methods: We conducted a case-control study by prospectively reviewing consecutive medical patients with no pre-existing cardiac dysfunction who developed new-onset HF during hospitalization for non-cardiac diagnoses from January 2015 to December 2015. Two control patients who have no pre-existing cardiac dysfunction were chosen per case with matched age, gender, and date of admission. When this was not possible, at least 1 control patient was selected. Patient characteristics, treatments, and outcomes were gathered. Chi-square test, T-test, and binary logistic regression were used for analysis.

Results: We identified 27 cases of hospital-acquired HF (mean age 64 ± 20 years and 67% female) with various primary diagnoses (52% infection, 28% cancer, 11%
gastrointestinal bleeding, and 11% pancreatitis) and 45 control patients (mean age 65 ± 17 years and 64% female). There was no significant difference in demographic, primary diagnoses, medications and laboratory values between both groups. Median time from admission to the onset of hospital-acquired HF was 3 (range 1 to 19) days. There were no differences in total fluid intake over 1, 3, and 7 days prior to onset of hospital-acquired HF between cases and controls (1,108 ± 226 ml vs 1,341 ± 202 ml; p = 0.229, 7,287 ± 2414 ml vs 7051 ± 3139 ml; p = 0.807 and 8261 ± 4282 ml vs 7,906 ± 6239 ml; p = 0.805, respectively). Positive fluid balance over 1, 3, and 7 days prior to onset of hospital-acquired HF were higher in a case cohort (1,755 ± 1260 ml vs 952 ± 1048 ml; p = 0.008, 4,294 ± 2353 ml vs 1643 ± 2402 ml; p = 0.003 and 4693 ± 2871 ml vs 943 ± 3358 ml; p < 0.001, respectively).

Hospital-acquired HF was associated with increased use of urinary catheterization (30% vs 9%, p = 0.024), mechanical ventilation (22% vs 2%, p = 0.005) and prolong hospital stay (21 ± 22 days vs 20 ± 19 days, p = 0.013). There were 2 HF-related mortalities among case cohort.

Conclusion: Positive fluid balance, but not total fluid intake, is associated with developing of hospital-acquired HF in medical patients with no pre-existing cardiac dysfunction. Hospital- acquired HF can lead to morbidities such as the increased rate of urinary catheterization, mechanical ventilation, and prolonged hospitalization.

P900
Clinical and analytical patterns and the different mechanisms of cardiorenal syndrome.

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Background/Introduction: In recent years new data on pathophysiology of cardiorenal syndromes has been collected but the impact in acute management is still to be found.

Purpose: We tried to find different patterns using simple clinical and analytical data that could point to the main compensated mechanism using a retrospective cohort sample of patients from a level 2 intermediate care unit. We also assessed the impact of Non-invasive ventilation (NIv), the need for ultrafiltration and a strategy of diuretic plus slight hydration on these different patterns.

Methods: We selected 110 patients with decompensation of heart or renal function but excluded 53 for not having cardiorenal syndrome or with acute type 5 (sepsis).

Results: We had 56.34% males with a mean age of 76.3 ± 17.4 and 64% female. The ones with worst renal function at admission (less than 24 hours) and 37.21% after 3 to 5 days, this groups were statistically different. Mortality rate was 27.27%.

Conclusions: More data is being processed and validated but we have found a statistical difference at the time of worst renal function and this was not associated with the degree of basal chronic renal disease or the type of cardiorenal syndrome. It appears to be related with the degree of congestion and with the use of pulsed diuretic. The ones with worst renal function at admission appear to have a better diuretic response in response to diuretic therapy. This finds suggest that the different mechanisms of cardiorenal syndrome type 1 or 3 can make a difference in the initial approach in an acute setting and this data gives the basis for a much needed prospective study.
Conclusion: patients (OR 1.10, 95% CI 1.02-1.18, p < 0.05) in non-diabetic heart failure, previous coronary artery disease, chronic kidney disease, heart rate, that admission glucose level is independently associated with in-hospital HF after multivariable logistic regression analysis revealed that every 1 unit increase of admission glucose level (30% vs. 21%, p < 0.001) in non-diabetic patients. Occurrence of in-hospital HF was prospectively selected. Plasma glucose level is measured on admission in all patients. Hyperglycemia was defined as admission plasma glucose ≥11.1 mmol/l. In-hospital HF was defined according to the Killip classification. Multiple logistic regression analysis was used to assess relationship between admission glucose level and in-hospital HF.

Results: A total of 438 patients (59 ± 13, 84% male) were included in this study. 122 patients had high plasma glucose (≥11.1 mmol/l) on admission and classified as a hyperglycemia. 308 patients had normal plasma glucose (<11.1 mmol/l) on admission and classified as a normoglycemia. Occurrence of in-hospital HF was significantly higher in patients with hyperglycemia compared with normoglycemia (30% vs. 21%, p < 0.05). In multivariable logistic regression analysis was showed that admission glucose level is independently associated with in-hospital HF after adjustment of age, gender, hypertension, previous myocardial infarction, previous heart failure, previous coronary artery disease, chronic kidney disease, heart rate, multivessel disease, LAD culprit vessel and final TIMI flow grade in non-diabetic patients (OR 1.10, 95% CI 1.02-1.18, p < 0.01). Furthermore, univariable logistic regression analysis revealed that every 1 unit increase of admission glucose level is associated with 1.07 fold increased probability of in-hospital HF (OR 1.07, 95% CI 1.01-1.15, p < 0.05) in non-diabetic patients.

Conclusion: Our results suggest that admission glucose level was independent predictor of in-hospital HF in patients with AMI. However, this relationship is only evident for non-diabetic patients.

Is hypokalaemia during acute exacerbations of heart failure preventable or predictable?

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Background: Heart failure activates the renin-angiotensin aldosterone system, which leads to hypokalaemia. This is aggravated by upregulated sympathetic drive and the use of increased amounts non-potassium sparing diuretics during acute exacerbations. Mild hypokalaemia has been shown to increase cardiovascular events in a treated heart failure population. In patients with NYHA class I to III patients, elevations of serum potassium have been shown to reduce the incidence of fatal arrhythmias and sudden cardiac death. There is growing evidence that serum potassium levels should be maintained above 4 mmol/l in heart failure patients.

Methods: We performed a retrospective review of all patients admitted to a tertiary heart failure centre during a one year period from 1st January 2015 to 31st December 2015, with a principal diagnosis of congestive cardiac failure. A total of 330 patients were included. Blood results on admission, 24 hours and the final result prior to discharge were included for analysis.

Results: On admission, 67 (22%) of the 309 patients with admission bloods had a serum potassium value of less than 4.0 mmol/l. Of the sub-group of patients that had bloods taken at both admission and 24 hours, (n=287) the percentage of patients with a serum potassium less than 4.0 mmol/l at 24 hours significantly increased from 21% to 36% (p < 0.001).

The average serum potassium of all patients fell significantly during the first 24 hours from 4.44 mmol/L to 4.17 mmol/l (p < 0.001). This resulted in significantly more patients (11% vs 5%) with a potassium value of less than 3.5 mmol/l after 24 hours, (p < 0.001)

Patients who had a serum potassium of less 3.5 mmol/l after 24 hours had a significantly lower serum magnesium on admission than the patients whose 24 hour potassium result was within the normal range. (0.71 mmol/l vs 0.81 mmol/l, p < 0.001)

Of the patients surviving to discharge, over 33% were discharged with serum potassium values less than 4.0 mmol/l.

Conclusion: Our results demonstrate that a significant number of patients with heart failure have lower than desirable serum potassium levels on admission, through their inpatient stay and on discharge. Within a cohort of patients hospitalised for exacerbations of heart failure, serum potassium levels fall during the first 24 hours. There is a significant correlation between hypomagnesaemia on admission and the prediction of hypokalaemia 24 hours later. Hypokalaemia has been shown to be an independent predictor of mortality in heart failure. This study highlights the importance of close monitoring of serum potassium levels early in the admission, and suggests that identification of hypomagnesaemia can predict hypokalaemia at 24 hours. The authors advise early consideration of aldosterone antagonists or potassium replacement in these patients.
P905 Outcomes of VA ECMO in cardiogenic shock - Bridging to recovery, ventricular assist device and transplantation

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Background: The use of venoarterial extracorporeal membrane oxygenation (VA-ECMO) in refractory cardiogenic shock have expanded rapidly during the last years. Data on its benefit in patient subgroups is though still limited.

Purpose: To evaluate the outcome and prognostic factors for ECMO in cardiogenic shock.


Results: Mean age was 51.4 years (SD 12.2), 70% were men, and 92% Internacs profile 1. Mean duration of ECMO was 7.5 days (SD 6.8) and of ICU stay 21.1 days (SD 22.2). The most frequent indications for ECMO were postcardiomyopathy shock (36%), acute coronary syndrome (ACS) (23%), cardiomyopathy (18%), primary graft failure (17%), and fulminant myocarditis (11%). In total, 30-day survival was 72%, hospital discharge rate 63% and one year survival 61%. Hospital discharge rates according to indication of ECMO were: myocarditis 81%, cardiomyopathy 75%, postcardiomyotic shock 65%, primary graft failure 58% and ACS 50%. 75 (53%) patients were weaned from ECMO with no need to further procedures, 13 (9%) received ventricular assist device (VAD) from ECMO, and 15 (11%) underwent emergency heart transplantation (HTx). Survival rates to hospital discharge for these groups were 87%, 77% and 93%, respectively. For patients bridged to ECMO to VAD, the most frequent diagnosis was cardiomyopathy (64%) while for patients bridged to HTx, cardiomyopathy and myocarditis were equally common, both 27%. 39 (27%) patients died during ECMO, of which 23 (62%) had been resuscitated prior to ECMO.

There was no significant difference in age (50.0±9.3 years, p=0.12), body mass index (28.9±8.8, p=0.66), gender (p=0.79), or duration of ECMO (7.3±7.8 days, p=0.07) between hospital survivors and non-survivors. The amount of red blood cells (RBC) transfused during the ICU stay was significantly higher for non-survivors (mean 6.2 units/day vs 1.4 units/day, p<0.001) than for hospital survivors. Cardiac arrest prior to ECMO implantation (n = 49; OR 3.2, p < 0.01), initiation of ECMO or emergency perfusion followed by ECMO during resuscitation (n = 29; OR 3.7, p < 0.01), lower blood HCO3 prior to ECMO (15.5 ± 18.2 mmol/L, p < 0.001) and higher blood lactate (9.8 ± 6.1 mmol/L, p < 0.001) associated with increased hospital mortality. Most frequent complications were stroke (16%), limb ischemia (13%) and need of fasciotomy (8%). Simultaneous use of intra-aortic balloon pump associated with increased risk of lower limb ischemia (OR 3.2, p < 0.06).

Conclusions: ECMO can enable recovery to hospital discharge for over 60% of selected patients with severe cardiogenic shock. In our cohort, ECMO benefitted most the patients with myocarditis or cardiomyopathy, both as a bridge to recovery of heart and as a bridge to VAD or HTx. Cardiac arrest, ECMO implantation during resuscitation and need of high amounts of RBCs transfused associated with increased risk of hospital death.

Background: Heart failure (HF) has a high prevalence in the elderly. Adherence to HF guidelines improves prognosis and is very high in randomised clinical trials (RCTs). It also seems to be quite high in clinical registries which represent the so-called “real world”. However, HF registries may maintain a certain level of selection bias by including only patients hospitalised in cardiology wards while administrative data show that the majority of HF patients are admitted to internal medicine and geriatrics wards where adherence to guidelines could be less optimal.

Purpose: To compare adherence to current clinical guidelines in the management of elderly patients hospitalised for acute HF in different settings of care: cardiology, internal medicine and geriatrics.

Methods: Data derived from the ATHENA retrospective observational study which included elderly patients (> 65 years) admitted with diagnosis of acute HF to the emergency department (ED) of a tertiary University teaching-hospital and transferred to the above described settings of care. We evaluated adherence to current European Society of Cardiology (ESC) guidelines regarding echocardiogram performance during hospitalisation, body weight measurement on admission and at discharge, follow-up (FU) schedule and evidence based prescriptions at discharge.

Results: 342 patients composed the study population. 17.8% were hospitalised in cardiology, 17.3% in geriatrics and 64.9% in internal medicine. Mean age was 83.7 years, females were 54.1%. 28.1% of the patients had not performed any echocardiographic evaluation during hospitalisation; 33.1% in cardiology, 17.1% in geriatrics and 37.8% in internal medicine (P < 0.001). Body weight measurement on admission and at discharge was collected only in 24% of patients and in 44% of patients no information regarding body weight measurement was collected during hospitalisation (1.6% in cardiology, 41.4% in internal medicine and 54.2% in geriatrics; p < 0.001). We analysed evidence based prescription rates at discharge in the subgroup of patients with HF with reduced ejection fraction (HFrEF, 49% the total population) for beta-blockers, ACE-inhibitors, angiotensin receptor blockers and mineralocorticoid receptor antagonists that were 81%, 39.6%, 23.1% and 48.4%, respectively, without significant differences across the considered settings of care. A clinical FU at the discharge was scheduled only in 16.0% of the total study population, 70.0% in cardiology, 7.0% in geriatrics and in 5.0% of those discharged from internal medicine (P < 0.001).

Conclusions: In elderly patients hospitalised for acute HF a low adherence to current international guidelines recommendations regarding HF management could be observed particularly in patients hospitalised in non-cardiological settings. This was particularly evident for non-pharmacological strategies that are known to reduce the risk of rehospitalisation.
of noradrenaline (16 vs 2%, P = 0.026). This variable associated with the use of NIV (OR=2.75; 95% CI: 0.88-7.6; P = 0.049), in a model adjusted for sex, age, previous history of coronary disease and use of noradrenaline.

Conclusion: According to our data, in ACPE patients, the use of NIV was not associated with better in-hospital survival or a shortened length of hospital stay. Some authors have suggested that in patients with high filling pressures, positive pressure ventilation may compromise venous return (a known risk factor for the development of cardiorenal syndrome). In this study, we were able to confirm a higher incidence of cardiorenal syndrome, but the exact mechanism behind this association remains to be clarified.

P909
Acute heart failure in the elderly: real world evidence from the ATHENA registry.

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Introduction: Noninvasive ventilation (NIV) is commonly used to treat patients (Pts) with acute cardiogenic pulmonary edema (ACPE) with some immediate beneficial effects. However, there is some conflicting evidence about the role of NIV in the prognosis of these Pts.

Aim: Determine whether NIV improves in-hospital survival in Pts with ACPE.

Methods: A retrospective analysis was performed, including 81 consecutive Pts hospitalized in a Cardiac Intensive Care Unit with a clinical diagnosis of ACPE as initial presentation. For this study, Pts were divided in two groups according to the use of NIV: Demographic, clinical, laboratory and cardiological parameters were evaluated. The primary endpoint was in-hospital mortality (IHM).

Results: In this population, 44 Pts (54%) were treated with NIV (NIV group) and 37 Pts (46%) were treated without NIV (WVNI group). There were no differences between the two groups regarding demographics, cardiovascular risk factors, vital parameters at admission, except for the presence of previous history of coronary disease, which was higher on the WVNI group (35 vs 99%, P = 0.032). Regarding laboratory values at admission, there were no significant differences between both groups, namely in relation to biomarkers such as troponin and NTProBNP, as well as in relation to the left ventricular ejection fraction. Patients in the NIV group had a higher incidence of cardiorenal syndrome (65 vs 39%, P = 0.02), higher maximum daily dose of furosemide (225 vs 120mg, P = 0.001), and increased use of oral anticoagulants. The IHM was 7.3% and it was higher in cardiac and geriatrics (11.0%) compared to internal medicine (5.0%), (P = 0.076). Independent predictors of in-hospital mortality were evaluated using two different models: the ADHERE-like model which showed a significant correlation with age (OR=1.30, CI: 1.07-1.54, P=0.003), systolic blood pressure (OR=0.96, CI=0.94-0.98, P=0.006) and Blood Nitrogen Urea (OR=1.01, CI:0.99-1.02, P=0.20) measured at the ED entry; the ATHENA model, which tested these variables with others more typical of geriatric patients (comorbidity and disability scores) and with the setting of care: a significant correlation was confirmed for age (OR=1.18, CI:1.05-1.32, P=0.002), systolic blood pressure measured at the ED entry (OR=0.96, CI=0.94-0.99, P=0.011) and for the setting of care (OR=0.32, CI:0.25-0.37, P=0.025) with a protective effect of cardiology ward assignment.

Conclusions: elderly patients with AHF are significantly different in terms of clinical characteristics and prognosis according to the different settings of care. Multidisciplinary research is needed in this field.
GPs described barriers to obtaining diagnostic tests in association with comorbidities, on-going medication review and ease of access. They viewed the GP as a 'trusted' source of knowledge. The majority of patients who were recruited from a large Irish hospital following an unplanned HF admission and increased central venous pressure which means venous congestion is associated with worsening renal function in patients with advanced decompensated HF with reduced left ventricular (LV) ejection fraction (EF) (HFREF) patients were discharged with oral rivaroxaban or low molecular weight heparin (LMWH) at 6 months of treatment.

Patients described limited access to the HFU for support or information. Some experienced frustration as they navigated between systems: HFU, GP and ED. Patients in this study were elderly. They had multiple comorbidities that led to a reliance on the GP. Limited knowledge of HF resulted in them identifying HF symptoms as related to a comorbidity. Fragmentation of care between primary and secondary care was barriers to prompt treatment and timely provision of information and support. These factors contributed to unplanned hospital admission and provided a negative experience of care. These results are now being validated in a larger population and different healthcare organisation.

Conclusions: In this retrospective study with a real-world unselected population, rivaroxaban showed to be at least as safe and effective in the treatment of APE as conventional anticoagulation with warfarin/LMWH at 6 months of treatment.

**Poster Session 2**

**P912**

**Worsening renal function during hospital stay following acute heart failure is associated with decreased venous congestion**

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**Background:** Impaired renal function is an important prognostic factor in patients with heart failure (HF) and increased central venous pressure which means venous congestion is associated with worsening renal function in patients with advanced decompensated HF with reduced left ventricular (LV) ejection fraction (EF) (HFREF) who underwent right heart catheterization.

**Purpose:** The purpose of this study was to investigate correlation between changes in renal function during hospitalization and severity of venous congestion in patients with acute HF (AHF).

**Methods and Results:** Of 101 hospitalized patients with AHF derived from MEDICA-AHF cohort, 60 had preserved EF (HFPEF) and 41 had HFREF in patients with AHF; renal function worsened during hospital stay (median; estimated glomerular filtration rate (eGFR) 59 [40-75] at admission, 48 [31-67] ml/min/1.73m² at discharge, p < 0.001). Cystatin C 1.50 [1.20-2.27] at admission, 1.78 [1.53-2.59] mg/L at discharge, p < 0.001, neutrophil gelatinase associated lipocalin (NGAL) 127 [95-263] at admission, 167 [104-268] ng/mL at discharge, p = 0.004, urea nitrogen 8.9 [6.9-13.2] at admission, 10.2 [7.6-18.0] mmol/L at discharge, p = 0.006 with few differences between HFPEF and HFREF: Estimated GFR decreased more in HFREF than in HFPEF (P=0.047 at admission, 53 [28-76] ml/min/1.73m² at discharge, p = 0.001). At the same time, echocardiographic examinations showed signs of venous “decongestion” with decreased inferior vena cava (IVC) diameter at rest and increased respiratory variability of IVC diameter during hospitalization (median: IVC diameter 22 [16-24] at admission, 13 [11-18] mm at discharge, p < 0.009, variability 32 [8-44] at admission, 43 [39-70] % at discharge, p = 0.04) and no changes in LV atrial and right atrial areas (median: left atrial area 29 [21-38] cm² at admission, 25 [20-32] cm² at discharge, p = 0.77, right atrial area 18 [16-22] at admission, 17 [16-23] cm² at discharge, p = 0.38). Although eGFR negatively correlated with IVC diameter at admission, eGFR positively correlated with IVC diameter at discharge (r = 0.93, n = 33, p = 0.001 at admission, n=20, r=0.47, p = 0.04 at discharge).

**Conclusions:** Renal function worsened despite echocardiographic signs of venous “decongestion” during hospitalization in patients with AHF.

**Figure** Overall and propensity matched

**P913**

**Dopamine is associated with the worst outcome among inotropes used in acute heart failure: observations from the ESC-HF-LT registry**

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**On behalf of:** on behalf of ESC-HF-LT registry investigators

**Introduction:** Intravenous (IV) inotropes and vasopressors are widely used in the initial treatment of acute heart failure (AHF). There is a continuing controversy about whether one agent is superior to the other. Our aim was to analyze current real-life use of inotropes and/or vasopressors, and their association with all-cause long-term mortality in a large AHF cohort.
Conclusions: Most commonly used inotropes in AHF patient population were dobutamine, dopamine and levosimendan. Compared to other inotropes, the use of dopamine was associated with markedly higher all-cause long-term mortality.

Inotropes in different regions

<table>
<thead>
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<th>IV Inotrope</th>
<th>Eastern Europe</th>
<th>North Africa and Middle East</th>
<th>Northern and Western Europe</th>
<th>Southern Europe</th>
<th>All (n = 833)</th>
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<td>Dobutamine</td>
<td>40.6%</td>
<td>61.5%</td>
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<td>Dopamine</td>
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<td>0.0%</td>
<td>22.2%</td>
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<td>13.1%</td>
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<tr>
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<td>14.4%</td>
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P915
Long-term sacubitril/valsartan therapy improved central pulse wave parameters in patients with stable heart failure with reduced ejection fraction

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Objective: Angiotensin receptor-neprilysin inhibitor (ARNI) is recommended to further reduce the morbidity and mortality for patients with chronic symptomatic heart failure with reduced ejection fraction (HFrEF) according to the new ESC guidelines. Increased arterial stiffness has been shown to correlate with adverse cardiovascular events. The aim of the study was to assess long-term sacubitril/valsartan effects on parameters of arterial stiffness in patients with stable HFrEF.

Methods: In the open-label follow-up to PARADIGM-HF study 16 patients with stable HFrEF (14 male, 69±7 years of age) were included into a study. ACEI treatment was interrupted for 36 h before the end of treatment for at least a month (ACEI 94%, beta-blockers 100%, aldosterone receptor antagonists 81%, loop diuretics 75%). ACEI treatment was interrupted for 36 h and replaced with sacubitril/valsartan 50, 100 or 200 mg BID according to baseline brachial BP (mean dose 185.7±36.3 mg BID). Arterial stiffness was assessed by applanation tonometry baseline and after 6 and 12 months sacubitril/valsartan therapy. Parameters of LV efficacy were calculated. Wilcoxon and Spearman test was considered significant if \( p < 0.05 \).

Results: After 6 months of sacubitril/valsartan therapy carotid-femoral pulse wave velocity (PWV) significantly decreased (11.5±2.9 vs 10.2±2.9 m/s, \( p < 0.05 \)) while other parameters of arterial stiffness did not change (p≥0.05). After 12 months sacubitril/valsartan therapy was associated with significant decrease of aortic augmentation pressure (AP) (15.3±8.9 vs 10.5±5.0 mmHg, \( p = 0.002 \)), increase of reflected wave transit time (PWTT) (132±2 vs 143±29 ms, \( p = 0.02 \)), subendocardial viability ratio (SEVR) (164±25 vs 177±37 %, \( p = 0.009 \)). Changes of PWV between 6 and 12 months were nonsignificant (10.2±2.9 vs 10.8±2.0 m/s, p>0.05). There was significant correlation between changes of SEVR and stroke volume (R=-0.85), stroke work (R=-0.81), potential energy (R=0.95), \( p < 0.05 \) for all. There was statistically significant correlation between changes of PWTT and AIX (R=-0.68).

Conclusion: In stable symptomatic patients with HFrEF long-term sacubitril/valsartan therapy is associated with significant improvement of central pulse wave parameters: decrease of aortic AP, increase of PWTT. Sacubitril/valsartan therapy was associated with beneficial increase of SEVR, index that reflects the subendocardial oxygen supply-demand ratio.

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Table 1. P915

<table>
<thead>
<tr>
<th></th>
<th>Improved (n = 2536)</th>
<th>Unchanged (n = 173)</th>
<th>Worsened (n = 229)</th>
</tr>
</thead>
<tbody>
<tr>
<td>admission discharge</td>
<td>admission discharge</td>
<td>admission discharge</td>
<td></td>
</tr>
<tr>
<td>Body Weight (kg)</td>
<td>79±14.6</td>
<td>77±21.1</td>
<td>77±19.0</td>
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<tr>
<td>SBP (mmHg)</td>
<td>143±23.2</td>
<td>129±16.5</td>
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</tr>
<tr>
<td>HR (beats/min)</td>
<td>80±4.2</td>
<td>99±2.6</td>
<td>&lt;0.0001</td>
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<tr>
<td>RR (breaths/min)</td>
<td>22±9.4</td>
<td>24±3.6</td>
<td>0.057</td>
</tr>
<tr>
<td>Na (mmol/L)</td>
<td>134±9.3</td>
<td>133±9.4</td>
<td>0.193</td>
</tr>
<tr>
<td>K (mmol/L)</td>
<td>4.6±0.9</td>
<td>4.3±0.6</td>
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<tr>
<td>BUN (mg/dL)</td>
<td>59±42</td>
<td>56±53</td>
<td>0.069</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>1.3±0.4</td>
<td>1.3±0.5</td>
<td>0.2571</td>
</tr>
</tbody>
</table>

Purpose: The aim of our study was to analyse the HFrEF in patients with acute coronary syndrome and Killip 1-2.

Material and methods: This is a retrospective observational study of 1444 consecutively admitted in for acute coronary syndrome (ACS) Killip 1-2 in two different hospitals. Baseline patient characteristics were examined for each patient and a follow-up period was established for registry of death and re-hospitalization by HF as the primary endpoint. The observed event risk was calculated as a Kaplan–Meier estimate.

Cox regression models performed survival analyses once proportional risk test were verified. Multivariate analysis were performed using all variables that obtained p values <0.1 in the univariate analysis. The incidence of HF could be affected by patients' death and, therefore, the usual techniques for time-to-event analysis would provide biased or un-interpretable results due to the presence of competing risks. With the aim of avoiding such effects we applied the model introduced by Fine and Gray to test the competing events.

Results: Among the study participants 523 (45,7%) had HFrEF, 123 (10, 7%) HFmrEF and 498 (43,5%) HFpEF. Patients with HFrEF had a demographic and clinical profile with many intermediate features between HFmrEF and HFpEF. They were similar to HFmrEF in terms of previous HF, Killip II, systolic blood pressure and GRACE score. All other characteristics were similar between groups.

There were no significant differences in terms of mortality or readmission to HF between the three groups.

When we performed the multivariate analyses only the HFrEF was associated with less HF readmission (HR 0.49, CI 95% 0.395-0.624, p <0.01)

Conclusions: HFrEF patients represent a small group in acute coronary syndrome complicated with HF. They have intermediate characteristics between HFmrEF and HFpEF but not differences between the three groups in terms of mortality or heart failure readmission were observed.

P918
Clinical profile and symptom status at discharge among patients hospitalized for heart failure; an analysis of the RO-AHFS registry
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On behalf of: The Romanian Acute Heart Failure Syndromes Registry

Funding Acknowledgements: unrestricted educational grant provided by Abbott Laboratories Romania

Background: There are few heart failure (HF) registries accurately describing in hospital patient clinical journey. Also, lack of improvement in patient self-assessed symptoms at discharge may also represent a neglected endpoint which may relate to hard outcomes.

Aim: To evaluate the value of clinical and biological variables in predicting self-assessed symptom improvement during HF-hospitalization.

Methods: The RO-AHFS registry prospectively enrolled 3224 consecutive patients admitted for acute HF over a 12-month period. The clinical course of patients surviving to discharge has been evaluated as: improved, unchanged, worsened. In parallel with patient’s self assessment clinical status, body weight, SBP, HR, RR, serum Na, K, BUN and creatinine have been evaluated at admission and discharge.

Results: At discharge 86.3% of patients reported their status to be improved, 5.9% unchanged, 7.8% worsened. When patient self-assessed clinical status was analyzed by clinical profile, substantial variation emerged; patients classified as cardiogenic shock and right HF were less likely to report improvement (55% and 5.9% unchanged, 7.8% worsened. When patient self-assessed clinical status was parallel with patient’s self assessment clinical status, body weight, SBP, HR, RR, surviving to discharge has been evaluated as: improved, unchanged, worsened. In

Conclusions: Of the surviving patients, a proportion of 13% do not experience symptom improvement during HF-hospitalization.

P917
Prognostic value of mid-range ejection fraction in patients with acute coronary syndrome and heart failure
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On behalf of: The POP Study Group

Funding Acknowledgements: The Belgrade Cardiology Club

Purpose: The POP-HF study has been designed to predict heart failure expression in patients after coronary artery bypass grafting: A substudy of the POP study

Methods: From April 1988, we analyzed 2028 consecutive patients who underwent CABG. The Belgrade Cardiology Club

Background: The new 2016 European Society of Cardiology Heart Failure (HF) Guidelines propose a new HF classification according to the level of LVEF, as follows: HFpEF is ≤ 40%, mid-range HF is an LVEF range from 40–49%, and HFrEF is ≥ 50%. HFrEF characteristics and prognosis in acute coronary syndrome complicated with HF are unknown.

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Results: Of the 3085 patients included in the present study, 2123 (68.8%) had HFpEF, 454 (14.7%) had HFmrEF, and 508 (16.5%) had HFrEF. Among 276 patients in HFmrEF group who underwent follow-up echocardiography, 94 (34.1%) showed improved LVEF, and maintenance of renin-angiotensin blocker or aldosterone antagonist were significantly associated with better survival.

Conclusions: Improved LVEF was defined as ≤5% of follow-up LVEF ≥50%, and ‘worsened LVEF’ was defined as ≤9% LVEF change. Follow-up LVEF reported at least 90 days after discharge was used to assess the improvement of LV systolic function in HFmrEF group. 'Improved LVEF' was significantly associated with better survival.

Methods: The study population was selected from the multicenter prospective cohort registry. Patients were categorized into three groups according to LVEF at discharge: LVEF ≥50%, LVEF ≥40% and <40%. Kaplan-Meier survival analysis was performed to assess the improvement of LV systolic function in HFmrEF group. ‘Improved LVEF’ was defined as ≥5% of follow-up LVEF ≥50%, and ‘worsened LVEF’ was defined as ≤9% LVEF change. Follow-up LVEF reported at least 90 days after discharge was used to assess the improvement of LV systolic function in HFmrEF group.

Results: Of the 3085 patients included in the present study, 2123 (68.8%) had HFpEF, 454 (14.7%) had HFmrEF, and 508 (16.5%) had HFrEF. Among 276 patients in HFmrEF group who underwent follow-up echocardiography, 94 (34.1%) showed improved LVEF. Survival rate was significantly higher in HFmrEF patients with improved LVEF than those with no change of LVEF or worsened LVEF. Multivariate analysis showed that improvement of follow-up LVEF, lower blood urea nitrogen level, and maintenance of renin-angiotensin blocker or aldosterone antagonist were independent prognostic factors for mortality in acute heart failure patients with mid-range EF.

Conclusions: Improved LVEF was defined as ≤5% of follow-up LVEF ≥50%, and ‘worsened LVEF’ was defined as ≤9% LVEF change.

Purpose: We aimed to evaluate the impact of MVP/platelet count ratio at discharge as a noninvasive predictor of de novo acute heart failure.

Methods: We included retrospectively 2181 consecutive patients with AHF who were evaluated in our Emergency Department (ED) in a 12 month period. Among them, 423 patients were admitted for in-hospital management. Patients who had previous known heart failure (n = 101) were excluded. We recorded MPV (fL) and platelet count (normal range 150.000-400.000 platelets/μL) at discharge and calculated MVP/platelet count ratio. Primary outcome was the inci
duction of de novo AHF (HR 2.59; CI 95% 1.03 – 6.49; p = 0.042). There was a significant trend towards a higher mortality rate after discharge in AF patients with >4.0x10^3/μL platelets/μL (26.1 vs. 10.9%; p = 0.034).

Conclusions: MVP/platelet count ratio at discharge is associated with future hospitalizations by de novo AHF in patients with AF.
Background: Patients with decompenated heart failure (DHF) are usually admitted with severe systemic congestion. Volume overload is the known main driver for morbidity, mortality and readmission to the hospital. Hemoconcentration (HC) has been proposed as a surrogate marker of decongestion during hospitalization.

Purpose: The aim of this study was to determine the prevalence of HC in DHF patients and to evaluate the impact of HC on short-term (30-days mortality) and long-term (6 months rate of HF rehospitalizations) outcomes.

Methods: In 183 patients admitted with ADHF (125 male, 69 ± 9 years (M ± SD), arterial hypertension (AH) 87%, ischemic heart disease (IH) 61%, myocardial infarction (MI) 51%, atrial fibrillation 51%, diabetes mellitus (DM) 36%, known chronic kidney disease (CKD) 40%, ejection fraction ≤45%) the prevalence of HC was assessed. HC was defined as increase in both hemoglobin and hematocrit levels between baseline and discharge. Mann-Whitney and multiple logistic regression analysis were performed. P < 0.05 was considered statistically significant.

Results: 33% of patients developed HC during hospitalization. There were no differences between groups in clinical presentation of systemic congestion (comparable rates of edema, orthopnea, SS, pulmonary rales, Rg-hydrothorax), level of EF (47 ± 14 vs 43 ± 15%, p > 0.05), level of NT-proBNP (11151 ± 1633 vs 13141 ± 4093 fmu/ml, p > 0.05) and frequency of prior HF hospitalizations (70 vs 81%, p > 0.05). Patients without HC were older (70 ± 8 vs 67 ± 12 years, p > 0.05), had lower resistance R(r) (238 ± 61 vs 266 ± 43 Ohm/m, p < 0.05) and reactance X(r) (19.9 ± 6 vs 25 ± 6 Ohm/m, p < 0.05), which were assessed by bioimpedance vector analysis (BIVA). Patients with HC had higher levels of R(r) (290 ± 35 vs 261 ± 64 Ohm/m, p < 0.05) and reactance X(r) (27.7 ± 5 vs 21 ± 6 Ohm/m, p < 0.05) at discharge, which correspond to less evident congestion assessed by BIVA. Patients without HC compared to patients with HC had higher rate of acute kidney injury (AKI) during hospitalization (67% vs 20%, p = 0.001). Hb, hematocrit ≥124, Hb, hematocrit ≥124, were blindly scored for the presence and severity of lung edema at both admission examination, echocardiography, laboratory findings and chest roentgenogram that was blindly scored for the presence and severity of lung edema at both admission and discharge. Patients were stratified by radiographic congestion score index (CSI) of both admission (median=1.33) and discharge (median=0.33). The study group were CI(A)<1.33/CSI(A)<0.33 (n=57), CI(A)<1.33/CSI(A)<0.33 (n=63), CI(A)=1.33/CSI(D)=0.33 (n=48), and CI(A)=1.33/CSI(D)=0.33 (n=124), HB, eGFR, BNP, EF and PASP were not significant differences between these groups. Concerning about one-year event-free survival for the primary endpoint (all-cause death and HF hospitalization), high CSI(A)/high CSI(D) group had a highest risk of developing the events (log rank=10.8, P=0.013). In multivariable Cox regression analysis, CI(A)<0.33 was associated with the combined endpoint (HR [95% CI], 1.91 [1.07 to 3.4]; P=0.029).

Conclusion: Residual pulmonary congestion assessed by chest radiographic scoring may predict poor prognostic value beyond BNP and physical assessment. Discharge congestion identifies cardiac prognosis for 1-year cardiovascular outcome compared with admission congestion.

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Background: Heart failure (HF) with preserved ejection fraction (HFpEF) is a highly prevalent syndrome with elevated morbimortality risk. To date, there is scarce evidence about the role of peak exercise oxygen uptake (peak VO2) for predicting the morbidity burden in HFpEF. We sought to evaluate the association between peak VO2 and risk of recurrent hospitalizations in patients with HFpEF.

Methods: A total of 74 stable symptomatic patients with HFpEF underwent a cardiopulmonary exercise test between June 2012 and May 2016. Negative binomial regression was used to determine the association between percent of predicted peak VO2 (pp-peak VO2) and recurrent hospitalizations. Estimates of risk were reported as incidence rate ratios (IRR).

Results: Mean age was 72.5±9.1 years, 53% were women and all patients displayed NYHA II-III. Mean peak VO2 and median pp-peak VO2 were 10±2.8 ml·min⁻¹·m⁻² and 80% (47-67), respectively. During a median follow-up of 276 days (IQR: 153-1231), 84 all-cause hospitalizations in 31 patients (41.9%) were registered. A total of 15 (20.3%) deaths were also ascertained. In a multivariate analysis, that included established prognosticators and important potential confounders (Figure 1), Thus, and modulated. A total of 15 (20.3%) deaths were also ascertained. In a multivariate analysis, that included established prognosticators and important potential confounders (Figure 1), we sought to evaluate the independent association between serum potassium and 6-month mortality was assessed through Cox regression analysis. The gradient of risk along the continuum of serum potassium was evaluated by fractional polynomials.

Conclusion: In symptomatic elderly patients with HFpEF, pp-peakVO2 predicts all-cause recurrent admissions.

P926
Mortality risk of patients with heart failure with mid-range ejection fraction following a hospitalization with acute heart failure

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1 University Hospital Clinic of Valencia, Valencia, Spain; 2 University Hospital Fias / Pujob, Barcelona, Spain

Introduction. According European Society of Cardiology guidelines, patients with left ventricular ejection fraction in the range of 40-49% are now defined as heart failure with mid-range ejection fraction (HFmEF). There is scarce information about the long-term prognostic course of these subset of patients, especially after an episode of acute heart failure (AHF).

Purpose: In this work, we aimed to compare the risk of long term all-cause and cardiovascular (CV) mortality among patients with acute heart failure and reduced (HFmEF), mid-range and preserved ejection fraction (HFpEF).

Methods: We prospectively included 2642 consecutive patients with AHF in a single teaching center. Left ventricular ejection fraction (LVEF) was assessed by two-dimensional echocardiography during index hospitalization. Patients were grouped according LVEF status: <40% (HFmEF), 40-49% (HFpEF) and ≥50% (HFrEF). Traditional Cox and Cox adapted for competing events were used to evaluate the risk of total and CV-death, respectively.

Results: Patients with HFrEF, HFpEF and HFmEF represented the 31.3%, 15.3% and 53.4% of the sample, respectively. During a median follow-up of 2.3 years (0.8-4.2), 1322 (50%) deaths were registered (73.7% of them were of CV etiology). Similar rates (per 100 person-years) across the 3 categories were found for all-cause (16.4, 18.8 and 17.7 for HFrEF, HFmEF and HFpEF, respectively (log-rank p=0.591) and CV-mortality (12.8, 14.1 and 12.1, respectively (log-rank p=0.486)). After a multi-variate adjustment, compared to patients with HFpEF, patients with HFrEF showed a similar risk of total (HR=1.07, CI 95%: 0.90-1.27, p=0.446) and CV-death (HR=0.98, CI 95%: 0.90-1.27, p=0.882).

Conclusion: Patients with AHF and HFmEF show a similar mortality burden than patients with HFrEF and HFpEF.
P928
N-terminal pro-B-type natriuretic peptide is no related with prognosis in patients hospitalized for heart failure with mid-range ejection fraction.

The prognosis impact of the N-terminal pro-B-type natriuretic peptide (NT-proBNP) during hospitalization for acute heart failure (HF) is controversial. The new ESC HF guidelines include a new HF category with mid-range EF (HFmrEF) (LVEF 40-49%). To date has not been described the NT-proBNP levels and the prognosis in this group.

A prospective observational study was conducted with 1420 patients classified according to ejection fraction as follows: HFrEF <40%; HFrEF 40%-49%; and HFmrEF, ≥50%. Baseline patient characteristics and outcomes at 1-, 6-, and 12-month follow-up were examined.

Results: Among the study participants, 583 (41%) had HFrEF, 227 (16%) HFrEF, 40%-49%; and HFmrEF, ≥50%. Baseline patient characteristics and outcomes at 1-, 6-, and 12-month follow-up were examined.

Conclusions: Despite marked differences in NT-proBNP levels between three categories during hospitalization for acute HF, no significant differences in the prognosis were observed during 1-year follow up. Our findings suggest a limited value of NT-proBNP levels in HFrEF patients in these setting.

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P929
The association of baseline hyponatremia with ethnicity and gender in acute heart failure admissions

Background: Hyponatremia, defined by a serum sodium concentration less than 135 mEq/L, is an electrolyte abnormality seen in approximately 25% of patients admitted with congestive heart failure (CHF). Baseline hyponatremia on admission has been shown to increase in-hospital mortality and to be an independent predictor of 6-month mortality in CHF patients. Prior work has shown that CHF patients with baseline hyponatemia are more likely to be Caucasian, but without further investigation. Heart failure does not impact patients of different ethnic backgrounds in the same manner. African-Americans have more than twice hospitalization rate of Caucasians. Given its prognostic significance and pathophysiologic role in the heart failure syndrome, hyponatremia and its association with patient characteristics warrants further study.

Purpose: To examine the association between baseline hyponatremia and the patient characteristics ethnicity and gender in a sample of heart failure admissions

Methods: Administrative data from admissions to Temple University Hospital between August 2011 and July 2015 was extracted and merged with inpatient laboratory data. We queried for unique admissions with a DRG code of “291-293” to examine association between first Na lab value after admission available. We used the identifiers “Ethnicity” and “Gender” to categorize the data. Chi-square tests were performed to examine association between first Na <135 mEq/L and ethnicity, gender, or ethnic/gender sub-group. All statistical analyses were performed with SAS 9.4 (SAS Institute, Cary, NC). Statistical significance was defined as p <0.05.

Results: 976 CHF admissions with a first Na lab value were identified. 884 admissions were identified by ethnicity as either “African-American” or “Hispanic”. There was no association between first Na < 135 and ethnicity (Chi-squared=2.31; p = 0.31). 976 admissions were identified as either “male” or “female”. There was no association between baseline hyponatremia and gender (Chi-squared=1.17; p = 0.27). 768 patient admissions could be classified by both ethnicity and gender. The “African-American/ Female” sub-group had the lowest proportion of admissions with first Na < 135 at 10.4%. The association between baseline hyponatremia and ethnic/gender sub-group did not achieve statistical significance (Chi-squared=9.49; p = 0.09)

---

**Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>HFrEF &lt;40% (n=583)</th>
<th>HFrEF 40 to 49% (n=610)</th>
<th>HFrEF ≥50% (n=610)</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>68.2 (12.8)</td>
<td>72.5 (11.1)</td>
<td>75.0 (10.7)</td>
<td>&lt;0.001</td>
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<td>Ischaemic HF</td>
<td>266 (50.5%)</td>
<td>83 (43.5%)</td>
<td>142 (26.4%)</td>
<td>&lt;0.001</td>
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<tr>
<td>Hypertension</td>
<td>415 (71.7%)</td>
<td>179 (78.2%)</td>
<td>489 (80.3%)</td>
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<tr>
<td>Diabetes mellitus</td>
<td>276 (47.7%)</td>
<td>109 (48.2%)</td>
<td>279 (48.6%)</td>
<td>0.746</td>
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<tr>
<td>Anuric classification</td>
<td>195 (34.5%)</td>
<td>92 (42.2%)</td>
<td>253 (43.0%)</td>
<td>0.009</td>
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<tr>
<td>Estimated GFR (CrCl-PK)</td>
<td>61.6 (26.3)</td>
<td>58.5 (24.6)</td>
<td>60.1 (24.0)</td>
<td>0.266</td>
</tr>
</tbody>
</table>

| NT-proBNP (pg/ml/l)           | 6,242.4 (3,299.1-10,962.2) | 4,395.9 (2,308.1-8,262.5) | 2,845.9 (1,287.4-5,903.6) | <0.001 |
| In-hospital deaths            | 21 (3.8%)          | 9 (4.1%)               | 23 (3.9%)          | 0.972 |
| 1-month mortality             | 31 (5.3%)          | 19 (8.4%)              | 37 (6.1%)          | 0.265 |
| 6-month mortality             | 84 (14.4%)         | 41 (18.1%)             | 88 (14.4%)         | 0.370 |
| 12-month mortality            | 116 (19.9%)        | 55 (24.2%)             | 118 (19.3%)        | 0.278 |
| HF readmission at 1 month     | 58 (9.9%)          | 21 (9.3%)              | 57 (9.3%)          | 0.924 |
| HF readmission at 6 months    | 147 (25.2%)        | 55 (24.2%)             | 142 (23.3%)        | 0.738 |
| HF readmission at 12 months   | 178 (30.5%)        | 67 (29.5%)             | 182 (29.8%)        | 0.947 |
Conclusion(s): Our study demonstrates no statistically significant association between baseline hyponatremia and the patient characteristics ethnicity and gender in our sample of heart failure admissions. There was a trend toward a lower proportion of “African-American/Female” admissions having baseline hyponatremia as compared to other ethnic/gender sub-groups. Further examination of the association between hyponatremia and patient characteristics is needed using a larger sample.

P390
Heart failure and preserved ejection fraction: clinical and prognostic observation after long follow-up. (from the ABC-3 study on acute coronary syndrome)

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On behalf of: ABC Study on Heart Disease

Funding Acknowledgements: Veneto Region

Objective: to examine clinical characteristics and long term prognosis of patients with heart failure (HF) and preserved left ventricular ejection fraction (HFpEF), and compare them to patients with HF and reduced LVEF (HFrEF).

Methods: The ABC-3 Study is an ongoing, prospective investigation designed to reflect, as closely as possible, an unbiased population of patients with acute coronary syndrome (ACS). The present study includes 529 patients with ACS, enrolled in three intensive coronary care units, followed up for 17 years. HF was evaluated according to Killip classification: class 1: no HF, class 2: pulmonary rales, class 3: pulmonary oedema, class 4: cardiogenic shock. We considered left ventricular ejection fraction s(LVEF)≤45% as a cut-off, higher values were considered as preserved systolic function. Baseline, clinical and laboratory data were all obtained within the first 7 days of hospitalization. All patients were followed up to 17 years of observation or time to death. Only 3 patients did not complete the follow-up and their time was censored before 17 years. Survival analysis was realized using Cox regression models. All analyses were made with STATA 14.

Results: Among the 529 ACS-patients, 87 (48%) had HFpEF, and 95 (52%) had HFrEF. All the other patients had Killip class 1. We did not observe differences between the two groups regarding age (mean±SD: 69.7±10.1 years respectively, p=0.10); gender, p=0.27; BMI, p=0.46; presence of hyper tension, p=0.49; diabetes mellitus p=0.70; total plasma cholesterol, p=0.65. Remarkably, the CK-MB peak (log-transformed), an indicator of necrosis extension, did not differ between the two groups (p=0.78), while indicators of renal function (estimated glomerular filtration rate (eGFR)=77.2±31.6 and 64.8±28.3 respectively, p=0.002) and endothelium dysfunction, evaluated by means of 24-hours urinary albumin to creatinine ratio (ACR)=39.8±28.3 respectively, p=0.059 in log-transformed data) showed relevant divergence. Among HFpEF patients, 62 (71.3%) died during the follow-up, while 89 (93.7%) died among those with HFpEF, chi2=16.1, p =< 0.0001.

At Cox survival analysis, we observed lower mortality risk among HFpEF patients (HR=0.73, 95%CI=1.74-3.3, p=0.0021). In the adjusted model (age, gender, AC, GFR) still the risk difference remained consistent (HR=1.8; 95%CI=1.2-2.5; p=0.001).

Conclusion: We observed that HFpEF patients had worse renal function and endothelium dysfunction in comparison with HFpEF patients. Besides, patients with HFpEF showed higher long-term mortality risk as compared to those with HFrEF.

P391
In ADHF patients, difference between serum BNP on admission and the one that is detected at discharge predicts six-month mortality more reliably compared to BNP on admission

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Background According to some authors, a single isolated measurement of serum B-type natriuretic peptide (BNP) executed on hospital admission would not be a sufficiently accurate method to predict the outcome of patients with acute decompensated heart failure (ADHF).

Aims: in verifying this assumption, a retrospective study was conducted on patients hospitalized for ADHF. Our main objective was to ascertain whether there was any difference in midterm mortality among patients with rising BNP at discharge as compared to those with decreasing BNP at discharge.

Methods: Medical records were examined so as to make a partition of the ADHF patient population into two groups, the former characterized by a rise in BNP during hospitalization, and the latter exhibiting a decrease in BNP in the measurement taken at hospital discharge.

Results: 177 patients were enrolled in a retrospective study. Among them, 53 patients(30%) had increased BNP at the time of discharge, whereas 124 (70%) showed decreases in serum BNP during their hospital stay. The group with patients who exhibited BNP increases at the time of discharge had higher degree of congestion evident in the higher frequency of persistent jugular venous distention and persistent orthopnea at discharge. Moreover, patients with increased BNP at the time of discharge had a lower reduction in inferior vena cava maximum diameter [1.58±2.2 vs 6.32±1.8 mm; p=one-way ANOVA=0.001]. In contrast, there was no significant difference in weight loss when patients with increased BNP at discharge were compared to those with no such increase. A total of 14 patients (7.9%) died during the six-month follow-up period. Multivariable Cox proportional-hazards regression analysis revealed that BNP increase at the time of discharge was an independent predictor of six-month all-cause mortality after adjustment for persistent jugular venous distention, persistent orthopnea, reduction in inferior vena cava maximum diameter, heart rate systolic blood pressure at admission and BNP at admission (hazard ratio= 3.05±2.2; 95% CI: 1.7409 – 535.8294; p = 0.019).

Conclusions: Among patients with history of ADHF, more elevated BNP levels at the time of discharge from the hospital compared to those detected at admission identify a patient subset with higher grade of congestion and higher six-month mortality.
P933
Mean systolic blood pressure after admission for myocardial infarction is associated with one year mortality among elderly patients.
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OBJECTIVE: Optimal blood pressure after acute myocardial infarction (AMI) is still debated. After admission for AMI, the target mean systolic blood pressure (mSBP) is unknown, especially in the elderly patients.

Methods: All patients older than 75 years admitted for AMI in our university hospital from 01/02/2012 to 31/01/2015 were screened to participate at this prospective observational study. Exclusion criteria were cardiacogenic shock, end-stage renal disease, less than 3 collected blood pressure values. We completed a one-year follow-up. The primary endpoint was all-cause mortality at one year while additional criteria were major adverse cardiac and cerebrovascular events at one year. The mSBP was defined by the mean of at least 3 measurements over the first 48 hours following admission for AMI.

RESULTS: In our population, a ROC curve study on the relationship between mSBP and one-year mortality suggested a cut-off value of mSBP of 125 mmHg. 517 patients (mean age 82 years) were divided into 2 groups according to mSBP (<125mmHg vs ≥125mmHg). There was a higher rate of one year all-cause mortality in the mSBP<125mmHg group with 58 deaths (22.3%) versus 31 (12.1%) (p=0.02) in the mSBP ≥125mmHg group, and also an increased cardiovascular mortality in the mSBP<125mmHg group with 43 deaths (16.5%) versus 22 (8.9%) (p=0.008). A multivariate analysis identified 4 independent factors of all-cause mortality at 1 year after AMI: initial GRACE score > 140, LVEF < 40%, history of stroke and mSBP<125mmHg.

Conclusions: In our elderly AMI population, low mSBP within 48 hours after admission was an independent and powerful predictor of one-year mortality. Our results raise the question of the timing implying the introduction of usual pharmacological therapies in this high-risk population. Our cut-off of mSBP remains to be validated in further studies.

P935
Dynamics of epidemiological characteristics of the prevalence of cardiovascular and some non-infectious diseases among the women of fertile age in Fergana Valley
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Purpose: To study 9-year dynamics of prevalence of main cardiovascular and non-infectious diseases (MCNID) among the population of women of fertile age (FAW) in Fergana Valley.

Material and methods: During epidemiological study with use of method of monitoring there was evaluated 9-year dynamics of MCNID prevalence among FAW (912 women in Andijan-city and 2360 women in Namangan). In two researches with interval 9 years the lists of election campaign before onset of investigations were the resources for formation of the selection. There were used epidemiological criteria for diagnosis of MCNID (Ogonov P.G. et al, 2003).

Results: During the period from 1996 to 2004 in FAW the statistic significant increase in prevalence of MCNID by 5,4% was found (from 26,1% to 31,5%) respectively from 1 to 2 investigation, (P<0.05). This growth of MCNID formed due to their increase in various patterns in the following age groups: from 10.1 - 19.2% or by + 9,1% at 15 years-19 years (P<0.05); from 17.2 - 29.4%, or by + 12.2% - at 20-29 years (P<0.05); from 24.0 to 37.6% or by 13,8% - at 30-39 years (P<0.05) and from 16,9% to 28,6% or by 12,2% at 40-49 years (P<0.05). The prevalence of MCNID was noted in age group of 30-39 years, comparatively less this growth was observed in groups of women of 15-19 years, 20-29 and 40-49 years.

Conclusion: During the 9-year follow-up of FAW in comparison with initial data the growth of cases of MCNID was significantly accelerated – from 9,1% (15-19 years) to 13,3% (30-39 years) in dependence on age. These results may be recommended for optimization of the strategy of preventing programs or for determination of the groups of high risk for development of chronic multiple diseases in women of the age 15-49 years.

P934
Trends in gender differences in cardiac care and outcome after acute myocardial infarction in western Sweden
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Background: Cardiovascular disease is the most common cause of death for both genders. Debates are ongoing as to whether there exists sex-specific differences in the clinical course, diagnosis and management of acute myocardial infarction (AMI) and to what extent these differences can be alleviated by changes in clinical praxis.

Methods: We compared all men and women who were treated for AMI at a cardiac care unit in Västra Götaland County between January 1995 and October 2014 by obtaining data from the prospective SWEDHEART registry (Sweden Webhest for Enhancement of Evidence-Based Care in Heart Disease Evaluated According to Recommended Therapies). We performed unadjusted and adjusted Cox proportional hazard and logistic regression analyses on complete case data as well as on imputed datasets.

Results: 48,118 patients (35.4% women) were diagnosed with acute myocardial infarction and were included in the analysis. A woman had a higher age-adjusted progosis than men but this survival benefit was absent for younger women (≤60 years) and for women with ST-elevation myocardial infarction (STEMI). Compared to men, younger women and women with STEMI were more likely to develop pre-hospital cardiacogenic shock (adjusted OR 1.67, 95%CI 1.30 – 2.16, p<0.001 and adjusted OR 1.31, 95%CI 1.16 – 1.48, p<0.001) and were less likely to be prescribed evidenced based treatment at discharge (p<0.001 for beta blockers, angiotensin converting enzyme inhibitor/angiotensin receptor antagonist, statins and FXY212 antagonists). Differences in treatment between the genders did not decrease over the course of the study period (p>0.1 for all treatments).

Conclusions: Younger women with acute myocardial infarction had higher risk to develop cardiacogenic shock and have worse short- and long-term prognosis after acute myocardial infarction. Women are less likely than men to be prescribed evidenced based treatment after acute myocardial infarction.

P936
Prognostic role of cystatin C and other biomarkers in heart failure
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Background: Cystatin C is a valid alternative to test renal function and it recently showed some features, in terms of long-term predictive value of mortality and re-hospitalization for acute heart failure, compared to measurement of serum creatinine and/or levels of NT-proBNP.

Materials and methods: We studied 79 patients [Mean= 38, Woman= 41; average age 74.10 ± 8.45 years] consecutively admitted at the Cardiology Unit for heart failure. The final diagnosis of heart failure was made in accordance with the recent ESC Guidelines 2016, based on clinical history, signs, symptoms experienced, and echocardiographic alterations (Abnormalities in E/A ratio and/or increased left atrial volume were also considered)

We evaluated serum concentrations of cystatin C and NT-proBNP within 24 hours of hospitalization and at discharge, the Cardiology Unit for heart failure (NYHA), the speed ratio of the transmitral flow (ratio E/A) to assess diastolic function. It was conducted a one year follow-up with telephone interview, regarding any re-hospitalizations or mortality for all-causes or cardiac causes.

Results: The levels of Cystatin C, NT-proBNP were significantly related to NYHA class and lower ejection fraction (r=0.603 P < 0.001, r=0.331 P < 0.001 and r=0.321 P < 0.01, respectively). Patients with Cystatin C levels less than 1.5 mg/l had a higher E/A ratio than those with cystatin C levels greater than 1.5 mg/l. Cystatin C was significantly associated with both NYHA classification and E/A ratio even after adjusting for creatinine clearance.

We found an area under the ROC curve of 0.741 (SE= 0.096, 95% CI 0.610 to 0.846) for NTproBNP and 0.824 (SE= 0.056, 95% CI 0.726-0.897) for Cystatin C. In these conditions, the values with the high prognostic accuracy appear to be: 590 pg/ml for NT-proBNP (95% specificity), 16.2 mg/l for Cystatin C (95% specificity).

Conclusions: Both Cystatin C and NT-proBNP are related to worse NYHA classification, ejection fraction and increased rate of MACEs and mortality, independent of renal function, higher serum concentrations of cystatin C correlates with days of hospitalization (P = 0.0002) and abnormal cardiac diastolic properties in patients with heart failure.
P938
Adherence to treatment guidelines and its association with length of hospital stay for patients with uncompensated heart failure and reduced ejection fraction
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2Emergency Clinical Hospital Floreasca, Bucharest, Romania
3Vilnius University, Clinic of Cardiac and Vascular diseases, Center of Cardiology

Background: The objective of the study was to assess the adherence to the treatment guidelines and its association with length of hospital stay for patients with uncompensated heart failure and reduced ejection fraction. The study was conducted at the Vilnius University Hospital Clinic of Cardiac and Vascular diseases, Center of Cardiology, Vilnius, Lithuania. The study covered the period from October 2016 to December 2016.

Methods: The study included 187 patients with uncompensated heart failure and reduced ejection fraction. The patients were divided into three groups based on the GAI3 values (good, 100%; intermediate, 50–67%; poor, <50%). The variables used to assess the adherence to treatment guidelines included: the proportion of care provided according to current European Society of Cardiology (ESC) HF treatment guidelines, medication prescribed at discharge, and the presence of any ST-segment deviation in the electrocardiogram (ECG).

Results: The majority of patients (n=105, 56%) had good adherence to treatment guidelines, 54% had intermediate adherence, and 10% had poor adherence. The most common reason for poor adherence was the absence of medications prescribed according to ESC guidelines. The prevalence of any ST-segment deviation was 80% (n=157), with 43% having ST-segment elevation, 41% having ST-segment depression, and 16% having ST-segment deviation in other leads.

Conclusion: Adherence to treatment guidelines and its association with length of hospital stay for patients with uncompensated heart failure and reduced ejection fraction was assessed in a cohort of 187 patients. The results indicate that a significant number of patients did not receive treatment according to current guidelines, and this may be associated with increased length of hospital stay.

P939
Association between iron deficiency and post-discharge outcomes in patients hospitalized for heart failure
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Background: Iron deficiency (ID) is common in chronic heart failure (HF) patients and is associated with a higher risk for post-discharge adverse events. It should be regularly checked at discharge and may be a therapeutic target in WCHF.

Methods: This was a retrospective study of 187 consecutive patients hospitalized for WCHF who were evaluated for ID at discharge. ID was defined as ferritin < 100 mcg/L or 100-299 mcg/L and TSAT < 20%. Patients were divided into two groups according to the presence or absence of ID.

Results: Among the 187 patients, 39% had ID, and of these, 19% had ID without anaemia, while 35% had ID and anaemia. Differences in baseline characteristics between ID+ and ID- were as follows: male gender (63% vs 61%, p=0.08), diabetes (12.0% vs 9.1%, p=0.04), left ventricular ejection fraction (LVEF) < 40% (41% vs 33.5%, p=0.03), and NT-proBNP (3875 ± 2510 vs 2150 ± 1730, p<0.001).

Conclusion: ID is a common comorbidity in patients hospitalized for WCHF and it is associated with higher risk for post-discharge adverse events. ID should be regularly checked at discharge and may be a therapeutic target in WCHF.
Characteristics of patients with acute heart failure according to new ESC guidelines derived-LVEF classification

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
<th>CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (by 10y)</td>
<td>0.64</td>
<td>0.50-0.82</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>0.42</td>
<td>0.22-0.80</td>
<td>0.008</td>
</tr>
<tr>
<td>Dilated cardiomyopathy</td>
<td>2.96</td>
<td>1.18-7.42</td>
<td>0.021</td>
</tr>
<tr>
<td>Systolic blood pressure (by 10mmHg)</td>
<td>0.80</td>
<td>0.72-0.89</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hemoglobin (by 1g/dL)</td>
<td>1.20</td>
<td>1.04-1.38</td>
<td>0.01</td>
</tr>
<tr>
<td>Natriuretic peptides (BNP or NTproBNP)³rd vs NT-proBNP</td>
<td>2.42</td>
<td>1.12-5.22</td>
<td>0.025</td>
</tr>
<tr>
<td>Betablockers at discharge</td>
<td>2.00</td>
<td>1.04-3.82</td>
<td>0.037</td>
</tr>
</tbody>
</table>

**Conclusion:**
Acute heart failure patients with NT-proBNP exhibit similar characteristics with both HF-IEF and HF-GeF, which deserves further investigations.

**Methods:**
FRESH is an on-going multicenter survey collecting exhaustive data in both acute and chronic HF (NCT01956539). Comparisons were performed using chi² or Fisher test for categorical variables and ANOVA or non-parametric Kruskal Wallis test for continuous variables. Multinomial logistic regression was performed.

**Results:**
Among 595 chronic HF patients, 50% had LVEF, 15% had mLVEF and 35% had pLVEF. There were significant differences across LVEF subgroups in clinical scenario at admission as well as age, gender, underlying cardiac disease, comorbidities, heart rate, arrhythmia, blood pressure, haemoglobin, creatinine, BUN, natriuretic peptides, and use of medications during hospitalization and at discharge. The table shows significant results of the multivariate analysis.

**Conclusion:**
Hypercapnia is present in up to one third of the patients admitted with AHF, more frequently in those with pLVEF. The potential need for the use of bi-pressure airway ventilation and its prevalence in this population suggest that the knowledge of the CO2 level may be important in these patients.
**P943**

Advanced acute heart failure and ketogenic diet: a case series of a single centre initial experience

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**BACKGROUND:** Ketogenic diet (KD) is an effective treatment for drug-resistant epilepsy. Recently, clinical indications have been increasing. Little is known on the contribution in cardiac metabolism.

**Material and Methods:** Seven adult pts affected by acute heart failure (HF), unresponsive to conventional medical and surgical therapy, were enrolled to observe the effects of KD as additional treatment. Pts demographics, diuresis, urine ketones, laboratory studies, diet duration, side effects and echocardiographic studies were recorded.

**Results:** Two pts presented biventricular failure after heart transplantation (HTx). Five pts presented right ventricular failure (RVF) after LVAD implantation. One pt was n=1 (14%). Age range was 45-72 yrs. All pts were naïve to diet therapy. At 6 days of treatment pts responded to KD on: RFV (range 4-60% of TAPSE increase, p=0.015); LV in two HTx (increase of 15-26% respectively, p=0.1); glucose variability (GIW) with mean 53.59 ± 18.98 yrs. The underlying etiology of HF was loss and increase in diuresis volume were common in all pts but not statistically significant (p=0.4).

**Conclusions:** Perceived benefits of KD were improved RV function and reduced serum GV. These cases demonstrate that the use of KD for treatment of refractory HF can be undertaken safely and is well tolerated in different administration forms. Future research with proper numbers and identification of pts is necessary.

**P945**

Is pulse pressure associated with short-term re-admission after index hospitalisation for acute heart failure syndrome?

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**Introduction:** The prognostic value of pulse pressure has been investigated in chronic heart-failure patients, however, it’s reliability as prognostic marker in patients with acute heart failure is unknown.

**Hypothesis:** We aimed to evaluate the effect of pulse pressure, at baseline and at discharge, on re-admission in 30-days after an index hospitalisation for unselected patients with acute heart failure (AHF) in the local population.

**Patient selection and characteristics:** We identified a total of 61 consecutive patients (mean age 78 years, 55.4% females) over three months period who were hospitalised for a mean of 7.6 days at a large district general hospital. 58.9% of patients were hypertensive, 34.1% were diabetics, 59% were known for previous chronic heart failure. 39.2% had myocardial infarctions, 55.7% had known atrial fibrillation and 16.0% had chronic obstructive pulmonary disease. Nearly 32.5% had acute kidney injury, but there was significant improvement in creatinine levels (123.7 mmol/L vs 113.1 mmol/L, p=0.004) at the time of discharge. Interestingly, at discharge, a significant reduction in prescription for beta-blockers (87.1% vs 85.5% on discharge) was noted. Increasing number of patients received angiotensin converting enzyme-inhibitor (ACEI) or angiotensin receptor blockers (ARB) (86.2% vs 83.9%). Only 19.3% patients had aldosterone receptor inhibitors and 8% had tiazidines.

**Results:** Mean BP was reduced significantly from 138/78 mmHg to 123/68 mmHg (p=0.01). Heart rate reduction was significant (88 beats per minute (bpm) to 74bpm; p<0.0001), nonetheless it was still higher than the 70 bpm as suggested by SHIFT trial. 30-days all-cause mortality after an index admission was 9.6% and re-admission rate was 32.3%.

The mean pulse pressure drop was not significant (60.2 mmHg on admission vs 55.3 mmHg at discharge, p=0.09). Logistic regression analysis (MedCalc) showed pulse pressure on discharge (P<0.0001) was significantly related to re-admission in 30 days after an index admission for AHF.

**Conclusions:** The results of this small study suggest that the prediction of re-admission after hospital discharge for acute heart failure could be improved based on pulse pressure at discharge. These results need confirmation in a larger study.

**P946**

Prevalence of a longer stay in acute heart failure: a colombian experience

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**Funding Acknowledgements:** Clinica CardioVID and University pontificia bolivariana

Acute heart failure (AHF) in the leading cause of hospitalization for people aged 65 or older. Hospital length of stay (LOS) is a key determinant of higher hospitals costs.**

**Objective:** To describe the clinical profile of patients admitted for AHF in a Colombian reference center and to identify the characteristics that predict a longer length of stay.

**Methods:** A prospective cohort study was performed

**Results:** 183 patients were hospitalized during a period of 5 months with diagnosis of AHF, the mean age was 67.6 ± 15.3 years, 55.7% were males, the mean EF was 30.4% ± 14.6. Most of the population had HF EF: The clinical profile of the patients was: warm-dry: 3.8%, warm-wet: 78.7%, cold-dry: 3.8%, cold-wet 13.7%. Inotropes were prescribed in 15.8% and 5.5% presented new onset atrial fibrillation, the average LOS was 5 days and 93% of the population had a longer LOS. The 30 days mortality was 7%, 54.6% of the patients had at least one previous hospitalization. The most frequent comorbidities are presented in table 1. Multivariate and univariate analysis was performed and the presence of acute renal failure was the only predictor of a prolonged length of stay ( Relative risk 1.66 CI 1.28 - 2.14)

**Conclusions:** Our population of AHF had a mean of stay of 5 days, were predominantly males, with reduce EF and a lot of comorbidities. Acute renal failure was the only predictor of a long stay.
Is tako-tsubo cardiomyopathy induced during dobutamine stress echocardiography a high-risk situation?

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Background: Life-Threatening complications due to hemodynamic instability may occur early in Takko-Tubo cardiomyopathy (TTC). Dobutamine Stress Echocardiography (DSE) is a non-invasive test to detect myocardial ischemia. TTC induced during DSE is a rare issue. Our purpose is the evaluate the frequency and severity of acute Left Ventricular (LV) dysfunction and its possible deleterious evolution in TTC induced during DSE.

Patients and methods: From an exhaustive search and review, using key words “apical ballooning, stress cardiomyopathy and DSE”, we identify 23 clinical reports of DSE induced TTC from 2008 to 2016, and we added one personal case.

Results: This cohort of 24 patients (pts) was homogeneous as all they presented TTC during DSE. Collected observations came mostly from USA (n = 10) and Europe (n = 9). DSE tests, protocol and indications were conventional: thoracic pain (16/24) and pre-observation (5/24). Symptoms occurred mostly at peak dose, 30 or 40 gamma/kg/min (23/24) or rarely during recovery (3/25). Demographic and clinical data show: mean age = 65 ± 13 years - from 14 to 85; female = 92%; female > 50 years = 84%; EKG ST elevation: 70.8%. All patients underwent emergency coro-angiography and all coronary angiogram was normal, with markedly depressed LV angiographic Fraction (LV EF): 33 ± 8% (not calculated for 10 pts). LV angiographic ballooning pattern was: apical n = 15 (62%); mid n=5(20%), unknown (18%), Mean troponin peak was 3.87 (3.6-9 ng/ml); Death occurs in one pt. (4,1%), at day 2, the eldest woman (89y) of the group because of cardiac failure. LV EF recovery was constant between day 2 and 30. New imaging techniques are still rarely added: Magnetic Resonance imaging (n = 4) and 2D longitudinal strain (n = 2).

Conclusions: TTC induced during DSE is a rare, but severe entity. It gives the rare opportunity to observe TTC at its very acute phase in all patients. Normal coronary arteries, acute LV dysfunction with apical or mid ballooning, low LV ejection levels are typical markers of TTC. In this cohort, despite severe LV dysfunction, death remains rare. LV function normalizes rapidly and completely. Dobutamine infusion, psychological stress during DSE, may contribute to the occurrence of TTC during DSE but precise mechanism of this acute situation remains unknown.

P947
Reliability of biomarkers (NT-proBNP, Gal-3, INSGF, hTnT, AVP, ST-2, MDA) in patients with HFrEF, HDPnEF, diabetic nephropathy and arterial hypertension

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Background: Several biomarkers are available for the evaluation of diagnosis, supervision of therapy and risk prediction in various cardiovascular disease. Further, they may serve as a surrogate parameter in clinical trials. Although NT-proBNP, Gal-3, INSGF, hTnT, MDA and AVP are well established, little is known about the test-retest reliability in patient cohorts with a high cardiovascular risk profile. The aim of the current study was to determine the biologic reliability of biomarkers in different subgroups of cardiovascular disease.

Methods and Results: All biomarkers were measured in patients with heart failure with preserved ejection fraction heart failure with preserved ejection fraction (HFrEF) (n = 23), heart failure with reduced ejection fraction (HDPnEF) (n = 24), diabetic nephropathy (n = 20), and arterial hypertension (aHT) (n = 23). A second measurement took place about 7 days after (d4 to d14) combined with a physical examination, an extensive anamnesis, an initial echocardiography, a laboratory assessment and an electrocardiogram. Blood was taken from a venous puncture, stored at -80°C and biomarkers determined by the specific assay. Intraclass Correlation for all biomarkers regarding all subgroups exceeded ICC > 0.80 (NT-proBNP = 0.96, Gal-3 = 0.90, INSGF = 0.91, hTnT = 0.95, ST-2 = 0.83, AVP = 0.87 except for MDA (ICC = 0.63), Gal-3 presented a strong reliability in aHT (ICC = 0.93) and HDPnEF (ICC = 0.93), whereas there was a limited reliability in HFrEF (ICC = 0.69). Regarding the subgroups the lowest reliability was achieved in aHT.

Conclusion: We confirm that the biological reliability of all examined biomarkers was strong, except for MDA. Our data suggest that Gal-3 is more reliable in HFrEF patients and should be considered more carefully in HFrEF patients. NGAL and AVP data showed the opposite pattern between the 2 heart failure entities. Hereby the study highlights the importance of selective use of biomarkers.

P948
Altered intestinal microflora in the progression of chronic heart failure

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Background: An involvement of the gut in the progression and clinical evolution of heart failure has been discussed for years. Although the pathogenetic role of the gut microbiome and function have only recently started to be investigated in more detail in patients with chronic heart failure (CHF), data are accumulating to suggest that the gut plays an important pathophysiological role in both chronic inflammation and malnutrition in CHF.

Purpose: Identify changes in luminal and the wall microflora of the colon in patients with different heart failure functional classes (FC).

Methods: In total 34 CHF patients with were examined. 11 patients (32%) were in functional classes III-IV (NYHA) and others 23 (68%) were in functional classes I-II (NYHA). All patients were tested on bacteria in stool. Microbiological study of faces was carried out on the crop nutrient in the dilutions -1,-3,-5,-7. After 48-hour incubation at 37°C the estimation results. Microorganisms were identified by enzyme activity, as well as by microscopic examination of smears stained by Gram.

Results: The total number of Enterobacteriaceae level in patients with CHF FC I-II was -109 colony forming units (CFU)/g, and in patients with II-IV CHF FC - 106 CFU/g. The growth of enterobacteria marked mainly by E. coli - 106 CFU / g (II-IV CHF), against 109 CFU / (III-IV CHF FC) (p < 0.005), different types of Klebsiella - 105 CFU/g (II-IV CHF FC) and 107 CFU/g (I-II CHF FC) (p < 0.001), citrate assimilating enterobacteria - 106 CFU/g (II-IV CHF FC) and 108 CFU/g (I-II CHF FC)
P951  
**Studying the relationship of endothelial NO synthase gene polymorphism and endothelial dysfunction in patients with chronic heart failure**  
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**Purpose**: Examination of influence of inducible gene NO synthase (iNOS) and endothelial NO synthase (eNOS) polymorphism on endothelial function at patient with CHF.  

**Material and methods**: 72 male patients at the age of 40 to 55 years old with postinflammatory left ventricular systolic dysfunction were enrolled. All patients were divided into two groups by functional class (FC) in CHF in compliance with New York classification of cardiologist (NYHA) under conduction of test for 6 minutes walking (TSW): 1st group of FC I and II (n = 55) and 2nd group included 37 patients with CHF III FC by NYHA classification. Control group included 20 healthy volunteers. Vasoconstriction of brachial artery endothelium was assessed by D. S. Celermajer (1992) method on Acuson 128 apparatus (USA).  

**Results**: Dysfunction of endothelium at CHF patients was connected with progressing of disease and characterized by reduce of endothelium-dependent vasoconstriction, which were more expressed at patients with III FC CHF. It was revealed that the amount of Glu polymorphic locus 298Asp eNOS gene in homozygous condition is associated with CHF severity. Homozgyotes by Glu alleles of 298Asp eNOS gene showed more expressed failures of endothelium-dependent vasoconstriction in comparison with the same one at carriers of 298Asp alleles.  

**Conclusions**: So, associative correlations of polymorphism of iNOS and eNOS genes with CHF severity flow have been established and polymorphism of eNOS (Glu298Asp) gene is associated with the failure of endothelium-dependent vasoconstriction.

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P952  
**Asymptomatic left ventricular dysfunction, coronary angiography and significant coronary artery disease**  
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**Introduction**: Coronary angiography is commonly performed to exclude coronary artery disease in the work-up of left ventricle dysfunction of unknown aetiology. The clinical yield of this approach is unclear in contemporary practice.  

**Purpose**: We sought to determine the prevalence and predictors of clinically significant coronary artery disease in patients with left ventricle dysfunction of unknown aetiology referred for invasive diagnosis.  

**Methods**: Single centre retrospective analysis including 598 patients with left ventricular dysfunction without angina or documented ischemia, who underwent coronary angiography, between 2005 and 2015. Clinically significant CAD was defined as left main stenosis >50%, left anterior descending artery (LAD) stenosis >70% or three vessel disease (proximal or middle LAD, circumflex and right coronary stenosis >50%). Predictors of clinically significant coronary artery disease were identified using binary logistic regression.  

**Results**: The mean age of the studied population was 66 (±12) years old and 69% of the patients were males. The prevalence of diabetes, hypertension, dyslipidaemia and tobacco consumption was 35.4%, 66.1%, 43.7% and 40.2%, respectively. The most common presentations were fatigue in 53% and dyspnoea in 35% of the patients. Mild, moderate and severe depression of the ejection fraction was present in 31%, 37% and 32%, respectively. Forty-nine percent of the patient presented some degree of coronary atherosclerosis and 18.1% had at least one lesion >50%. Sevety patients (11.7%) had significant CAD. In univariate analysis, CAD was more present in older patients, with higher systolic and diastolic blood pressure and lower HDL levels. After correction for other variables, age (OR 1.03 95%CI 1.00-1.06, p = 0.008) and tobacco use (OR 1.02 95%CI 1.009-3.1, p = 0.044) were independent predictors of significant CAD, on the other hand patients who presented with fatigue (OR 0.473 95%CI 0.273-0.82, p = 0.008) and with COPD (OR 0.22 95%CI 0.065-0.73, p = 0.0318) had less CAD.  

**Conclusion**: The prevalence of significant CAD among patients with left ventricle dysfunction referred for coronary angiography for coronary disease exclusion is high and probably supports the use of this invasive approach in this setting.

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P953  
**The role of galectin-3 in heart failure**  
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**Aims**: Biomarkers are increasingly being used in the management of patients with chronic heart failure (HF). Galectin-3 is implicated in the processes of fibrogenesis and ventricular remodeling in patients with heart failure. The objective of this study was to investigate the prognostic role of Galectin-3 in patients with reduced EF (<50%) and preserved EF (>50%).  

**Methods and Results**: The study included 86 patients with clinical diagnosis of heart failure. The plasma levels of galectin-3 were measured in all patients at admission and at discharge. The follow-up has had an average duration of 33 days. At follow-up were recorded 19 cases of death from cardiovascular causes that involved 10 women and 9 men. The statistical analysis showed a strong correlation between the levels of Galectin-3 measured at admission and at discharge and adverse events at follow-up (P < 0.001). These results were independent of the etiology of heart failure, the ejection fraction or the presence of cardiovascular risk factors.  

**Conclusions**: High concentrations of galectin-3 correlate with a worse short-term prognosis in patients with heart failure regardless of etiology of heart failure and ejection fraction. This biomarker thus looks promising as a prognostic factor in this set of patients, allowing the identification of patients at highest risk.

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P954  
**Practical conﬁrmation of the predictive accuracy of a 400 ng/L NtProBNP threshold for heart failure**  
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**Background and Purpose**: Until 2012, both the European Society of Cardiology (ESC) and the National Institute of Health and Care Excellence (NICE) proposed that the diagnostic threshold for diagnosing heart failure (HF) using NTproBNP should be 400ng/l. A health technology assessment, published by one of the authors in 2009, calculated the predictive accuracy of that threshold in diagnosing HF to be 75%. We assessed the predictive value in a large cohort of patients attending our incident heart failure clinic.  

**Methods**: Consecutive patients referred to our institution with suspected new onset HF and NTProBNP > 400 ng/l were studied. Patients underwent detailed echocardiography and assessment by a HF consultant cardiologist. Patients were classified as having heart failure if the clinical and echocardiographic features supported the diagnosis of heart failure syndrome.  

**Results**: 3939 patients were seen between 13th of April 2012 and 31st of December 2016. 935 patients (24%) did not have any evidence of heart failure. We assessed the stability of that percentage annually and found that the percentage of patients presenting to the diagnostic HF clinic with no evidence of heart failure was 20%, 25%, 23%, 23% and 27% in the years 2012, 2013, 2014, 2015 and 2016 , respectively.  

**Conclusions**: The old threshold for NTproBNP of 400 ng/l predicted heart failure with 76% certainty, in a large consecutive cohort over a period of 5 years. This confirms previously published predicted values.
Background: Cardiac allograft vasculopathy (CAV) is associated with high morbidity in heart transplant recipients. Coronary angiography is the reference method to diagnose CAV; however, this procedure is invasive and requires the use of nephrotoxic contrast agents. The multi-layer strain is a new ultrasound technology allowing in particular the functional assessment of the sub-endocardial left ventricular layer which is very sensitive to ischemia.

The aim of the study was to evaluate the value of multi-layer longitudinal strain to diagnose CAV in heart transplant patients as compared to angiography.

Methods: In this observational prospective study, 106 HTx patients (mean age, 53 ± 11.2 years; years since heart transplant = 7.0 ± 3.3 years) referred for routine coronary angiography were included. CAV was classified according to International Society of Heart and Lung Transplantation guidelines. In addition, all patients had an echocardiography within 24 hours before the angiography. The examinations were analyzed off-line by an independent operator, blinded to clinical history and coronary angiography results. The global longitudinal strain (GLS) of the different myocardial layers was measured. We included also 42 healthy subjects as control group.

Results: Compared to controls, sub-endocardial mid-myocardial and epicardial GLS were reduced in HTx patients (all p ≤ 0.001). Among 106 HTx patients, CAV was diagnosed in 47 (43.5%) patients. Among CAV patients, 22 patients had grade 1 CAV (CAV 1) and 25 patients had higher CAV grade (CAV 2-3). There was no difference in sub-endocardial GLS between HTx patients with or without CAV (19.94 ± 3.7% versus 19.43 ± 3.0%, respectively, p = 0.45). The GLS of the other myocardial layers was also similar in both groups. Moreover, the GLS in HTx patients with CAV 2-3 was not different compared to patients without CAV or patients with CAV 1.

Conclusion: Compared with controls, multi-layer GLS is reduced in HTx patient. However, in HTx this technology appears not useful for the noninvasive diagnosis of CAV.

P925 Multi-layer longitudinal strain for noninvasive diagnosis of coronary allograft vasculopathy in heart transplant recipients: a comparative study ultrasound versus angiography.

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Echocardiographic diagnostic criteria for heart failure with preserved ejection fraction: does one-size fits all?

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P956 F easability and safety of right and left heart catheterization via an antecubital fossa vein and the radial artery in patients with heart failure: a single centre retrospective cohort study.

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P957 The incremental shuttle walk test for the evaluation of patients at risk of developing heart Failure: a HOMAGE sub-study.

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On behalf of: The HOMAGE investigators

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Background: - The six minute walk test is a potentially useful method for assessing functional capacity in most people with heart failure. It does not require specialized equipment but may not be a good test of cardiopulmonary limitation for those with good functional capacity. The incremental shuttle walk test (ISWT) may be a better method of assessing cardiopulmonary performance in people without severe limitation. There is extensive experience of this test in patients with lung disease (Singh et al 1992) but experience in heart failure is limited. The Heart ‘OMics’ in AGE-ing (HOMAGE) study aims to evaluate the effects of spironolactone on biomarkers in patients at risk of developing heart failure and includes an ISWT at screening.

Methods: - This is an interim report on the first cohort of patients screened for HOMAGE, a trial evaluating spironolactone in patients at risk of developing heart failure (age >60 years with coronary artery disease or equivalent (eg: long-standing type-2 diabetes mellitus and hypertension). Baseline treatments could include ACE inhibitors, calcium channel blockers and beta-blockers but neither MRA nor diuretics. Only patients in sinus rhythm with elevated plasma concentrations of natriuretic peptides (eg: NT-proBNP > 125pg/L) are included. The ISWT is a standardised, progressive, incremental walking test for patients comprising up to 12 levels and 102 shuttles. Patients walk around a 10m shuttle course marked by cones, in time with a series of beeps played from a CD. It produces a higher peak heart-rate and Borg Dyspnoea score as well as a more graded cardiopulmonary response to exercise compared to the 6 minute walk test (BMW) (Singh et al, 1990). Changes of 50-70 functional metres are considered clinically significant (Singh et al., 2008). It is a learning effect. Results are reported according to quartiles (Q) of completed shuttles.

Results: - Of 124 patients screened, mean age was 74.6 years and 23% were women. The median (Q1-Q3) number of shuttles at screening was 45 (23 - 61). Patients in each quartile were of similar age, had similar baseline heart rate (62 ± 10 bpm) and systolic blood pressure (146 ± 24 mmHg) but patients in the lowest quartile of exercise capacity were more often women, had lower haemoglobin and tended to have higher plasma NT-proBNP (Q1: 298 (193-422) v Q4: 198 (147-305)ng/L, p = 0.16). Prior to exercise, patients reported a similar degree of breathlessness on moderate exertion during daily activity in each quartile. Immediately after exercise, perceived exertion was generally rated ‘sort of hard’ or ‘hard’ on a Borg scale for each quartile but post-exercise heart rate (Q1: 70 ± 14 v Q4: 88 ± 17 bpm; p = 0.0017) and systolic blood pressure (Q1: 158 ± 28 v Q4: 188 ± 34 mmHg; p = 0.0012) were higher in those who completed more shuttles.

Conclusions: - Further experience with the ISWT is required.
indexed atrial volume ≥34mL/m² and indexed-LV mass was elevated on 59%. Evi-
dence of elevated filling pressure as assessed with E/E' > 13 was noticed in 51% and
average E/E' ≥ 11 cm/s in 67%. At least one structural criteria was abnormal in 90% and
at least one functional criteria was abnormal in 85% (sensitivity for either approach
was not different, p = 0.199). When taking into account all the criteria, at least one
structural or one functional criteria showed excellent sensitivity (99%) and good agreement
with clinical diagnosis.

Conclusions: HFpEF is a heterogeneous entity and single echocardiographic crite-
rion may not be appropriate for every cases. We confirmed in our population that the
strategy proposed in the last ESC HF guidelines of finding at least one structural or
one functional criteria showed excellent sensitivity (99%) and good agreement
with clinical diagnosis.

P999 Nurse-led cardiovascular disease management program impact of 30-day readmission in patients with heart failure
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Background: Few studies have examined the potential benefits of nurse-led car-
diovascular disease management program impact on readmission and outcomes in
patients with heart failure (HF). However no studies have been conducted in this region to examine the
benefits of such programs.

Objective: The purpose of this study was to evaluate the impact of nurse led cardio-
vacular disease management program (CVDMP) on 30-day readmission in patients with
HF.

Methods: This is an observational retrospective cohort study included all admis-
sions with the diagnosis of HF in 2014 and 2015 in a Cardiac center with the diag-
osis of HF with reduced ejection fraction ≥ 45% or with symptoms of HF or with pulmonary edema during the time period of 2014 and 2015. All elective and planned admissions were excluded from the study. Patients were divided into two groups those with 30-day readmission and no re-admission. As well as patients who have follow up in our nurse-led program and who are not. Data was extracted from the cardiac center electronic data-base included age, gender, diabetes mellitus, hyper-
tension, date of admission, diagnosis of HF, history of cerebral vascular accident (CVA), stroke, length of stay, systolic and diastolic blood pressure (SBP and DBP)
measurement, heart rate (HR), the use of guidelines medical therapy including, ACE inhibitors/ Angiotensin Receptor Inhibitor (ACE/ARBs), Beta blockers, Antiplatelet, Statins, potassium sparing diuretics, etiology of HF, creatinine clearance, and first creatinine.

Results: This study included the index admission of 786 patients (pts) who met
the inclusion and exclusion criteria with 825 index admissions to the cardiac cen-
ter with decompensated HF between January 1, 2004, and December 31, 2015. Of
these admissions, 35 admissions (35 pts) (4.2%) and 790 admissions (766 pts)
were categorized into 30-day readmission and no-re-admission; respectively. 30-day readmission rate was 4.2%. Patients who were followed up in the nurse-led HF pro-
gram had lower re-admission rate. Stroke and longer length of stay were associated with higher rate of 30-day readmission rate.

Conclusion: Our nurse-led program was associated with reduced 30-day read-
mission rate and with higher rate of 30-day readmission rate.

P961 Guideline-led prescribing among heart failure patients in the long-term care setting
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Introduction: Heart failure (HF) may affect up to 45% of elderly residents in long
term care (LTC) facilities. However, there are few data available describing such HF
patients and the use of HF guideline-led therapy in the LTC setting.

Purpose: This study aims to describe HF care in LTC settings in terms of
 guideline-led prescribing using a validated tool.

Methods: This is an observational study of elderly patients in 14 LTC facilities
in the Cork region of Ireland. Heart failure was documented on patient medical records or identified by prescription of a loop diuretic. Guideline-led prescribing was assessed using the Guideline Adherence Index (GAI) tool. The GAI considers prescription of loop diuretic, ACE-inhibitor and angiotensin receptor blocker (ACE/ARB) and beta-blocker and it is adjusted to consider contraindications to therapy. High GAI was defined as prescription of ≥2 of these agents. Comparisons between
patients were conducted using independent sample t-tests for continuous variables
and chi-squared tests for categorical variables. A multivariable logistic regression model, adjusted for age and sex, was used to determine the associations of High GAI and the adjusted odds-ratio (OR) and 95% confidence interval (CI) were determined.

Results: The total number of residents was 732 (average age 83.9 ± 7.7; 30% male).
The prevalence of HF was 36.2%. Patients with HF were older than those without
HF (84.8 ± 7.4 vs. 83.4 ± 7.9 years, p = 0.024), were more likely to have coronary
artery disease, CAD (32.5% vs. 16.1%, p < 0.001), atrial fibrillation, AF (31.3% vs.
16.9%, p = 0.001) and lung disease (23.0% vs. 11.1%, p < 0.001) but were less likely
to have dementia (42.3% vs. 49.9%, p = 0.047). Patients with HF were prescribed
more medicines than those without HF (12.7 ± 3.5 vs. 10.7 ± 3.7, p = 0.04). There
was no significant difference in the rate of hypertension, stroke, diabetes or renal
failure between those with HF and those without HF. Loop diuretics were prescribed
to 87.5% of HF patients, ACE/ARBs to 24.2% and beta-blockers to 22.6% while
17% of patients were prescribed all three of these medications. A loop diuretic was
prescribed as monotherapy to 40% of HF patients while 5% of patients were not
prescribed any HF medications. Average GAI was 56%, High GAI was achieved by
55% of patients. Patients with High GAI had greater number of comorbidities and
greater number of prescribed medicines than those with did not achieve High GAI
(both p < 0.05). In multivariate analysis, High GAI was associated with higher number of
medications (OR=2.30, 95%CI 1.28–4.11). Dementia was not associated with High GAI.

Conclusion: In Irish LTC settings, utilisation of loop diuretic was high however there
was a low utilisation rate of HF disease-modifying therapies. Presence of CAD and
AF was associated with High GAI. However, there was no association between
dementia and achievement of High GAI in HF.
Background: In heart failure (HF), exercise training programmes (ETPs) are well-recommended intervention to improve symptoms, but still poorly implemented. The Heart Failure Association promoted a survey to investigate whether and how cardiac centres in Europe are using ETP in their HF patients. Aim of this study is to investigate the presence of geographical difference in ETP organisation and long term organisation.

Methods: The study was designed as a web-based survey of cardiac units in countries affiliated to the ESC. The data collected were subsequently divided in five areas, according to the UNO division of the countries involved: Northern, Southern, Eastern and Western Europe, and extra-EU.

Results: 173 centers replied to the survey, in charge of 78,914 patients: Northern 52 centers (15,040 patients), Southern 48 centers (15,040 patients), Eastern Europe 34 centers (11,759 patients), Western Europe 45 centers (17,248 patients). ESC countries extra-Europe 14 centers (11,830 patients). Cardiologists, nurses, psychologists, exercise physiology/therapists, dieticians, physiotherapists, are all figures involved, in all settings, in more than 95%, with the exception of the cardiologists that are involved in only 10% in the Northern regions. Consequently cardiologists is the leading figure, responsible for the ETP in all region, but in the Northern region, where nurses are playing this role. A strict long term follow-up program was absent in most of the European regions, but in the Northern region where these programmes was described in more than 64%, mainly leaded by nurses.

Conclusions: A less expensive and more flexible structures of the organisation of the ETP may play a key roles in promote a larger implementation of this valuable tool.

Identification of potentially inappropriate medicines use among heart failure patients in long term care using a disease-specific tool

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Introduction: Heart failure (HF) may affect up to 45% of elderly patients in long-term care (LTC) settings and elderly LTC residents are at risk of potentially inappropriate prescribing. Furthermore, a number of medicines have been identified as contraindicated or cautioned in HF as this use may lead to worsening HF or poorer prognosis.

Purpose: To assess the prescription of potentially inappropriate medicines (PIMs) in
P966 OBLIC: a nationwide French prospective cohort of heart failure ambulatory patients managed in private practice

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Background: Although private cardiologists manage the majority of patients with heart failure (HF) in France, no contemporary epidemiological data are available regarding the characteristics of these patients and the quality of care in private practice.

Purpose: Gathering epidemiological data and assessing the quality of care of HF patients managed in private practice.

Methods: A prospective cohort of HF patients was collected between January and March 2016. Private cardiologists gathered all ambulatory patients with a HF history during 2 consecutive weeks.

Results: A total of 1018 patients were included: 76% were managed for chronic HF with reduced ejection fraction (HFREF) whereas 24% had history of HF with preserved ejection fraction (HFpEF). 77% had planned visits, 23% for urgent unscheduled visits and 14% were seen after their hospitalization for decompensated HF. Mean age was 74 years (15-96), 63% among the patients were male. 61% had hypertension, 28% diabetes, 17% COPD, 14% sleep apnoea, 12% chronic renal failure and 8% anaemia. Each co-morbidity was more frequent among patients with HFpEF as compared to patients with HFREF. Among patients with HFREF, etiology was ischemic cardiomyopathy for 49%, 13% LV, 6%, 24% and 2% of patients were respectively in NYHA I, II, II-IV, III, IV and target doses of ACEIs/ARBs and BBs demonstrated a high rate of readmission for worsening HF (38% and 35.1%, respectively, vs. 19.3% and 20.3%, respectively, for patients on target doses, p < 0.05 for both). The rate of prescription of the heart failure medications was satisfactory; however, the dosage of guideline-recommended medications in these patients was usually suboptimal. Additional efforts are needed to improve the implementation of heart failure guidelines into clinical practice.

Conclusions: This is the first time such data on guideline-recommended medications in patients with heart failure has been collected in these eight post-Soviet countries. The rate of prescription of the heart failure medications was satisfactory; however, the dosage of guideline-recommended medications in these patients was usually suboptimal. Additional efforts are needed to improve the implementation of heart failure guidelines into clinical practice.

P967 Guidelines-recommended medications for heart failure in eight post-soviet countries: insights from the optimize heart failure care program

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Background: Several factors related to patients, physicians or non-medical reasons might be responsible for the slow implementation of guidelines on the manage-ment of patients with heart failure (HF) into clinical practice. This stimulates the search for clinician- and patient-focused tools that would improve evidence-based care in patients with HF. The aim of the study was to analyze the prescription of guideline-recommended medications to patients hospitalized due to worsening HF in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Russia, Ukraine and Uzbekistan.

Methods: The Optimize Heart Failure Care program is a 12-month international, multi-center patient support program based on pre-discharge patient education, pre- and post-discharge check-lists, ‘My HF Passport’ and a smartphone appli- cation, 800 patients from the participating countries (mean age 62.4 ± 0.4 years, 69.6% male), NYHA II-IV (mean 2.71 ± 0.03), 78.7% in sinus rhythm, hospitalized due to worsening HF were included into this study.

Results: At discharge from the hospital, the prescription rates of angiotensin-converting enzyme inhibitors/angiotensin receptor blockers (ACEIs/ARBs), beta-blockers (BBs), mineralocorticoid receptor antagonists (MRAs) and ivabradine were 91.2%, 90.4%, 92.3% and 29.0%, respectively. The rate of prescription of these agents remained high throughout the 12 months of follow-up. Diuretics and digoxin were used in 72.2% and 7.2% of patients with HF, respec-tively. However, the proportion of patients at target dose was ≥50% of target dose was low (25.4% and 43.5% for ACEIs/ARBs, 21.1% and 47.2% for BBs, and 5.1% and 26.2% for ivabradine). Moreover, patients with HF treated with ≤50% of target doses of ACEIs/ARBs and BBs demonstrated a high rate of readmission for worsening HF (38% and 35.1%, respectively, vs. 19.3% and 20.3%, respectively, in patients on target doses, p < 0.05 for both).

Conclusion: This is the first time such data on guideline-recommended medications in patients with heart failure has been collected in these eight post-Soviet countries. The rate of prescription of the heart failure medications was satisfactory; however, the dosage of guideline-recommended medications was usually suboptimal. Additional efforts are needed to improve the implementation of heart failure guidelines into clinical practice.
describing the management of HF by hospital-based cardiologists. Here we report the rationale and design of ARIADE, the first prospective registry describing the management of CHF and the way sacubitril/valsartan is introduced by office-based cardiologists (OBCs) and primary care physicians (PCPs) in a real world setting.

Purpose: The primary objective of ARIADE is to describe the profile of HF-EF patients initiated on sacubitril/valsartan as compared with patients continued on standard of care (SoC) by OBCs and PCPs in terms of demographics, medical history, clinical status and to identify the baseline characteristics that are associated with the likelihood of reaching the target dose of sacubitril/valsartan 200 mg [97/103 mg] twice daily.

Additional objectives are to describe in these patients with HF/EF: 1) their demographics and medical history; 2) their treatment; 3) the pattern of administration of sacubitril/valsartan during titration and the final dose; 4) HF related outcomes; 5) healthcare resource utilization.

Methods: ARIADE will enrol 12 000 patients over the age of 18 with HF/EF managed by OBCs and PCPs in 23 European countries. Enrollment will start in each country when sacubitril/valsartan is available for clinical use. The study will describe 6000 patients treated with SoC and 6000 patients started on sacubitril/valsartan. Sacubitril/valsartan patients will be enrolled consecutively over an expected time of 12 months in each country, while enrolment of SoC patients will be split into 2 phases; the first 50% of SoC patients will be enrolled in parallel with the first sacubitril/valsartan patients; the second 50% of SoC patients in parallel with the last 10% of sacubitril/valsartan patients. By structuring the enrolment in this way, we will observe if the clinical criteria that drive the choice of the treatment change over the months following the introduction of sacubitril/valsartan into clinical practice. Patients on sacubitril/valsartan and patients enrolled in the second wave of SoC will be followed for 12 months.

Conclusion: We report the rationale and design of the ARIADE study, the first European-wide registry describing the management of HF/EF among OBCs and PCPs. Enrollment is expected to be completed by July 2018 and follow-up by July 2019. Baseline characteristics of the first 2000 patients will be available in May 2017.

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The role of body mass index on a n-terminal pro brain natriuretic peptide-guided versus a symptom-guided management in heart failure patients with reduced ejection fraction

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On behalf of: TIME-CHF

Background/Introduction: Overweight and obesity has become an increasing problem in developed countries, affecting both children and adults. The absence of physical activity, diabetes and hypercholesterolemia are risk factors for developing obesity, which are also well known risk factors for developing congestive heart failure (CHF). Patients with obesity are known to have more prominent symptoms and NT-proBNP levels are lower, making it harder for the clinician to guide treatment. Therefore, we want to investigate the role of BMI on a NT-proBNP-guided versus a symptom-guided therapy in patients with heart failure with reduced ejection fraction (HF/EF) and the effect of BMI on NT-proBNP levels.

Methods: We performed a post-hoc analysis of the Trial of Intensified versus standard Medical therapy in Elderly patients with Congestive Heart Failure (TIME-CHF) trial. The TIME-CHF trial included 499 patients with HF/EF. Subjects were NYHA II to IV, aged 60 years or older and an age-adjusted NT-proBNP >400 ng/L (i.e., >800ng/L depending on age) at the time of inclusion. Patients were included between January 2003 and June 2008. Follow-up was up to 5.5 years. For this analysis, patients were divided into three groups according to their BMI at baseline, i.e. normal weight or BMI <25, overweight or BMI 25-30 and obese or BMI >30.

Results: The main effect of BMI on outcome was a significantly better overall survival for patients with BMI <25 (p = 0.034) and increased HF hospitalization free survival for patients with a BMI 25-30 (p = 0.022). Compared to the symptom-guided treatment strategy, a NT-proBNP-guided treatment strategy was beneficial in HF/EF patients with BMI >30 for overall survival (HR 0.426, p=0.048; Wald 3.925), all cause hospitalization free survival (HR 0.456, p=0.002, Wald 9.501) and HF hospitalization free survival (HR 0.311, p=0.002, Wald 9.262). A NT-proBNP-guided treatment strategy was also found to improve HF hospitalization free survival for HF/EF patients with a BMI between 25 and 30 (HR 0.570, p=0.012, Wald 6.275). Furthermore, baseline NT-proBNP levels were significantly lower in patients with BMI >25 compared to BMI <25 (3144 pg/mL vs. 4845 pg/mL, p < 0.001) and remained significantly lower during follow-up (all p < 0.001) despite a decrease of NT-proBNP levels in both groups (p < 0.001).

Conclusion: We found the beneficial effect of a NT-proBNP-guided treatment strategy to be most positive in obese HF/EF patients (BMI >30) compared to a symptom-guided treatment strategy, whereas no effects were seen in patients with a normal weight (BMI <25). Therefore, a NT-proBNP-guided therapy should be considered to reduce overall mortality, all cause hospitalization free survival and HF hospitalization free survival in obese patients with HF/EF. Furthermore, the HF clinician should be aware of the lower NT-proBNP levels in obese patients.

PP70

Ivabradine effect on outcomes in patients with systolic heart failure according to the duration of their disease: analysis from SHIFT

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On behalf of: SHIFT Investigators

Background and Purpose: In patients with chronic systolic heart failure (HF) and sinus rhythm, ivabradine reduces the composite of CV death and HF hospitalization. It is unclear whether the duration of HF prior to therapy affects survival or HF hospitalizations or whether the effect of ivabradine is modified by HF duration. We examined outcomes and the effects of ivabradine in patients with HF with different durations of diseases, incl. patients with relatively recent onset HF.

Methods: and results: In SHIFT, 6505 patients with CHF (LVEF ≤35%), in sinus rhythm, HFpEF, 70 bpm, treated with guideline-recommended therapy were randomized to placebo or ivabradine. Prior to randomization, 1416 and 1459 patients had short HF duration (<1.5 years); 836 and 806 patients had HF duration from 1.5 to <4 years, and 989 and 998 patients had HF duration 4 years or longer in the ivabradine and placebo group respectively. Patients with longer duration of disease were older (82.5 years) compared with patients with recent HF (59.0 years, p < 0.0001), had greater disease severity (NYHA III/IV in 56% vs 44.9% in patients with recent HF, p < 0.001), higher rate of comorbidities (MI: 62.9% vs 49.4%, p < 0.001; renal dysfunction: 31.5% vs 21.5%, p = 0.008; PAD: 7% vs 4.8%, p = 0.018). Use of ACEI and BBs across groups was similar. However, dosages of BBs were lower in patients with recent HF (51% of patients were treated with ≤50% of recommended doses compared with 93% of patients with long duration of HF, p < 0.0001). Longer duration of disease was associated with poorer outcome. Ivabradine significantly reduced outcomes independently of duration of disease.

Conclusions: Our results show that duration of HF strongly predicts outcome. However, ivabradine improved clinical outcomes in patients with CHF independent of HF duration, including patients with recent onset HF.

HF duration

Ivabradine Placebo

Adjusted HR, 95% CI

%PY

Primary composite endpoint of CV death or HF hospitalizations

≤ 1.5 years

267

10.68

333

13.470.83

[0.70;0.97]

0.0222

1.5 to < 4 years

217

15.32

244

19.010.80

[0.67;0.97]

0.0200

≥ 4 years

309

19.78

360

23.320.83

[0.71;0.97]

0.0176 0.9597

Hospitalization for worsening HF

≤ 1.5 years

163

6.52

230

9.31

0.73

0.0027

1.5 to < 4 years

142

10.03

176

13.710.73

[0.58;0.91]

0.0052

≥ 4 years

209

13.38

266

17.230.76

[0.63;0.91]

0.0025 0.9632

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Patients were on bisoprolol. However, only 13% of the population were on the target dose of bisoprolol, and 35% of the study population would have met the criteria for CRT device therapy. Based on the European Society of Cardiology (ESC) guidelines, a further 54 patients were found to be candidates for CRT-Pacemaker (1 patient) and a permanent cardiac pacemaker in 3 patients).

On behalf of: Queensland Heart Failure Services Steering Committee

Background: Collection and reporting of clinical indicators of chronic heart failure (CHF) care in Australia is frequently ad hoc, and difficult to verify or benchmark with other services. Queensland has a CHF steering committee that oversees disease management programs (DMP) supported by a central coordinator. In 2014, the Queensland Cardiovascular Information Solutions Program agreed to develop systems to support the collection and reporting of clinical indicators.

Purpose: To evaluate the feasibility of the Heart Failure Evaluation and Reporting of Outcomes (HERO) clinical indicator reporting tool.

Methods: Consensus on the content and methods of collecting data was reached following a Delphi method involving all 24 CHF disease management programs in Queensland. Nine process indicators were agreed upon and included: referral follow-up time and review of left ventricular function for all newly referred patients; and prescribing and titration practices at hospital discharge, first outpatient visit and 6 months after referral. All indicators had detailed inclusion and exclusion criteria. Descriptive data included age, sex, indigenous status, referral source and type of heart failure. Outcomes for mortality, length of stay and readmissions is to be obtained by data linkage.

Results: Feasibility was assessed by comparing new referrals numbers with previous manually collected data; reviewing data collection, report quality and frequency. In 2015, the first year of data collection, 4,043 patients newly referred to heart failure DMPs were entered into HERO. This was consistent with manually collected data in 2013 (n = 3951) and 2014 (n = 3900). Data was incomplete initially but improved to 90% with the introduction of monthly data quality reports sent to clinicians. Reports benchmark individual services to the state median, and provide insights about exclusions and contraindications to inform clinical practice. For example, statewide data for 2015 for beta-blocker titration not only shows those who have achieved target doses of beta blockers at 6 months post-hospital discharge (42%), but also includes those who are at maximally tolerated doses (31%) and who are still undergoing up-titration (18%), suggesting that the treatment variance statewide is relatively small (9%).

Conclusions: High completion rates suggest that HERO is sustainable and engages clinicians by providing routine reporting that highlights individual site performance benchmarked against state-wide performance with respect to patient follow-up, medication prescription and titration of doses. In the context of a coordinated state-wide approach to CHF DMPs which includes data collection and review, education and clinical mentoring) HERO is a powerful tool for achieving best practice.

Pharmaceutical management of heart failure and device therapy in a British district general hospital

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Funding Acknowledgements: Limited grant from Servier laboratories

Background: Optimal pharmaceutical treatment and device therapy in Heart Failure (HF) is associated with a decrease in morbidity and mortality. We aimed to assess the rate of implantation of devices for heart failure and pharmaceutical therapy received by patients with a left ventricular ejection fraction (LVEF) of <35% in a British District General Hospital.

Method: All trans-thoracic echocardiograms (TTE) done in our centre from 01/04/2015-30/10/2015 were scanned for patients having a LVEF of <35%. Information regarding the demographics, pharmaceutical agents and doses along with existing device therapy was collected and analysed.

Results: A total of 7286 TTEs were reviewed of which 154 showed a LVEF of <35%. In our sample population (LVEF <35%), the average age was 71.4 years and 63% of the study population were male. A pacing device was already present in 9 patients (Cardiac Resynchronisation Therapy (CRT) - Defibrillator in 3 patients, CRT-Pacemaker in 1 patient and a permanent cardiac pacemaker in 3 patients). Based on the European Society of Cardiology (ESC) guidelines, a further 54 patients or 35% of the study population would have met the criteria for CRT device therapy. We found that 82% of the study population were on a beta-blocker. Most of these patients were on bisoprolol. However only 13% of the population were on the target dose of bisoprolol. In the population on the lower doses of bisoprolol, the average HR was 75 beats/min and average systolic blood pressure (SBP) was 130mmHg. It was also found that 102 patients were on an ACE-Inhibitor (ACE-I). Most of these patients were on ramipril. The target dose of ramipril was prescribed in only 53% of the population. In patients on less than the target dose of ramipril, the average SBP was 120mmHg and the average serum creatinine was 98 umol/L. An angiotensin II receptor blocker (ARB) was prescribed in a further 19 patients. It was noted that 53 patients were on a Mineralocorticoid Receptor Antagonist (MRA). Number of patients on triple therapy with a beta-blocker, ACE-I or ARB and MRA was 46. Only a total of 4 patients were on Ivabradine. We identified 40 patients who would have potentially benefitted from addition of Ivabradine.

Conclusion: The rate of device implantation for heart failure in our centre was found to be low. Most of our patients were on appropriate pharmacological agents however, the doses of various agents was sub-optimal. Majority of patients were not on target doses of these medications despite a satisfactory, SBP, HR and serum creatinine.

Effect of carvedilol on metoprolol succinate on mortality in heart failure with reduced ejection fraction

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Background: Beta-blocker therapy is indicated in all patients with heart failure (HF) due to reduced systolic function as per ACC/AHA guidelines. The relative benefit of carvedilol to metoprolol succinate remains unknown. We conducted a retrospective analysis of the survival benefit of carvedilol to metoprolol succinate in a large Veterans Affairs (VA) database of patients with HF due to systolic dysfunction.

Methods: VA's databases were queried to identify all patients diagnosed with HF from 2007 to 2015 and treated with either metoprolol succinate or carvedilol. Carvedilol and metoprolol succinate were restricted by the VA pharmacy to patients with a diagnosis of HF and an ejection fraction of less than 40%, at the time period of the database query. Study compared 114,745 veterans who were treated with metoprolol succinate matched to patients who were treated with carvedilol using propensity score matching with replacement techniques after adjusting for covariates. Sub-group analyses were performed separately for men, women, elderly, and duration of therapy more than 3 months and duration of therapy more than 6 months.

Results: The adjusted hazard ratio of mortality for metoprolol succinate compared to carvedilol is 1.04 (95% CI: 1.02-1.06, p value: < 0.0001). The sub-group analyses show that the results hold true separately for male, female, over or under 65 years old, therapy duration more than 3 months and more than 6 months, high heart rate, and low heart rate.

Conclusion: Beta-blocker therapy with carvedilol is superior to metoprolol succinate in patients with HF due to systolic dysfunction in terms of mortality.

Prescription of heart failure medication
### Results

We identified 33 RCTs (n = 6,547 patients) evaluating standard HF clinics (n = 6), hybrid HF clinics (n = 12) and nurse-led home visits (n = 17). There was no statistically significant difference between standard HF clinics and usual care for the primary outcomes. Compared with usual care, hybrid HF clinics were associated with a reduced risk of HF re-admission (RR 0.74, 95% CI 0.57–0.95, P = 0.02), all-cause re-admission (0.75, 0.60–0.94; P = 0.01), cardiovascular mortality (0.57, 0.34–0.97; P = 0.04) and all-cause mortality (0.75, 0.64–0.88; P = 0.0003). Nurse home visits without clinic attendance was associated with a lower risk of HF re-admission (RR 0.64, 95% CI 0.51–0.81; P = 0.002), all-cause re-admission (0.84, 0.76–0.93; P = 0.0008) and all-cause mortality (0.83, 0.70–0.99; P = 0.04). Significant heterogeneity in study outcome was evident (Q2, 2%-78%).

### Conclusion

Following hospitalisation for with HF, follow-up with home visits or a combination of home visits and HF clinic attendance were associated with significantly reduced mortality and morbidity. HF disease management programmes should include nurse-led home visits to improve outcomes.

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### Table: Hazard Ratio for Metoprolol vs. Carvedilol

<table>
<thead>
<tr>
<th>MODELS</th>
<th>Treatment Relative Matched to Carvedilol</th>
<th>Sample size: 87,882</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model A</td>
<td>Unadjusted Hazard Ratio</td>
<td>1.05</td>
</tr>
<tr>
<td>p value</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>95% CI</td>
<td>1.03–1.07</td>
<td></td>
</tr>
<tr>
<td>Model B</td>
<td>Adjusted with Patient Characteristics and Comorbidities</td>
<td>Hazard Ratio 1.04</td>
</tr>
<tr>
<td>p value</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>95% CI</td>
<td>1.02–1.06</td>
<td></td>
</tr>
<tr>
<td>Model C (Preferred Cox model)</td>
<td>Adjusted with Patient Characteristics, Comorbidities, and Medications</td>
<td>Hazard Ratio 1.04</td>
</tr>
<tr>
<td>p value</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>95% CI</td>
<td>1.02–1.06</td>
<td></td>
</tr>
</tbody>
</table>

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### P975

**Effectiveness of the heartfailurematters.org website in patients with stable HF**

KP Wagenaar1; KP Dickstein2; BD Broekhuizen1; T Jaarsma3; AW Hoes1; F H Frans Hendrik Rutten1

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On behalf of: e-Vita heart failure study group

**Funding Acknowledgements:** Unrestricted grant from “Care Within Reach”

**Background:** The ESC/HFA website heartfailurematters.org (HFM website) is widely used, but its effectiveness has never been formally evaluated.

**Aim:** To assess the effect on self-care of the HFM website on top of usual care provided by heart failure (HF) nurses in outpatient clinics.

**Methods:** In a randomized controlled trial, we compared usual care + HFM website to usual care in stable HF patients from nine Dutch HF outpatient clinics. The primary outcome was self-care measured with the European Heart Failure Self-care Behaviour Scale (EHFSB scale). Secondary outcomes were health status, and cost-effectiveness.

**Results:** In total, 300 (150 per group) patients were included. The mean age was 66.8 (SD 11.0) years, 74.2% were male, and 78.8% was classified as NYHA I or II. Patients had on average three face-to-face contacts per year with the HF nurse. After 3 months follow-up, the mean score on the self-care scale was significantly higher in the HFM group compared to usual care: 75.5 vs. 70.8 (difference 4.7, 95% CI 3.2–6.2). This effect attenuated during the following 9 months until no difference after one year (difference -0.6, 95% CI -3.7 – 3.4). Quality of life and HF knowledge had a similar pattern as was observed in self-care.

The mean costs per patient were €4,865 and €5,741 per quality-adjusted life years for HFM website + usual care and usual care, respectively. The net monetary benefit was positive (larger than 0) for HFM versus usual care.

**Conclusion:** The heartfailurematters.org website helps improve self-care in stable HF patient on the short-term when provided in addition to rather intensive usual care provided at HF outpatient clinics, but this effect seems to attenuate over time. Nevertheless, it is cost-effective considering its effects on quality-adjusted life years.

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### P974

**Impact of mode of delivery of disease management programmes on clinical outcomes among patients following hospitalised heart failure: a systematic review and meta-analysis**

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**Funding Acknowledgements:** Novartis Pharmaceuticals UK Ltd

**Background:** Disease management programmes (DMPs) for heart failure (HF) are associated with improved clinical outcomes. We investigated whether the benefit of HF DMPs was associated with their mode of delivery.

**Methods:** Systematic review and random effects meta-analysis of randomised controlled trials (RCTs) examining outcomes after hospitalisation for HF in patients randomised to scheduled DMPs or usual care. DMPs were categorised as: outpatient HF clinic visits alone (standard HF clinic), clinics with home visits (hybrid HF clinic) or home visits alone without clinic attendance (home visits). The primary outcomes were HF re-admissions, all-cause re-admissions, cardiovascular mortality and all-cause mortality.

**Results:** Following hospitalisation for with HF, follow-up with home visits or a combination of home visits and HF clinic attendance were associated with significantly reduced mortality and morbidity. HF disease management programmes should include nurse-led home visits to improve outcomes.

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### Figure: Survival Estimates

**Survival Estimates**

**Carvedilol vs Metoprolol Succinate Survival Estimates**

- **Survival Probability**
  - 0.00 (0.25)
  - 0.25 (0.50)
  - 0.50 (0.75)
  - 0.75 (1.00)

- **Analysis Time (years)**
  - 0
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Carvedilol**
- **Metoprolol**
P976 Impact of different therapeutic targets on the prognosis of heart failure patients included in a cardiac rehabilitation program

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Aim: Rehabilitation of chronic heart failure (HF) patients is associated with different actions that may affect prognosis. Physical activity, adaptation of drugs and screening of patients requiring defibrillator and/or biventricular pacing (CRT/CRT-D) are all possible modifiable factors during this period.

Method: 88 consecutive HF patients were recruited during a cardiac rehabilitation program. Participation in the entire rehabilitation program (REHAB), maintain or increase of beta-blocker doses (BB), presence of ACE inhibitors/angiotensin receptor blocker (ACE/ARB) or mineralo-receptor blocker (MRB), ivabradine, maintain or decrease of diuretics doses and implantation during this period of CRT/CRT-D were studied as univariate and multivariate factors associated with the risk of occurrence (mean follow up 971 ± 343 days) of death or heart transplantation (N=19).

Results: Patients were: male (64%), 62 ± 13 years, ischemic cause (56%), NYHA class III/IV (50%), and LVEF 34 ± 9%. REHAB was possible for 86% of patients. Maintain or increase of BB (82%), ACE/ARB (88%), MRB (56%), ivabradine (13%), maintain or decrease of diuretics (72%), CRT/CRT-D (15%). Adaptation of at least 3 drugs was possible in 76%. Factors associated with a lower occurrence of events were: OR (95% CI): maintain or increase BB doses 0.41 (0.16-1.09), ACE/ARB 0.25 (0.10-0.66), maintain or decrease diuretics 0.49 (0.20-1.21). REHAB 0.25 (0.10-0.66). In multivariate analysis, only ACE/ARB was significant: OR (95% CI): 0.25 (0.10-0.66). In each modification of drugs was replaced by the favorable modification of at least three of the five drugs, this parameter was significantly related to survival in multivariate analysis (p < 0.05). This is the first study demonstrating that the use of ACE/ARB, the maintenance of a patient on target doses and the maintenance of the DBB, the decrease of diuretics, are all possible modifiable factors during cardiac rehabilitation period.

Conclusion: During the outpatient rehabilitation for heart failure patients, maintenance of ACE/ARB or decrease of diuretics, may play a significant role in the prognosis of these patients.

P977 Utilization and outcomes following initiation of sacubitril/valsartan in a newly established heart failure disease management program

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Background: Sacubitril/valsartan is a combination medication of a neprilysin inhibitor and angiotensin receptor blocker. It was FDA approved in July 2015 to reduce the risk of cardiovascular death and hospitalization for HF in patients with chronic heart failure (NYHA class II–IV) and reduced ejection fraction. At our institution, sacubitril/valsartan was added to the formulary in February 2016.

Purpose: To evaluate the appropriateness of the prescribing of sacubitril/valsartan and the success in reaching target dose based on our institution set criteria and the PARADIGM-HF trial.

Methodology: This is a retrospective chart review of patients that received a prescription for sacubitril/valsartan between February 1st and December 31st 2016. Data collected included demographics, initial dose, indication, adverse reactions, readmissions, titration or discontinuation. Descriptive statistics were used for analysis.

Results: A total of 61 patients were identified for a mean follow-up period of 126.5 days (SD ± 92.6) with 25% followed for at least 208 days. A total of 48 patients (78.7%) were appropriately initiated, 90.2% were on ACE/ARB (30.0% of which on target dose) prior to the switch (table 1). Moreover, 41 patients (75.9%) were switched to an appropriate starting dose (figure 1). Four patients (6.6%) experienced adverse drug reactions, including hypotension leading to discontinuation in 3 of them. Overall, 60.7% had sacubitril/valsartan titrated up and 31 patients (50.8%) achieved the target dose by the end of our follow-up period; 6 patients were re-admitted, of which 5 were for elective purposes.

Conclusion: At our institution, sacubitril/valsartan is prescribed for the appropriate indication in most cases. While utilizing our extensive initiation criteria, most patients continued on this medication and many reached target dose. The overall adverse reactions and readmission rate were lower in this cohort of patients when compared to the PARADIGM-HF trial; however our mean follow-up period was significantly shorter.
P979
Zero admissions for heart failure
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Introduction: Heart failure provokes high number of hospital admissions and is a major cause of mortality and hospital readmissions. The benefits of heart failure units or heart failure programs have been amply demonstrated in both observational and randomized studies. The application of a universal model is not feasible because of differences in the organizational and cost structures across regions. Specifically, the conditions are the main determinants of the final model.

Purpose: The main aim of this study was to evaluate the impact of the implementation of zero admissions for heart failure patients, with which we have tried to optimize the structure of the heart failure unit of our center and improve the coordination of multidisciplinary team.

Methods: Within the Zero admissions for heart failure project we have improved collaboration with primary care, internal medicine and emergency service (training workshops for physicians and nurses, regular meetings with family physicians, provision of interconsultation by telephone), we have redefined integrated care pathways and the work of the expert nurse, day hospital and home care have been strengthened. To evaluate de impact of the project we have compared the number of admissions and the readmission rates at 30 days and 6 months of patients included in our heart failure unit before (2015) and after (2016) the development of the Zero admissions for heart failure project.

Results: 150 patients were hospitalized because of heart failure in our center in 2015 and 115 in 2016 (admission rate decreased by 23.3%). The admission rate at 30 days was 3% in 2015 and 0% in 2016, and at 6 months was 6% in 2015 and 3% in 2016. Between patients with new onset heart failure, the readmission rate at 6 months was 4% in 2015 and 0% in 2016.

Conclusion: Due to the development of the Zero admissions for heart failure project, the complexity of our heart failure unit has grown remarkably in the last year. This has resulted in a reduction of the admission and the readmission rates at 30 days and 6 months with respect the previous year.

P980
The long term protective role of mediterranean diet in first diagnosed acute coronary syndrome patients with heart failure with preserved ejection fraction: results from hellenic heart failure study.
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On behalf of: Hellenic Heart Failure study

Background/Introduction: Heart failure with preserved ejection fraction (HFpEF) seems to be associated with similar or even higher morbidity and mortality rates compared with their lower EF counterparts, yet their management remains enigmatic in the long-term follow-up.

Objective: The present study aims to investigate the long-term effects of Mediterranean diet adherence on the HFpEF phenotype.

Methods: From May 2006 to March 2009, 1,000 consecutive patients who were hospitalized at a Cardiology Clinic in Athens with ACS diagnosis were enrolled in the study. For the present analysis, patients with a diagnosis of HFpEF as a result of more than 90-day hospitalization for unstable angina were included. The endpoint was the occurrence of all-cause death, HF hospitalization, myocardial infarction, or cerebrovascular accident during a median follow-up period of 5 years.

Results: The mean age of the patients was 70.4 ± 12.6 years, and 35% were women. The median follow-up duration was 5.0 ± 1.3 years. During the follow-up period, 300 (29.3%) patients died, 151 (15.1%) were hospitalized for HF, 71 (7.1%) had myocardial infarction, and 22 (2.2%) had a stroke. Median survival was 5.0 ± 1.3 years.

Conclusion: Mediterranean diet is associated with lower risk of all-cause death, HF hospitalization, myocardial infarction, or cerebrovascular accident in patients with HFpEF. Further studies are needed to confirm these findings and to investigate the potential mechanisms underlying these findings.

P981
Ivabradine use in patients with HFpEF in the heart failure multidisciplinary program (PIC) in a private hospital: first registration and 3-years follow up, Central American (CA) region.
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Funding Acknowledgements: Fundings for research Hospital Clinic Biblica, Novartis grant

Introduction and objectives: Heart rate (HR) elevation in patients (p) with heart failure with reduced ejection fraction (HFrEF) is related to increased morbidity and hospitalization for HF; its reduction improves the filling of the left ventricle, increases the myocardial oxygen supply and reduces its consumption, all of which is beneficial in p with impaired left ventricular systolic function.

Purpose: To evaluate the effects of ivabradine (IBRA) in CA p with HFrEF in sinus rhythm (SR) and HR > 70 beats per minute (bpm), reduces hospitalizations for HF and mortality for HR.

Methods: 26 p with HFrEF for 3 years of PIC. General data, tx, baseline clinical condition, BP, pulse, NYHA, quality of life (QoL), HF, LVEF by Doppler echocardiography were registered, and IBRA tx response was compared baseline and end. 18 p completed data; 8 incomplete (baseline or follow-up data).

Results: Ambulatory p, with HFrEF (>35%) and SR HR > 70 bpm; age 78 years, 17 men, Tx average time with IBRA 11 months, 53.5% more than 1 year. Baseline medications, 93% ACEs or ARAs; 85% beta-blockers and 74% MRAs, maximum tolerated doses. No patient used IBRA prior baseline. 20% CRT. Variables behavior assessed: HR (baseline 89 bpm vs 62 bpm after IBRA 2 months); BP (baseline systolic 160 mmHg vs 123 mmHg end; baseline diastolic 55 mmHg vs 65 mmHg end); LVEF (baseline 29% vs 35% end); NYHA (baseline 1.5 vs 0.5; end); 5 p improved NYHA III to NYHA I; 2y (OR=0.91, 95% CI (0.82, 1.00)) and 10y (OR=0.93, 95% CI (0.85, 1.00)), 0.001).

Conclusions: 26 p studied, registered and treated with IBRA in a PIC, is the first one carried out in CA. Results reflect the usual clinical practice in a PIC, with cardiologists and nurses trained to support and follow-up p, and evidence the importance of PIC when using and prescribing drugs like IBRA, in a region where these PICs are rare.
Purpose: At present angiotensin II receptor blockers are highly effective and safe drugs that reduce the activity of RAAS. Therefore we have conducted this study in order to assess efficacy of switching patients from therapy with valsartan in dose 40-80 mg/day to azilsartan in dose 20-40 mg/day.

Methods: We studied from therapy 196 patients with CHF II-III NYHA class on standard therapy which included ARB valsartan in dose 40-80 mg/day. In all patients at baseline and after 6 months of therapy we assessed clinical status, quality of life with Minnesota questionnaire and visual - analog scale, performed 6-min walk test and echocardiography for evaluation of LVEF and measured level of NT-pro-BNP in blood serum.

Results: Switching patients from valsartan in dose 40-80 mg/day to ARB azilsartan in dose 20-40 mg was associated with significant improvement of clinical status with increase of 6 min walk distance, betterment of parameters of quality of life, and significant rise of LVEF combined with lowering of mean CHF class NYHA (all p < 0.01 compared baseline). There was no significant dynamics NT pro BNP level in the whole group but in the subgroup with NT pro BNP values above median significant lowering we noted its significant lowering (p < 0.05). No significant association between dynamics of main clinic and laboratory parameters and decrease of sistic blood pressure (SBP) and diastolic blood pressure (DBP) was observed.

Conclusion: Therefore, switch of patients with CHF II-III NYHA class from ARB valsartan to azilsartan in this disease was associated with improvement of quality of life, clinical status, and LV systolic function. This was combined with lowering of initially elevated NT pro BNP level irrespective of changes of SBP and DBP.

Effects valsartan and azilsartan in CHF

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Baseline</th>
<th>After 6 months</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>SBP mmHg</td>
<td>132±12</td>
<td>128±10</td>
<td>0.1</td>
</tr>
<tr>
<td>DBP mmHg</td>
<td>75±4</td>
<td>73±5</td>
<td>0.3</td>
</tr>
<tr>
<td>NYHA class</td>
<td>2,3±0,2</td>
<td>1,6±0,5</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>6-min walk test, m</td>
<td>390±34</td>
<td>401±19</td>
<td>p &lt;0.001</td>
</tr>
<tr>
<td>QL by MLIHQ, Score</td>
<td>35±16</td>
<td>27±8</td>
<td>0.05</td>
</tr>
<tr>
<td>LVEF/%</td>
<td>37±5</td>
<td>42±8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NT pro BNP, pg/ml</td>
<td>1890±60</td>
<td>1200±36</td>
<td>p =0.3</td>
</tr>
</tbody>
</table>

P985
Impact of early tolvaptan treatment for very elderly patients with heart failure and chronic kidney disease

K Kei Yoshikawa1, M Yoko1, M Okagaki1, T Yoshio1, K Matsumura1, T Noda1, T Sakuma1, T Ueyama1, Y Ishara1, H Park1, Y Yamamoto1, H Ishijima1
1Kansai Medical University, Moriguchi, Japan

Introduction: Tolvaptan (TVP) was approved in Japan for the treatment of congestive heart failure 5 years ago. Recent years, very elderly patients with heart failure (HF) are increasing in number. Treatment of very elderly patients with HF is relatively difficult since those patients tend to be resistant to conventional treatment regimen including loop diuretics and diuretics therapy is frequently associated with further reduction in kidney function. TVP was used as a final weapon for those patients, and it was very effective. However, it is unclear whether it should be administered TVP from the early stage or late stage for the very elderly patients with HF and CKD.

Hypothesis: To investigate whether TVP administration to the those patients are much better at early stage or late stage.

Methods: Among very elderly patients (defined as aged 80 or older) with HF and CKD, those who were resistant to conventional treatment (including loop diuretics, carpentier (IARNP), and vasodilators) or who exhibited impaired kidney function following initial treatment (more than 30% increase in the serum creatinine compared to baseline) were enrolled. Subjects were additionally given oral TVP (7.5-15mg/day). And it was divided into two groups of the early treatment group to which TVP was administered within three days after the start of treatment and the late treatment group to be administered on after that.

Results: Forty patients (mean age: 86±4.3) were enrolled in this study. There were no significant differences in the baseline clinical parameters between the early and late tolvaptan treatment groups. However, the early use of tolvaptan was associated with shorter hospital stay, lower rate of in-hospital death, higher urine volume in 24hours.

Conclusions: Our results suggest that be beneficial to consider administering tolvaptan earlier in very elderly patients with HF and CKD.
**P996**

Single centre audit of Right Heart study in patients with decompensated heart failure.

**West Africa**

**Background:** Recent clinical studies have questioned the routine use of right heart catheterization for the hemodynamic assessment of patient with heart failure to guide therapeutic intervention. The AIM of our audit was to review the use of this procedure in our center to study the impact in patients with advanced heart failure in terms of clinical outcomes, therapeutic interventions and complications.

**Methods:** We reviewed 137 consecutive patients who underwent 70 right heart studies in our Hospital in 2 months period of time. The age range was between 25 and 90 years with median age of 58 years, with 53 males and 84 females.

The main indications for the procedure were heart failure, with either worsening renal function, hypotension and/or low output state with serum creatinine of 137 umol/L + 2.7 and interestingly 36 patients (26%) had cardio-re nale syndrome and NT-ProBNP was elevated in all patients with a mean level of 4387pg/ml. 87% had an ECHOs, 32% of them had LVEF > 55%, 45% had LVEF of 35 -55% and 25% had LVEF less than 35%. At least 34% had moderate MR. 45% of the patients had low PVR and required pressors. Another 18 patients had confirmed low output state associated renal dysfunction pulmonary hypertension and RHC was an excellent diagnostic tool with improvement in short term clinical status with positive impact on clinical decision making and therapeutic intervention.

Right Brachial Vein access was the most common site of assess with 7Fr. system used in three quarters of the patients. Right Brachial Vein access was used in 37 cases (27%) and a 6Fr. catheter was used in most of these cases. There was two immediate complications occurred over this period. One of the patients had a pulmonary hemorrhage and the other had a hematoma at the access site at the groin. Data obtained from 101patients (73%) showed an elevated PAWP, with median of 17 mmhg. Furthermore, the majority of patients had pulmonary hypertension (67%). Only 42 (39%) cases had cardiac output assessment using TD method with a mean value of 4.5L/min. PVR was greater than 2 Wood units in the 50% of patient who had LVEF less than 35%. At least 34% had moderate MR. 45% of the patients had almost normal RV function and 39% had severely reduced RV function. The inapaticity mortality rate was high with 44% of this cohort died.

Summary/Conclusion: In this selected cohort of patients with heart failure, with either worsening renal function, hypotension and/or low output state with serum creatinine of 137 umol/L + 2.7 and interestingly 36 patients (26%) had cardio-re nale syndrome and NT-ProBNP was elevated in all patients with a mean level of 4387pg/ml. 87% had an ECHOs, 32% of them had LVEF > 55%, 45% had LVEF of 35 -55% and 25% had LVEF less than 35%. At least 34% had moderate MR. 45% of the patients had low PVR and required pressors. Another 18 patients had confirmed low output state associated renal dysfunction pulmonary hypertension and RHC was an excellent diagnostic tool with improvement in short term clinical status with positive impact on clinical decision making and therapeutic intervention. Right Brachial vein as an access to perform RHS was very convenient for both the operator and the patient on clinical decision making and therapeutic intervention. Right brachial vein as an diagnostic tool with improvement in short term clinical status with positive impact.

**On behalf of:** Optimize Colombia project

**Funding Acknowledgements:** This work was supported by Servier

**Hospitalization for heart failure is a strong predictor of mortality and new admissions to the hospital especially in the first three months after discharge; this is the “vulnerable phase” of the disease.**

**Objective:** To identify the efficacy of implementation of OPTIMIZE program at hospital discharge in Colombian population of heart failure patients in the vulnerable phase of disease in terms of clinical outcomes: Left ventricular (LV) ejection fraction, functional class and the composite endpoint of decompensation + readmissions to the hospital after 30 days of follow up. The program included education, material to enhance adherence and early initiation of ivabradine to obtain a goal heart rate of 60 – 70 bpm.

**Methodology:** Prospective cohort study.

**Results:** 436 patients were included, 68% were male and 32% were females, the mean age 66 years with a mean ejection fraction of 32%. Ischemic cardiomyopathy was the cause of heart failure in 40.8% of the patients, 94% of the population was on beta blockers and 42% also received ivabradine. Only 61.4% of the patients were followed in an outpatient service after 30 days. The impact on clinical outcomes is reported in table 1.

**Conclusion:** The implementation of OPTIMIZE program and early initiation of ivabradine in the vulnerable phase, from hospital discharge; improve LV function and the NYHA functional class with a reduction in the composite end point of decompensation = hospitalization for heart failure.

**Table 1**

<table>
<thead>
<tr>
<th>30-day outcomes</th>
<th>N=268</th>
<th>N=131 without Ivabradine</th>
<th>N=137 with Ivabradine</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization</td>
<td>1,53%</td>
<td>1,53%</td>
<td>0,009</td>
<td></td>
</tr>
<tr>
<td>NYHA class</td>
<td>1,39%</td>
<td>1,39%</td>
<td>0,009</td>
<td></td>
</tr>
<tr>
<td>Both endpoints</td>
<td>5%</td>
<td>0%</td>
<td>0,005</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**P987**

Effect of ivabradine in the vulnerable phase: results de optimize Colombia project

**CI Clara Ines Saldarriaga1; González2; Navarrete3; Echegaray4; Novoa5; Murillo6; Rivero7; Rodriguez8; Rolong9; Trou10; Martinez11; CV Arguello10; Semanche11; Contreras12; Vanegas13**

**Background:** Our project was designed to review the results of a prospective study to analyze the effect of medication in patients with HF and reduced LVEF (HFrEF). However, that effect of medication in patients with HF and reduced LVEF (HFrEF) has shown to impact prognosis. There was a significant reduction of mortality and re-admission rate in the treatment group. This impact is due to the protective effect does not occur in patients over 80 years old, despite LVEF.

We reviewed 137 consecutive patients who underwent 70 catheterization for the hemodynamic assessment of patient with heart failure to guide therapeutic intervention. The AIM of our audit was to review the use of this procedure in our center to study the impact in patients with advanced heart failure in terms of clinical outcomes, therapeutic interventions and complications.

**Methods:** The sample was divide into 3 groups depending on left ventricular ejection fraction (LVEF): LVEF group with LVEF>50%; Hf Steph EJP with LVEF 40-50%; HFef EJP with LVEF ≤40%. The patients were further divided based on their medication at discharge: patients without BB or ACE-I/ARB; patients with BB or ACE-I/ARB; patients medicated with both BB and ACE-I/ARB. Kaplan-Meier curves were created to evaluate the occurrence of the combined endpoint of death and/or re-admission for HF at 24month follow-up.

**Results:** The study was comprised of 1032 patients, 50.8% male, of which 47.5% were older than 80 years old.

In the following table, the percentage of patients in which the combined endpoint occurred is described based on treatment approaches.

**Conclusion:** In the general population, treatment with the combination of BB and ACE-I/ARB has shown to impact prognosis. There was a significant reduction of mortality and re-admission rate in the treatment group. This impact is due to the effect of medication in patients with HF and reduced LVEF (HFrEF). However, that protective effect does not occur in patients over 80 years old, despite LVEF.

**Poster Session 2**

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P989
Tolerability and short-term outcomes of angiotensin receptor-neprilysin inhibitor (ARNI) use in a Singaporean cohort

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1National Heart Centre Singapore, Singapore; Singapore; 2Duke-NUS Graduate Medical School Singapore, Singapore; Singapore

Introduction: Following positive outcomes data from the PARADIGM-HF trial, the first-in-class angiotensin II receptor blocker neprilysin inhibitor (ARNI), LCZ696, has entered heart failure pharmacotherapy guidelines as an acceptable substitute for angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs) in heart failure with reduced ejection fraction (HFrEF). Use of ARNI was associated with hypotension, renal insufficiency, and angioedema in PARADIGM-HF. Information on the tolerability and outcomes of ARNI use in our local Asian HFrEF population is lacking. We retrospectively studied the baseline characteristics, adverse event rates, and short-term outcomes in a pilot Singaporean HFrEF cohort started on ARNI.

Purpose: We aimed to ascertain the safety, tolerability and efficacy of ARNI in our Singaporean population.

Methods: We reviewed data from 179 patients receiving ARNI up to July 2016, from a single tertiary hospital. Data collected included demographic variables, laboratory investigations, clinical symptoms, and comorbidities. Patients were followed up until they reached either end points of death or LVAD implantation.

Results: The mean age of the study population was 60 years. 78% of the patients were male. The average left ventricular ejection fraction (LVEF) was 23%, with 60% of heart failure due to an ischaemic etiology. Overall, ARNI was discontinued in 29 (16%) patients and dose reduced in 7 (4%) patients due to adverse events. Patients who discontinued ARNI were older (age 65 vs 59 years, p = 0.026). There were no other significant baseline differences between the groups such as gender, NYHA functional class, comorbidities, heart failure medications, and other clinical attributes. 5.6% of patients had ARNI discontinued due to symptomatic hypotension, 2.2% due to worsening creatinine, and 1.7% due to hyperkalemia. Other reasons for discontinuation are described in the figure below. Patients who discontinued ARNI had higher rates of all-cause (18% vs 2%, p = 0.003) and cardiovascular (15% vs 1%, p = 0.002) mortality but no difference in rate of heart failure hospitalizations. Overall, there was no difference in serum creatinine and potassium at baseline and three months. A significant decrease in NT-proBNP was observed at three months compared to baseline (median 3614 vs 1328pg/mL, p < 0.001).

Finally, more patients were in NYHA class I, and fewer patients in NYHA class III (19% vs 5% and 81% vs 23% respectively, p < 0.001), after three months on an ARNI than at baseline.

Conclusion(s): ARNI use is well-tolerated in our Singaporean cohort. The most common reason for discontinuation of ARNI was symptomatic hypotension. Patients who discontinued ARNI tended to be older, and had higher all-cause and cardiovascular mortality. While ARNI seemed to improve NT-proBNP and NYHA functional class in this short-term study, a longer duration of study and larger cohort are needed to further support these findings.
and shorter LOS in hospitalized heart failure patients with hyponatremia treated with intravenous furosemide.

P991
Ivabradine reduces myocardial hibernation in patients with acute coronary syndrome
GAYNIE Gayane Chngryan1; TM Solomenechuk1; LM Kopchak1
1Lviv national medical university n/a. Danylo Halystsky, , Lviv, Ukraine

Methods: The study involved 112 patients with acute coronary syndrome who were divided into 2 groups: group I - 73 patients with viable (hibernating) myocardium, the group II - 39 patients with non-viable myocardium, and each - 2 subgroups. The criterion of myocardial viability was improved left ventricular (LV) ejection fraction (EF) ≥ 5% in dynamics between the first observation and 21 day. Double perfused echocardiography in M-, B- modes and calculated: end- systolic size (ESS), end- systolic volume (ESV), stroke volume (SV), LV ejection fraction, LVEF (VMSS). The study results in 21 day were derived as the sum of individual scores divided by the total number of segments analyzed and asymmetry index (AInd) (total score segments/16). The patients included in the subgroup IA (n = 34) and IB (n = 14), on the background of standard therapy they received additionally ivabradine, the patients in subgroup II A (n = 39) and II B (n = 25) - did not take ivabradine.

Results: When analyzing received data was observed following dynamics, which are presented in the table.

Conclusions: Ivabradine in patients with myocardial hibernation improves the systolic function (decreasing the ESS, ESV, increasing the SV, LVEF) and improves recovery of regional abnormalities myocardium (VMSS, AInd). In patients with nonviability myocardium admission ivabradine enables not impair this parameters.

P992
Furosemide doses and long-term mortality after discharge from heart failure episode
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1University Hospital of Reims, Cardiology, Reims, France

Background: Heart failure causes congestion, treated by loop diuretics. While there is a lack of evidence supporting the positive impact of these drugs on survival, previous studies suggested that high loop-diuretic doses could be associated with improved survival of heart failure patients.

Purpose: To determine if furosemide doses > 80 mg/day are associated with higher long-term survival.

Methods: Clinical, biological and echocardiographic data were retrospectively analyzed from the electronic medical record of patients discharged after acute heart failure hospitalization in a general cardiology department between January and December 2013, including treatment prescriptions at discharge and time of death within the two-years follow-up.

Results: Among 313 patients discharged (163 men and 150 women, mean age 78.3 years), 132 died within the two-years follow-up (42%). Furosemide was the first treatment on prescription (96%) with daily doses 7.8 ± 4.4 mg/day. 73% of patients had doses > 80 mg/day for 114 patients (37%, group 2). In univariate analysis 730 days after discharge, 68.9% patients in group 1 were still alive whereas they were 33.3% in group 2 (OR 4.44 [2.63–7.47], p < 0.001). After Cox-regression, furosemide doses > 80 mg/day, chronic obstructive pulmonary disease or asthma, impaired left-ventricle ejection fraction, renal system antigens, dyskaliemia, inflammation and anemia impacted the two-years global survival, with respective OR of 2.39 [1.60–3.57] (p < 0.001), 2.02 [1.28–3.18] (p = 0.002), 1.69 [1.10–2.59] (p = 0.016), 0.60 [0.39–0.90] (p = 0.016), 3.58 [1.80–7.11] (p = 0.001), 2.04 [1.21–3.47] (p = 0.008) and 1.87 [1.17–2.98] (p = 0.008).

Conclusion: At hospital discharge after an episode of acute heart failure, furosemide doses > 80 mg/day is an independent predictive marker of two-years global mortality.

P993
Long-term sacubitril/valsartan therapy is associated with decrease of arterial elastance in stable patients with heart failure with reduced ejection fraction
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1RUDN University, Moscow, Russian Federation

Objective: Angiotensin receptor-neprilysin inhibitor (ARNI) is recommended to further reduce the morbidity and mortality for patients with chronic symptomatic heart failure with reduced ejection fraction (HFrEF) according to the 2016 ESC Guidelines. The aim of the study was to assess the effects of long-term sacubitril/valsartan therapy on parameters of ventricular-arterial coupling and left ventricular (LV) work efficiency in patients with stable HFrEF.

Methods: In the open-label follow-up to PARADIGM-HF study 16 patients with stable HFrEF (14 male, 69 ± 9 years (M ± SD), arterial hypertension 88%, previous myocardial infarction 88%, diabetes mellitus 43%, dyslipidemia 63%, LV EF 32 ± 6%, serum creatinine 122 ± 23 μmol/l, eGFR 56 ± 13 ml/min/1.73m2, serum potassium 4.43 ± 0.38 mmol/l) were enrolled. Patients received a stable background treatment for at least a month (ACEI 94%, beta-blockers 100%, aldosterone receptor antagonists 81%, loop diuretics 75%). ACEI treatment was interrupted for 36 h and replaced with sacubitril/valsartan 50, 100 or 200 mg BID according to baseline plasma levels of the active component of the medication. The optimal range was considered as 0.5-1.2. Wilcoxon test was considered significant if p < 0.05.

Results: Sacubitril/valsartan therapy was associated with significant decrease of Ea (2.20 ± 0.84 vs 1.79 ± 0.63 mmHg/ml/m2, p = 0.005). Ees remained unchanged.

P991 Table of echocardiography

<table>
<thead>
<tr>
<th>Group</th>
<th>Data</th>
<th>Subgroup</th>
<th>1st day</th>
<th>7th day</th>
<th>21st day</th>
<th>1st day</th>
<th>7th day</th>
<th>21st day</th>
<th>1st day</th>
<th>7th day</th>
<th>21st day</th>
<th>1st day</th>
<th>7th day</th>
<th>21st day</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (n=73)</td>
<td>ESS (mm)</td>
<td>4.26 ± 0.13</td>
<td>4.07 ± 0.13</td>
<td>4.07 ± 0.13</td>
<td>4.56 ± 0.14</td>
<td>4.27 ± 0.19</td>
<td>4.25 ± 0.15</td>
<td>4.30 ± 0.16</td>
<td>4.31 ± 0.15</td>
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<tr>
<td></td>
<td>ESV (ml)</td>
<td>87.38 ± 6.88</td>
<td>76.97 ± 6.13</td>
<td>102.71 ± 7.45</td>
<td>93.48 ± 6.88</td>
<td>85.21 ± 8.18</td>
<td>82.85 ± 7.00</td>
<td>87.08 ± 7.71</td>
<td>87.32 ± 7.40</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>LV EF (%)</td>
<td>60.11 ± 4.8</td>
<td>73.82 ± 5.28</td>
<td>54.32 ± 3.92</td>
<td>63.10 ± 2.56</td>
<td>55.14 ± 3.51</td>
<td>57.57 ± 4.04</td>
<td>70.40 ± 3.29</td>
<td>69.40 ± 3.05</td>
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<tr>
<td></td>
<td>WMSI</td>
<td>1.36 ± 0.08</td>
<td>1.04 ± 0.11</td>
<td>1.45 ± 0.09</td>
<td>1.37 ± 0.08</td>
<td>1.64 ± 0.20</td>
<td>1.48 ± 0.18</td>
<td>1.29 ± 0.10</td>
<td>1.55 ± 0.13</td>
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<tr>
<td></td>
<td>AInd</td>
<td>1.65 ± 0.07</td>
<td>1.38 ± 0.06</td>
<td>1.79 ± 0.07</td>
<td>1.61 ± 0.07</td>
<td>1.90 ± 0.15</td>
<td>1.64 ± 0.11</td>
<td>1.54 ± 0.08</td>
<td>1.61 ± 0.13</td>
<td></td>
<td></td>
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</tbody>
</table>

* - significant differences in dynamics through 21 day (p < 0.05) if significant differences between subgroups IA and IB in 21 day (p < 0.05)

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European Journal of Heart Failure © 2017 European Society of Cardiology, 19 (Suppl. S1), 5–601
In stable patients with HFrEF long-term sacubitril/valsartan therapy

discussed below. Patients were treated with 97 mg LO 24 hours with

Conclusion: In stable patients with HFrEF long-term sacubitril/valsartan therapy

There were no BP-related adverse events. Brachial BP decrease was found. Sacubitril/valsartan was well tolerated and

did not correlate with systolic BP decrease.

Discussion: To our knowledge, this is the first and largest study to demonstrate the efficacy and safety of the HTZ/A diuretic despite renal function in patients with ADHF and DR to date. This results give clinicians an attractive option, safe, effective and available worldwide, to overcome such a frequent situation in daily practice as DR.

Several previous studies have shown that medication management was often incomplete for patients with heart failure (HF) or acute coronary syndrome (ACS). In the same time, other studies had reported that clinical pharmacists improved medication quality and safety. So, a pharmacy team was relocated in cardiology units. 1 senior pharmacist, 1 junior pharmacist and 7 student pharmacists were deployed in intensive care of cardiology and complete hospitalization (79 ± 38 mmHg/ml). The aim of this study is to evaluate the impact of clinical pharmacist in cardiology department.

This prospective experience was realized during one year (December 2015-December 2016). Pharmacy team used several clinical pharmacy activities to improve medication management of patients: medication reconciliation, pharmacist intervention (PI) during medical examination and medical staff, prescription revision. Pharmacist’s interventions were directly classified with ACP/IP, a national tool edited by The French Society of Clinical Pharmacy. This check-list had the permission of number and type of PI, drugs and cardiovascular diseases involved, and the physicians’ acceptance rate.

238 PI were registered for 507 patients. The mean age was 71.9 years. Most frequent type of PI were overdosage (50.7%), missed drug (15%), inappropriate form of administration (74% ; 8.9%) and con- tra-indications (55% ; 6.6%). The physician’s acceptance rate was 96.9%. Concerning drugs involved, medications of cardiovascular system were the most important (231 ; 27.9%) followed by medication of alimentary tract and metabolism (152 ; 18.4%) and nervous system (106 ; 13.0%). More precisely for cardiovascular system, Statines were the most important therapeutic class implicated (67 ; 24.7%), followed by ACE inhibitors/Angiotensin II receptor antagonist (53 ; 22.9%) and Beta-blockers (32 ; 13.9%). PI concerned optimization of ACP’s pharmacotherapy and 52 PI were about management of HF pharmacotherapy.

These results reflect the importance of collaboration between physicians and pharmacists on the medication management of cardiovascular diseases and complications. Others studies about improvement were begun especially for the medication management of HF patients.

This experience is a complete success, physicians and pharmacists will continue this collaboration to perpetuate works in progress and optimize medication management in cardiology.

P995

Is diuretic resistance a lost battle?

R Rocio Eiros1; I Baraba1; A Hernandez1; A De La Fuente1; E Iglesias1; N Palacios1; J Benito1; J Garcia Bolio1; JJ Gasol1

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Background: Data from a variety of sources have raised concerns about the overall safety profile of diuretics in heart failure (HF). A frequently mentioned complication of diuretic therapy in acute decompensated HF (ADHF) is diuretic resistance (DR), which consists in poor response to diuretic treatment with loop diuretics (LD), although the exact frequency is unknown due to the lack of a single definition. One of the most difficult challenges is to evaluate the presence of chronic kidney disease. We hypothesized that the combination of hydrochlorothiazide (HTZ) and amiloride (A), would be a safe and effective strategy despite renal function, notwithstanding his controversial use in this scenario.

Methods: This retrospective cohort study all patients with DR admitted for ADHF treated with the combination of A (5 mg) and HTZ (50 mg) was made in addition to treatment with LD. Two groups were created according to their baseline glomerular filtration rate (GFR); one group of patients with ADHF and DR (Group A) and the others with ADHF and no DR (Group B). A primary endpoint was defined as change in plasma creatinine (ΔCr) and glomerular filtration rate by MDRD in plasma was made at 24 h and at discharge. The secondary efficacy endpoint was the length of stay, 30-day readmission rate, and in-hospital mortality. Evaluation of sodium, potassium, creatinine (Cr) (mg/dL) and glomerular filtration rate by MDRD in plasma was made at 24 h and at discharge.

Results: 107 patients were included (88 male) with a mean age of 74 ± 12. Ischemic and valvular heart disease were the most prevalent cause of HF (34% vs 30%). Most patients had NYHA class III or IV. Group A was composed by 54 patients and group B by 53 patients. Δ Cr improved more at 24 h in group A (ρ = 0.026) compared to group B, but on both groups increased statistically significant at 24 h and 48 h. Change in body weight at 24 h and discharge was also statistically significant. Secondary efficacy endpoints were also similar, as there were no significant differences (Table 1). Not statistically significant changes of Cr at 24 hours were found neither of MDRD. None of them developed electrolytic disorders.

Discussion: To our knowledge, this is the first and largest study to demonstrate the efficacy and safety of the HTZ/A diuretic despite renal function in patients with ADHF and DR to date. This results give clinicians an attractive option, safe, effective and available worldwide, to overcome such a frequent situation in daily practice as DR.

Table 1: Primary and secondary outcomes

<table>
<thead>
<tr>
<th>Diuretics (mg) Basal</th>
<th>Group</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Λ24 Hours</td>
<td>A2000 (294-5380)</td>
<td>B2400 (350-5800)</td>
</tr>
<tr>
<td>Λ24 (mg)</td>
<td>30 (25-79)</td>
<td>24 (20-59)</td>
</tr>
<tr>
<td>Weight (kg) Basal</td>
<td>A 67 (52-22-98)</td>
<td>B 69 (31-129-9)</td>
</tr>
<tr>
<td>Λ24 Hours</td>
<td>66 (84-96-4)</td>
<td>68 (84-96-4)</td>
</tr>
<tr>
<td>Length of stay Hospital admission in-hospital mortality</td>
<td>107 (92-122)</td>
<td>110 (92-122)</td>
</tr>
<tr>
<td>ΔCr (Δmg/dL)</td>
<td>0.010*</td>
<td>0.010*</td>
</tr>
<tr>
<td>ΔFiltrationRate</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

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therapy based on clinical symptoms and/or signs. The CI of these patients was found to be significantly lower, indicating potential volume overload, than those without clinical congestion (31.1% vs 53.2%, p = 0.022).

When comparing IVC metrics to other markers of volume overload, patients with a distal or poorly collapsible IVC had a significantly higher N-terminal pro B-type NP (388 pg/mL vs 490 pg/mL, p = 0.015) and poorer estimated glomerular filtration rate (55 ml/kg/min vs 69 ml/kg/min, p = 0.029).

Conclusion(s): Measurement of IVC metrics in stable outpatient HF populations in two international tertiary HF centres appears to be a reliable and reproducible test. Preliminary data suggests clinically relevant correlation with volume status. Use of these measurements may provide a novel treatment target for HF optimization in the future. Further analyses and extension of the dataset continues at both sites [CI] 10.03-17.56) times higher if compared to themselves in an equivalent period prior to carvedilol administration. Patients with heart failure, chronic obstructive pulmonary disease, and concurrent chronic kidney disease had a higher probability of receiving carvedilol (Odds ratio [OR] 1.16; 95%CI 1.04-1.29). Contrarily those with concurrent hypertension (OR 0.75; 95%CI 0.69-0.81), atrial fibrillation (OR 0.62; 95%CI 0.57-0.67), inhalator glucocorticoids (OR 0.79; 95%CI 0.67-0.90), anti-cholinergics/selective beta-2-adrenoreceptor agonists inhalants (OR 0.80; 95%CI 0.71-0.90) or selective beta-2-adrenoreceptor agonists inhalants short acting (OR 0.88; 95%CI 0.81-0.96) had lower probability of receiving carvedilol.

Conclusion: An increased awareness of administering non-cardio-selective beta-blockers for heart failure in patients with chronic obstructive pulmonary disease and concurrent heart failure should be warranted.

P998
Tolvaptan for heart failure in chronic kidney disease patients: a systematic review and meta-analysis
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Background: Heart failure (HF) is frequently associated with renal impairment. Tolvaptan, a vasopressin type 2 receptor antagonist is reported to be effective in treating congestion in HF management without significant electrolyte loss compared to conventional diuretics. However, there is a lack of evidence guiding its use in patients with chronic kidney disease (CKD).

Purpose: This systematic review and meta-analysis aimed to evaluate the efficacy and safety outcomes of tolvaptan for HF management in patients with CKD.

Methods: We searched Medline, Embase, PubMed, Cochrane databases, Google Scholar, the New York Academy of Medicine Grey Literature Database, and hand-searched reference lists of articles for observational studies and randomized clinical trials that assessed the efficacy and safety outcomes of tolvaptan against placebo or standard care in adult patients with HF and CKD. Study screening, data extraction, quality assessment of included studies were performed independently.

Meta-analysis was performed using Comprehensive Meta Analysis, version 2.2.564. Our protocol was registered with PROSPERO.

Results: 19 studies were included in the qualitative review and 5 studies were included in the meta-analysis involving 1597 patients. Compared to baseline, tolvaptan appeared to increase serum sodium concentration (5 studies; mean change of 0.58 mmol/L; 95% CI: 0.05-1.11; p = 0.00) and increase urine flow rate (3 studies; 1.36 mL/h; [95% CI: -0.76-1.96]; p = 0.00). However, no significant differences in glomerular filtration rate (GFR) (4 studies, 0.06 mL/min/1.73 m2 [95% CI: -0.13 to 0.24]; p = 0.52), serum creatinine (5 studies; -0.04 mg/dL; [95% CI: -0.25 to 0.16]; p = 0.68) vs. baseline. Tolvaptan was also associated with a greater change of sodium concentration (3 studies; 0.37 mmol/L; 95% CI: 0.04 to 0.70; p = 0.03) compared to placebo or standard care. No significant difference in change of eGFR (3 studies; 0.13 mL/min/1.73m2 [95% CI: -0.08 to 0.35]; p = 0.23) and serum creatinine (4 studies; 0.13 mg/dL; [95% CI: -0.08 to 0.34]; p = 0.21) compared to placebo or standard care. There was also very low heterogeneity. No significant difference in mortality rates were reported in studies. A lower percentage of worsening renal function was found in patients receiving tolvaptan compared to control group (29% vs. 33%, respectively).

Conclusion: Our review offers reasonable support in the use of tolvaptan in patients with CKD. Tolvaptan may offer an improvement in serum sodium without significant change in renal function compared to placebo or standard care in managing HF in CKD patients. However, further research with high quality randomized controlled trials is needed to establish the effect of tolvaptan on long-term efficacy and safety outcomes.

P999
Effect of short daily versus conventional dialysis on cardiac structure and function in patients with diuretic-resistant congestive heart failure.
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Background: Heart Failure (HF) is a problem of growing significance worldwide. Although the efficacy of conventional therapies has been established, an increasing number of patients suffer from frequent re-hospitalizations due to persistent congestion, resistant to high doses of loop diuretics. This diuretic-resistant congestive HF (DR-CHF) is associated with poor prognosis. Alternative non-pharmacological strategies aiming to better control of overhydration based on hemodialysis have been previously considered.

Purpose: The aim of our study was to estimate the effect of short daily hemodialysis (sdHD) versus conventional hemodialysis (cHD) on left ventricular structure and function in patients with diuretic-resistant congestive heart failure.

Methods: Patients with diuretic-resistant congestive heart failure were divided into 2 groups: sdHD (4 sessions per week) and cHD (3 sessions per week). The primary outcome was to measure the left ventricular ejection fraction (LVEF) and left ventricular mass index (LVMI) after 6 months of dialysis. The study population consisted of 30 patients with advanced DR-CHF.

Results: The results showed a significant increase in LVEF from 30% to 35% in the sdHD group and a non-significant increase in LVEF from 30% to 32% in the cHD group. The LVMI also showed a significant decrease from 60 g/m2 to 55 g/m2 in the sdHD group and a non-significant decrease from 60 g/m2 to 58 g/m2 in the cHD group. The study also showed a significant decrease in hospitalization rates in the sdHD group compared to the cHD group.

Conclusion: The study results suggest that sdHD may be an effective alternative to cHD in the management of DR-CHF, as it was associated with a significant improvement in LVEF and LVMI, as well as a decrease in hospitalization rates.
function indices, blood pressure (BP) and total water homeostasis in patients with DR-CHF and chronic kidney disease stage III-IV.

Methods: Twenty patients (12 males, mean age 58.5 ± 10.3 years) with DR-CHF and chronic kidney disease stage III-IV were enrolled. We performed a non-randomized, controlled study of sdHD (group 1; n=11 patients, 2 sessions/week, 2 hours/session) vs cHD (group 2; n=9 patients, 3 sessions/week, 4 hours/session) with a follow-up period of 6 months. Conventional echocardiography with assessment of left ventricular mass (LVM) and left ventricular ejection fraction (LVEF) was performed and the total water homeostasis was determined in all patients at baseline and follow-up.

Results: The 2 groups did not differ in baseline characteristics. The total weekly ultrafiltrated removed volume did not differ between groups; 6.2 ± 0.6 vs 5.9 ± 0.8 L in groups 1 and 2 respectively (p = ns). Renal function, estimated by creatinine clearance, remained unchanged in both groups at 6 months (45.4 ± 21.3 vs 42.1 ± 18.9 ml/min, p = ns in the sdHD, and 43.6 ± 19.5 vs 37.7 ± 11.2 ml/min, p = ns in the cHD group). In the sdHD group, a significant improvement in BP (systolic / diastolic) was observed at 6 months (150.7 ± 10.7 vs 130.6 ± 9.7 mmHg, p = 0.01 / 88.2 ± 7.6 vs 68.7 ± 10.5 mmHg, p = 0.01) resulting in a reduction in a hypertensive drug use, whereas no difference was noted in the cHD group (154.6 ± 9.7 vs 148.3 ± 11.5 mmHg, p = ns / 90.1 ± 5.4 vs 82.7 ± 6.2 mmHg, p = ns). At the end of follow-up, a significant decrease in LVM was observed only in the sdHD group (147.9 ± 47.5 vs 122.6 ± 38.9 g, p = 0.01), but not in the cHD group (152.7 ± 36.9 vs 145.6 ± 31.7 g, p = ns). Similarly, LVEF improved only in the sdHD group (22.5 ± 10.3 vs 20.7 ± 10.5%, p = ns), whereas not in the cHD (24.1 ± 3.8 vs 26.9 ± 10.6%, p = ns).

Conclusions: In DR-CHF patients with advanced kidney dysfunction sdHD sessions, in contrast to cHD sessions, were associated with improved BP control and total water homeostasis, whereas no difference was noted in the cHD group. In the sdHD group, a significant improvement in BP (systolic / diastolic) was observed at 6 months (150.7 ± 10.7 vs 130.6 ± 9.7 mmHg, p = 0.01 / 88.2 ± 7.6 vs 68.7 ± 10.5 mmHg, p = 0.01) resulting in a reduction in a hypertensive drug use, whereas no difference was noted in the cHD group (154.6 ± 9.7 vs 148.3 ± 11.5 mmHg, p = ns / 90.1 ± 5.4 vs 82.7 ± 6.2 mmHg, p = ns). As compared to Qu 2 ± 3, patients in Qu4 were older, had a higher prevalence of hypertension, diabetes and coronary artery disease, had higher blood pressures and higher values for antegrade pressure wave, larger left atrium, larger enddiastolic and end-systolic left ventricular volumes, lower EF, and higher n-terminal proBNP (NT-proBNP). The predominant cause of HF-EF in Qu1 was dilated cardiomyopathy. As compared to Qu 2 ± 3, patients in Qu1 had lower BP, lower values for antegrade pressure wave, lower values for antegrade and reflected waves and pulse wave velocity.

Enddiastolic and end-systolic volumes were smaller, and filling pressures were lower, but n-terminal proBNP levels were higher in Qu4. In survival analysis (logrank test, p = 0.0029), patients in Qu1 as well as Qu4 had a higher mortality (Qu 1 vs Qu 2 + 3: HR 3.1 (95% CI 1.2-8.1); Qu 4 vs Qu 2 + 3: HR 4.4 (95% CI 1.7 - 11.2) - Figure. In a multivariate Cox proportional hazards model predicting all-cause mortality, Qu4 (HR 4.65 (CI 1.69-12.80), p = 0.003), and, of borderline significance, Qu 1 (HR 2.93 (0.96-8.88), p = 0.059), and log n-terminal proBNP (HR 2.27 (0.94-5.5), p = 0.07), were the independent predictors. Age, gender, presence of ischemic cardiomyopathy, EF, and SBP did not enter the final model.

Conclusion: Lower as well as higher PP is associated with impaired survival in HF-EF. In the first case, the lower PP likely is the expression of a very poor cardiac function. In the latter case, the higher PP stems from an increased pulsatile afterload. Both conditions can be detrimental.

P1000

Determinants and prognostic value of peak oxygen uptake in the current era of heart failure disease modifying therapy

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Purpose: To study the determinants and accuracy of peak oxygen uptake (VO2) to predict the outcome of patients with heart failure (HF) in the current era of disease modifying therapy.

Methods: We studied 282 patients with HF who consecutively underwent ergospirometry for prognostic stratification from 2009 to 2015 in a single center. Baseline variables independently associated with peak VO2 were identified by means of linear regression. Survival was assessed by means of the Kaplan-Meier method and Cox’s regression.

Results: Mean age of studied patients was 52.7 years; 24% were woman, 42% had ischemic heart disease and 74% had reduced LVEF (<40). NYHA III or IV class was present in 36% cases. 92% patients were on beta-blockers, 79% on ACEIs/ARBs and 70% on MRAs. Mean VO2 was 19.6 ± 5.2 ml/kg/min. In multivariable linear regression, age (p = 0.01), NT-proBNP (p < 0.001), body mass index (p = 0.001), and female sex (p = 0.007) were independently associated with lower VO2, while TAPSE (p < 0.001) was independently associated with higher VO2. A peak VO2 < 14 ml/kg/min was associated with significantly higher risk of the composite outcome death, heart transplantation or need for mechanical circulatory support during follow-up (HR 2.38, 95% CI 1.10-5.26, p = 0.027).

Conclusions: Peak VO2 retains a significant prognostic value in the current era of HF-disease modifying therapy. In our study, age, female gender, body mass index, NT-proBNP and TAPSE were identified as independent clinical determinants of peak VO2.

P1001

Pulsatile hemodynamics in heart failure with reduced ejection fraction - determinants and prognostic value

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Background: The findings relating pulse pressure (PP) and outcome in heart failure with reduced ejection fraction (HFpEF) have been controversial.

Purpose: We aimed to clarify the determinants and prognostic value of brachial PP in HFpEF.

Methods: We measured pulsatile hemodynamics (brachial blood pressure (BP), central BP, wave reflections, pulse wave velocity), using radial tonometry, a transfer function and dedicated algorithms, in 81 patients (mean age 61 years, 95% men) with HFpEF, and followed them for 4.1 years. Patients were divided into quartiles (Qu), according to brachial PP. Main outcome was all-cause mortality.

Results: As compared to Qu 2 ± 3, patients in Qu1 had lower BP, lower values for antegrade pressure wave, larger left atrium, larger enddiastolic and end-systolic left ventricular volumes, lower EF, and higher n-terminal proBNP. The predominant cause of HF-EF in Qu1 was dilated cardiomyopathy. As compared to Qu 2 ± 3, patients in Qu4 were older, had a higher prevalence of hypertension, diabetes and coronary artery disease, had higher blood pressures and higher values for antegrade and reflected waves and pulse wave velocity.

Enddiastolic and end-systolic volumes were smaller, and filling pressures were lower, but n-terminal proBNP levels were higher in Qu4. In survival analysis (logrank test, p = 0.0029), patients in Qu1 as well as Qu4 had a higher mortality (Qu 1 vs Qu 2 + 3: HR 3.1 (95% CI 1.2-8.1); Qu 4 vs Qu 2 + 3: HR 4.4 (95% CI 1.7 - 11.2) - Figure. In a multivariate Cox proportional hazards model predicting all-cause mortality, Qu4 (HR 4.65 (CI 1.69-12.80), p = 0.003), and, of borderline significance, Qu 1 (HR 2.93 (0.96-8.88), p = 0.059), and log n-terminal proBNP (HR 2.27 (0.94-5.5), p = 0.07), were the independent predictors. Age, gender, presence of ischemic cardiomyopathy, EF, and SBP did not enter the final model.

Conclusion: Lower as well as higher PP is associated with impaired survival in HF-EF. In the first case, the lower PP likely is the expression of a very poor cardiac function. In the latter case, the higher PP stems from an increased pulsatile afterload. Both conditions can be detrimental.
The the signs which had high J (≥0.5), determination of their sensitivity (Se), the predictive importance (Pp), the third stage - choice of diagnostic thresholds (the recreation center sum) which have allowed to make the correct decision. The following diagnostic indicators have been selected: the LV structural and geometrical parameters (PDS, FVD and FSS, LV EF, UCs and ICb), parameters of vascular remodeling (TIM at the level of the right and left general carotid artery, PL and PL at the level of the right and left renal arteries) and GFR MDRD.

To study the Pp for signs of progression of heart failure symptoms were selected DC which had informative: GFR MDRD less than 60 ml/min/1.73m2, FE LV less than 50%, FVD more than 137 ml, ISS more than 43 mm, Bsd, TIM of general carotid artery, more than 1.1 mm.

At the threshold values of DC ≥ + 15 and over is predicted unfavorable course of CHF, with the values of DC ≥ 00 is concluded that a stable flow of CHF. Results of research have shown that the most sensitive signs for definition of the forecast of CHF at patients: availability of FE less than 50% (Se=1), TIM inclination/vertical angle of carotid artery (Se = 0.96), increase in FVD more than 137 ml (Se = 0.95) and FSS more than 43 mm (Se = 0.95). Conclusions: The analysis of the carried-out mathematical forecasting of adverse current of CHF has shown that the most precautionary adverse predictive symptoms are: FV less than 50%, FVD more than 137 ml, ISS more than 43 mm and GFR less than 60 ml/min/1.73m2.

P1003
A white-coat effect for heart rate in heart failure? Characteristics and prognostic implications in idiopathic dilated cardiomyopathy

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White coat-effect for blood pressure is defined as temporary increase in blood pressure before and during visit in the clinic, regardless what the average daily ambulatory blood pressure values are. We hypothesized that such a phenomenon may also exist for heart rate (HR) in patients with heart failure (HF) whilst HF guidelines advocate a more aggressive drug management when HF in sinus rhythm is ≥70 bpm, and that white-coat effect on HR (WCHR) might be associated with a different prognosis in patients with idiopathic dilated cardiomyopathy (IDC).

Methods: Among 117 IDC patients (WHO critical) in sinus rhythm, 24-hour Holter monitoring was performed at admission to assess heart rate (HR) and heart rate variability (HRV) parameters. The HR and HRV were measured automatically over 24 hours, during daytime and nighttime periods. We considered mean HR measured during the first hour of recording (HRH1) as possibly being affected by WCHR. The endpoint of cardiac events included cardiac death, heart transplantation and major arrhythmic event (sustained VT/VF).

Results: Among 117 patients with IDC (age 51 ± 12 years, LVEF 33 ± 12%, 36 (31%) had WCHR ≥5 bpm for HRH1 compared to mean daily HR, and 12 (10%) had WCHR ≥10 bpm. There were 6 patients (5%) with HRH1 ≥70 bpm whilst daily HR was ≤70 bpm. Patients with WCHR ≥5 bpm had lower LVEF than those with WCHR < 5 bpm (30 ± 12 vs 35 ± 11%, p = 0.02) and those with WCHR ≥10 bpm were younger than those with WCHR < 10 bpm (42 ± 12 vs 52 ± 11, p = 0.006). With a follow-up of 62 ± 44 months, there were 41 events in 39 patients: 24 cardiac deaths including 12 sudden deaths, 5 sustained VT/VF and 12 heart transplantation. In univariate analysis, HRH1 was a predictor of cardiac events (Hazard Ratio 0.902, 95% CI 0.827-0.984, p = 0.017). With a follow-up of 62 ± 44 months, there were 41 events in 39 patients: 24 cardiac deaths including 12 sudden deaths, 5 sustained VT/VF and 12 heart transplantation. In univariate analysis, HRH1 was a predictor of cardiac events (Hazard Ratio 0.902, 95% CI 0.827-0.984, p = 0.017).

Conclusions: In patients with IDC, a phenomenon of WCHR is a common finding and may misclassify HR for adaptation of drug therapy according to current HF guidelines in 31% of the cases. Since WCHR is not independently associated with carotid artery (Se = 0.96), increase in FVD more than 137 ml (Se = 0.95) and FSS more than 43 mm (Se = 0.95). Conclusions: The analysis of the carried-out mathematical forecasting of adverse current of CHF has shown that the most precautionary adverse predictive symptoms are: FV less than 50%, FVD more than 137 ml, ISS more than 43 mm and GFR less than 60 ml/min/1.73m2.

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P1004
Impact of tricuspid regurgitation on survival in patients with chronic heart failure

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Purpose: Tricuspid regurgitation (TR) is common in patients with chronic heart failure (CHF). However, data about the prognostic value of significant TR in CHF patients are sparse.

Methods: 1600 consecutive patients with CHF were included between 2009 and 2014. Patients represented an unselected contemporary cohort of CHF patients treated according to current guidelines in a tertiary heart failure clinic. At study entry detailed clinical and echocardiographic data were collected. The prognostic impact of significant TR was assessed and compared with established risk factors.

Results: TR was common in the study population. 10.6% of patients had severe, 24.9% moderate, and 65.4% of patients had no or mild TR. Kaplan Meier analysis showed a considerably increased mortality rate of patients with moderate and severe TR (p = 0.0001). However, by multivariable analysis NTpro-BNP (p = 0.0004), systolic blood pressure (p = 0.0012), heart rate (p = 0.0015), age (p = 0.0001), serum creatinine (p = 0.0011), serum sodium (p = 0.0449) and left ventricular function (p = 0.0130), but not TR independently predicted mortality. These independent predictors of mortality were used to define disease severity to analyze the predictive value of TR at different stages of CHF. In patients with mild and moderate CHF characterized by NT-proBNP concentrations ≤ 500 ng/ml, serum creatinine levels < 1,5 g/dl, sustained systolic blood pressure > 100mmHg, heart rate > 70/min, severe TR was highly predictive of mortality (p = 0.0001 for except NTproBNP p = 0.00175). In patients with advanced disease, however, significant TR did not add additional information.

Conclusion: The prognostic impact of TR strongly depends on the severity of heart failure. Whereas TR excellently predicts excess mortality in mild to moderate CHF, it has no additive value in advanced CHF when compared with established risk factors. Since it is only in mild to moderate CHF that TR is associated with a worse outcome it is this group of patients that might benefit from tailored pharmacological or surgical interventions.

P1005
Low incidence of overt heart failure in south italy centenaries is linked with good life style: preliminary data from the cilo study

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2 Veterans Affairs San Diego Health Care System, San Diego, United States of America.

On behalf of: GREAT NETWORK

Background: In south of Italy there is a longer life expectancy compared to the other italian regions and the number of centenarians is extreme to be of 4-5% of the whole inhabitants.

Purpose: Aim of our study(Cilento Initiative Aging Outcome)DIaO) was to perform a preliminary evaluation of all reasons of the longevity in this region people. A complete cardiological assessment in order to evaluate the incidence of Heart Failure in centenarian from Cilento region compared to their cohabitants of the age between 50 to 70 years old and to link the results with their life-style.

Materials and Methods: 26 centenarians(Cen) and two of their cohabitants (coh) were enrolled in their houses. The centenarians were reached at their home by means of fully equipped car with cardiological instruments. Clinical assessment was performed including medical history, clinical exam to check signs of congestions, collection of Weight, Height, Blood pressure(BP), Heart rate (HR), respiratory rate (RR), oxygen saturation (SaO2) partial fraction of oxygen (FiO2). Moreover the patients underwent: electrocardiogram (EKG), bioimpedance vector analisys (BBV), Lung ultrasound test (ULS), soccodiagography to evaluate the heart function and structure and the collapsability of inferior cava vein. Life style of centenarians (including diet and physical activity)were also recorded. A six months later a phone call Follow up was also performed.

Results: 26% of Cen had a diagnosis of chronic heart failure (CHF) but were. Ischemic cardiopathy (CHD) was 4% in Cen and 6% in Coh. Risk factors for heart failure were less present in Cen compared to Coh. Diabetes was present in 8% of Cen compared to 23% in Coh. Hypertension was detected in 48% of Cen and 51% of Coh. High Colesterol level was 16% in Cen compared to 26% in Coh. Dispea at rest was present in only 8% of Cen. The hydration score mean was 76,8 ± 4,36 inCen and 73,9 ± 1,9 in Coh (ns). At Lung ultrasound test (ULS) no pleural effusion was detected in both groups. At echocardiography the percentage mean of ejection fraction(EF) and inferior vein cava diameter (IVC) were in the normal ranges for both groups: EF ≥ 52 ± 1,9, ad 55 ± 6,63 respectively and IVC: 15 ± 5,51 in Coh compared 15 ± 3,38 in Coh. Regarding life style we found that compared to Coh Cen had more adherence to strictly mediterreanean diet and physical activity. At Follow up no death occurred in Cen but one hospitalization between Cen and two in Coh.

Conclusions: The centenarians of Cilentum, despite of the presence of all typical cardiovascular risk factors, present low incidence of symptoms and signs of overt heart failure probably because of the adherence to mediterranean diet and acvitve life style.
P1006
The role of sodium level and in-hospital mortality in patients with acute, or acute worsening chronic heart failure

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AIM of the study: to determine the role of low sodium level (sNa) as a predictor of in-hospital mortality (IHm) in acute and acute worsening chronic heart failure.

DESIGN: observational retrospective study. Included patients admitted to ICU because of AHF. Analyzed variables: demographics: age, gender; co-morbidities; Biochemical: hemoglobin, anemia, renal failure, sodium, creatinine, BUN; Hemodynamic parameters: heart rate, systolic and diastolic BP; LV ejection fraction (based on what patients were divided in PEF-HF and REF-HF). Statistical analysis: descriptive, t-test, uni and multivariate logistic regression, ROC Curve. Significance determined at the level of 0.05.

Results: 451 pts. at mean age 69±10.8, 201(44.6%) females and 250 (55.4%) males were included. Presence of co-morbidities: Afib 41.9%, COPD 23.9%, DM 41.5%, HTA 71.6%, carotid artery disease (CAD) 41.2%, previous symptomatic HF 34.8%, renal failure 12.0%, anemia 31.9%; mean EF 42.9±10.3% (21.3% with PEF-HF ≥50%). HR 109±29 BPM; SBP 143±44, DBP 86±24mmHg; Hgb 13±3.8, BUN 26.8±21.5, creatinine 128±124.9 mmol/L; sodium 138±6.6 mmol/L. Pts were divided in two groups reduced sNa <135 (115-25.5%), and normal sNa ≥135 mmol/L. A total of 108 (23.9%) cardiac deaths were registered (IHm group), with the highest mortality rate during the first 48 hours (68.5%).

Univariate predictors: HLF: beta = -0.662, p = 0.011, exp(B) 0.516. HFA: beta = 0.751, p = 0.001, exp(B) 0.472; CAD: beta = 0.931, p = 0.005, exp(B) 2.536; renal failure: beta = 0.189, p = 0.007, exp(B) 2.268; anemia: beta = 0.135; creatinine: beta = 0.743, p = 0.002, exp(B) 2.102; anemia: beta = 0.930, p = 0.000, exp(B) 2.533; EF categorical: beta = 0.017, p = 0.017, exp(B) 2.109; EF categorical: beta = 0.167, p = 0.000, exp(B) 2.536; beta = -0.299, p = 0.000, exp(B) beta = -0.205, sNa <135 mmol/L: p = 0.038 as positive predictors. But when we entered low sodium as selection variable, three independent predictors were identified: HFA (p = 0.039), DBP (p = 0.009) and creatinine (p = 0.002).

Variables independently significantly positively associated with low sodium level were low SBP (p = 0.002), high BUN (p = 0.000), and CAD (p = 0.002), while HTA (p = 0.025) was independently negatively associated. When we entered IHm as selection variable there were three independently associated predictors added to low sNa: high BUN (p = 0.006), creatinine (p = 0.028) and presence of CAD (p = 0.006). Normal sNa level had good discriminate function (ROC Curve: Area under the Curve, 572, p < 0.024 (CI 503-641) (Image 1), in predicting absence of IHm.

Conclusion: low sodium is one of the significant independent predictor of in-hospital mortality in patients treated because of acute or acute worsening chronic heart failure.

P1007
The beneficial effect of the management of heart failure patients with reduced ejection fraction at an outpatient clinic after hospitalization and applying guideline recommended therapy on mortality

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Background: Mortality of heart failure (HF) is high despite the significant recent advances in pharmacological and device therapy. National data published a few years ago showed nearly 30% annual mortality. The data of European Society of Cardiology Heart Failure Long-Term Registry revealed 23.6% 1-year mortality in patients hospitalized with a diagnosis of HF and 6.4% among patients with chronic stable HF.

Purpose: The aim of the study was to assess the survival data of patients suffering from heart failure with reduced ejection fraction (HFrEF) managed at our HF outpatient clinic after HF hospitalization between June of 2001 and June of 2016. At the beginning of the management the patients’ characteristics were as follows: mean age 62.6±12.5 years, mean NYHA functional class 3.5±1.4, proportion of men 75.6% and ischemic aetiology 49.8%. We made every effort to achieve the optimal medical and device therapy in all patients. Mean follow-up time was 5.6±4.3 years. Survival was estimated by Kaplan-Meier method.

Results: After optimization of pharmacological therapy 95.6% of patients received ACEI/ARB, 60.2% of them BB and 86.1% MRA. 32.7% of patients on ACEI/ARB therapy got target dose (equivalent to 40 mg enalapril), 80.6% of them received at least the half of the target dose, and mean of the individual value of the ACEI/ARB dose expressed as percent of the target dose was 66.1±2.42%. The target dose of BB was applied in 50.2% of patients, 89.2% of them were treated with at least the half dose, and mean of the individual value of the BB dose expressed as percent of the target dose was 82.1±42.0%. CTRP implantation was performed in 77 patients, CRTD in 64 and ICD in 47 cases. After treatment optimization LVEF in the patients’ characteristics was as follows: mean age 62.6±10.5; p = 0.45, mean LVEF 27.5±10.5; p = 0.039, as positive predictors. But when we entered low sodium as selection variable, three independent predictors were identified: HFA (p = 0.039), DBP (p = 0.009) and creatinine (p = 0.002).

Variables independently significantly positively associated with low sodium level were low SBP (p = 0.002), high BUN (p = 0.000), and CAD (p = 0.002), while HTA (p = 0.025) was independently negatively associated. When we entered IHm as selection variable there were three independently associated predictors added to low sNa: high BUN (p = 0.006), creatinine (p = 0.028) and presence of CAD (p = 0.006). Normal sNa level had good discriminate function (ROC Curve: Area under the Curve, 572, p < 0.024 (CI 503-641) (Image 1), in predicting absence of IHm.

Conclusion: low sodium is one of the significant independent predictor of in-hospital mortality in patients treated because of acute or acute worsening chronic heart failure.

On behalf of: CRO-HF group

Background. The mortality of heart failure (HF) patients is still high in majority countries, despite the quality treatments, new guidelines and continuously education of medical staff. Treatment for heart failure with reduced ejection fraction (HF-REF) is widely well known and used in medical practice. The treatment approach for heart failure patients with preserved systolic function (HF-PEF), according to recent guidelines and scientific papers, is still not defined.

Purpose: The aim of this study was to analyze mortality rate of HF patients and to investigate how carvedilol therapy in HF-PEF patients influenced on mortality rate after ten-year follow-up from Croatian heart failure (CRO-HF) registry.

Methods: A group of 2003 in-hospital patients with diagnosis of HF (median age 76, 53.3% males, 46.7% females) who were hospitalized at University Hospital Split were analysed. Particularly, after ten-year follow-up, HF-PEF patients without any beta-blocker on discharge letter were enrolled as control group (119 vs 218, respectively); the data were part of CRO-HF Registry. HF-PEF was classified as EF≤40%. After follow-up, the mortality rate was analyzed in the carvedilol and control group.

Results: In-hospital mortality rate of 2003 patients was 13.8%. In-hospital mortality rate was higher in females than in males (females=14.4%, males=12.6%). HF-PEF with EF <25% had 37.8% and HF-PEF with EF >40-49% had 24.9% patients. We found significant difference in mortality rate when we compared patients with EF <50% and EF>50% (Hazard ratio=4.652; P=0.037; CI=0.069). Patients with EF ≤50% had 2.5 higher mortality rate. In the group of patients with EF ≥50% mortality rate was 4.2%, and 1.6% in the group of patients with EF ≤50%.
When we compared group on carvedilol therapy with control group we analyzed 337 patients; 159 men and 178 women. The mean age of patients was 77.29 ± 10.2 years. In the carvedilol group the one year follow-up, in carvedilol group 76 patients died and mortality rate was 63%. In the control group 167 patients died and mortality rate was 76%. For comparing these two groups we used chi square test and mortality rate in carvedilol group was significantly lower. Chi-square 5.612, p<0.0212.

Conclusion: Ten-year mortality rate of HF patients from CHO-HF registry is still high. We should try to reduce the mortality with quality implementation of guidelines, with better involvement of Heart Failure Association and all society. Carvedilol therapy appears to be associated with lower mortality rate in patients with heart failure with preserved systolic function.

P1009
Soluble ST2-receptor (sST2) is more powerful predictor of long-term prognosis in patients with acute decompen-sated heart failure, compared with copeptin

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Background: novel biomarkers sST2 and copeptin are known as powerful predictors of long-term prognosis in patients with acute decompensated heart failure, compared with copeptin. Discharge values of sST2 in heart failure pts is still high. We should try to reduce the mortality with quality implementation of guidelines, with better involvement of Heart Failure Association and all society. Carvedilol therapy appears to be associated with lower mortality rate in patients with heart failure with preserved systolic function.

Methods: In the prospective single-center study were included 159 pts with ADHF presenting with both atrial arrhythmia and reduced LVEF (i.e. from 82% to 73%, p < 0.01) and overweight/obesity (from 32% to 25%, p < 0.10). Discharge values of sST2 from the hospital combined with NT-proBNP have the best predictive capacity to reflect the adverse long-term prognosis in patients with ADHF.

Results: Discharge values of sST2 from the hospital combined with NT-proBNP have the best predictive capacity to reflect the adverse long-term prognosis in patients with ADHF.

Conclusion: sST2 is more powerful predictor of long-term prognosis in patients with acute decompen-sated heart failure, compared with copeptin. Discharge values of sST2 from the hospital combined with NT-proBNP have the best predictive capacity to reflect the adverse long-term prognosis in patients with ADHF.

P1010
Heart failure and comorbidities in acute coronary syndrome phenotype; a hierarchical analysis of clinical and lifestyle factors per heart failure phenotype, from hellenic heart failure study.

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On behalf of: Hellenic Heart Failure study

Background/Introduction: comorbidities in the context of secondary cardiovascular disease prevention highly determines patients’ prognosis. Focusing on heart failure and the differential pathophysiology behind its phenotype the “comorbidities” hypothesis remains a scientific field of much interest in the treatment spectrum. Purpose: to investigate the comorbidities in each heart failure phenotype and to classify these clinical as well as lifestyle factors in relation to Acute Coronary Syndrome (ACS) prognosis.

Methods: from May 2006 to March 2009, 1,000 consecutive patients who were hospitalized at Cardiologic Clinic in Athens with ACS diagnosis were enrolled in the study. In 2016, the 10y follow-up (2006-2016) was performed in 745 participants.

Heart failure phenotype was defined according to baseline EF; heart failure with reduced EF (i.e. <40%) (HFREf), preserved EF (i.e. ≥50%) (HFpEF) and mid range EF (i.e. 40-49%) (HFRmEF). Age, sex, overweight/obesity, current smoking, MedDIaScore, physical activity, hypertension, hypercholesterolemia and diabetes mellitus were evaluated in relation to 10y ACS prognosis, in each heart failure phenotype, based on hierarchical classification analysis using Fisher linear discriminant function. Results: The 10y fatal/non fatal ACS incidence was 86%, 53% and 45% in HFRmEF, HFRmEF and HFREF respectively. Crude analysis revealed that ranking from the lowest to the highest EF values i.e. from HFREF to HFRmEF patients had higher likelihood to suffer from hypertension (from 62% to 55%, p = 0.04), hypercholesterolemia (from 82% to 73%, p = 0.01) and overweight/obesity (from 32% to 25%, p < 0.10); yet no significant differences were observed as regards diabetes mellitus. In discriminant analysis, in HFRmEF patients the predominant predictors associated with 10y ACS prognosis were overweight/obesity (Odds Ratio 3.39; 95% CI 1.83-6.29), current smoking (Odds Ratio 7.10; 95% CI 3.77-13.47) and physical activity (Odds Ratio 0.69; 95% CI 0.48-0.98), compared with unchanged LVEF pts (-42 ± 8%, p < 0.01). Improved LVEF pts had greater reduction in HR (r = -0.59) regardless of rhythm. Pts with improved LVEF >10% increase were less likely to have hypertension, documented IHD or diabetes (all p < 0.01). Left atrial size was similar between groups (p = 0.51) but improved LVEF had smaller LVEDD (p = 0.04) and higher mitral annular velocities (p = 0.01) at baseline.

Conclusions: In patients presenting with HFREF and atrial arrhythmias, improved heart rate control was associated with improvement in LVEF regardless of rhythm. LVEF was also more likely to improve in those without coronary artery disease, hypertension or diabetes.
examinations: medical history, physical examination, laboratory tests including blood morphology with RDW and BNP, 12-lead electrocardiogram, chest X-ray, echocardiogram, six-minute walk test (6MWT). All patients recruited for the study were treated according to ESC guidelines. The follow-up period was 6 months. MACEs were defined as: death of all causes, cardiovascular death, hospitalization due to the heart failure exacerbation. In order to establish the link strength and direction between variables, the correlation analysis was used in calculating the Pearson and Spearman correlation coefficients. In all the calculations the level of significance was set at P=0.05.

Results: The LVEF ≤35% (mean 23±7%) was confirmed in all patients as well as elevated BNP level (762±177 pg/ml). The RDW was increased in the majority of patients and achieved 15±3%. The percentage of patients with heart failure exacerbation was 13% at 3 months and 24% at 6-month follow-up. The mortality rate was 4% at 3 months and 6% at 6-month follow-up. We found that RDW value was significantly higher in patients with CHF. During hospitalization the 6-month observation (16.7±1.5% vs. 15.7±1.7%, P < 0.001). There was no relationship between RDW value and death during 6-month follow-up in stable patients with CHF.

Conclusions: Red blood cell distribution width may be a potential predictor of subsequent hospitalizations due to heart failure decompensation in stable patients with CHF, and it can be used to predict the reduced left ventricular ejection fraction in short-term observation. No other correlations between RDW and MACEs were found.

P1013

Heart failure in patients with acute coronary syndrome: characterization of population and impact on prognosis.

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Introduction: Patients (P) with chronic heart failure (CHF) usually have multiple co-morbidities, so their approach in the context of Acute Coronary Syndromes (ACS) can be an important challenge.

Purpose: To characterize the P with ACS and previous CHF and to evaluate the impact of the presence of CHF on the therapeutic approach, complications and in-hospital mortality.

Methods: We studied 745 P admitted in our Cardiac Intensive Care Unit with the diagnosis of ACS. We considered 2 groups: P with prior CHF and P without previous CHF. The patient’s age, gender, personal history, clinical and electrocardiographic presentation of ACS, in-hospital therapy, left ventricular ejection fraction, coronary angiography and angioplasty were recorded. During hospitalization the following complications were defined: heart failure, cardiogenic shock, need of invasive mechanical ventilation, re-infection, mechanical complications, aborted sudden death, stroke and major haemorrhage. In-hospital mortality was compared between both groups.

Results: With previous CHF constituted 7.1% (53P) of the study population. These patients were older (77.3 ± 8.9 vs 66.6 ± 13.6, p < 0.001), had higher prevalence of history of arterial hypertension (88.7% vs 76.2, p = 0.03), myocardial infarction (59.8% vs 24.3%, p < 0.001), coronary surgical revascularization (18.9% vs 5.2%, p < 0.001), valvular disease 22.6% vs 1.4% (p < 0.001), peripheral arterial disease 22.6% vs 5.1% (p < 0.001), chronic renal failure (41.5% vs 10.1%, p < 0.001), chronic lung disease (22.6% to 42.4%, p < 0.001) and haemorrhage (9.8% vs 1.6%, p < 0.001). P with previous CHF presented more frequently with NSTE-ACS (82.3% vs 45.7%, p < 0.001) and indeterminate location myocardial infarction (26.4% vs 4.6%, p < 0.001). At admission they also presented Killip-Kimball class ≥ 2 more frequently (84.2% vs 16.8%, p < 0.001) and less frequently with chest pain (58.5% vs 87.7%, p < 0.001).

During hospitalization, P with prior CHF underwent less coronary angiography (56.6% vs 86.7%, p < 0.001), less radial artery access for coronary angiography and angioplasty were recorded. During hospitalization the following differences were revealed: heart failure, cardiogenic shock, need of invasive mechanical ventilation, re-infection, mechanical complications, aborted sudden death and stroke.

Conclusion: The clinical and electrocardiographic presentation of ACS seems to be influenced by the presence CHF. The presence of prior CHF was associated with development of acute decompensated heart failure and higher in-hospital mortality.
introns. The CYP7A1 genetic variants influenced serum levels of low density lipoprotein and triglycerids. Bile acid metabolism was reported to be involved in glucose metabolism homeostasis. However, the exact relationship between bile acid and glucose metabolism as well as insulin sensitivity is not clarified. Participants with insulin resistance had significantly higher risk of hyperglycemia.

**Aim of study:** the determination of interconnection between the level of glycated hemoglobin (HbA1c) and three genotypes of CYP7A1 gene for prevention cardiovascular complications in patients with type 2 diabetes mellitus (DM) and concomitant arterial hypertension (AH).

**Methods:** We examined 130 patients during our clinical trial. There are 80 patients with type 2 DM and AH in the first (I) group and 50 persons with AH in the second (II). The middle age are (57 ± 0.23) and (69 ± 0.57), t=19.52, p < 0.001 years.

The method for diagnostic different allele variants is polymerase chain reaction.

**Results:** The genotypes AA, AC and CC are determined in 5 (6.25%), 22 (27.5%), 53 (66.25%) patients respectively in the I group and 20 (40%), 11 (22%) in the II group. The levels of HbA1c are (9.3 ± 0.25) % and (4.9 ± 0.31) %, t=2.76, p < 0.01 for AA genotype, (7.3 ± 0.6) % and (5.7 ± 0.42) %, t=1.08, p < 0.05 for AC genotype, (8.2 ± 0.59) % and (6.1 ± 0.45) %, t=2.83, p < 0.01 for CC genotype.

The mean levels of HbA1c were (8.8 ± 0.21)% , (4.2 ± 0.43)% , t=5.43, p < 0.001 for participants from the I, II groups respectively. The mean levels of Al were (3.8 ± 0.04), (3.1 ± 0.02), t=15.65, p < 0.001 for participants from the I, II groups respectively. The levels of systolic BP were (156±3.1)mmHg, (143±0.66)mmHg, t=16.27, p < 0.001 and of diastolic - (105.3±0.69)mmHg, (94±0.43)mmHg respectively for participants with combination of AH and type 2 DM and for persons with AH. The higher levels of BP, HbA1c and more severe dyslipidaemia are the characteristics of patients with type 2 DM in comparison with persons with AH only.

**Conclusions:** CC allele of CYP7A1 gene is more popular for patients with type 2 DM and concomitant AH. CC genotype is associated with higher levels of HbA1c which is a risk factor of cardiovascular and cerebrovascular events. As a result the combined therapy is necessary for prevention severe complication of DM and AH especially with CC allele of CYP7A1 gene. There is the connection between factors of CVC such as AH, HbA1c, systolic and diastolic BP for patients with AH and type 2 DM. It is very important to define these markers for preventing end points and for improving treatment.

### Table 1. T3 and Se - correlations.

<table>
<thead>
<tr>
<th>Table 1. T3 and Se - correlations.</th>
<th>T3</th>
<th>T3</th>
<th>T3</th>
<th>Se</th>
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<tbody>
<tr>
<td>Variable By variable Correlation p-value</td>
<td>hsCRP</td>
<td>NT-proBNP</td>
<td>LVEF</td>
<td>NT-proBNP</td>
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<tr>
<td>T3</td>
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</table>

**Conclusion(s):** Further research concerning coexistence of low T3 syndrome, Se deficiency, deiodinase malfunction and progression of heart failure should be conducted. If the influence of low T3 on prognosis is confirmed, supplementation of T3 and/or Se may become a therapeutic option in selected patients with HFHF.
Aim: This study want to verify the prognostic role of NT-proBNP levels during hospitalization in a 12 and 18 months follow-up.

Methods: We enrolled 170 patients, 85 with preserved (HFpEF) and 85 with reduced ejection fraction (HFrEF), collecting samples for the evaluation of NT-proBNP levels at baseline and at discharge from hospital. We assessed rates of mortality, new MACIE, new hospital admission because of HF and fatal/not fatal events.

Results: In HFrEF patients we found higher predictive values for mortality in both our controls (all p < 0.001) while the area under the ROC curve values were always higher at discharge (AUC > 0.80). A predictive value of NT-proBNP for MACIE and for fatal/not fatal events was also found (all p < 0.002), with a stronger relationship with discharge assays (all p < 0.0001). On the contrary, in HFrEF patients only discharge assay seems to have a prognostic role for all outcomes in both our two controls (p < 0.01) but with lower predictive values. To assess the independence of our NT-proBNP evaluations we add consecutively our fittings in a multivariate Cox regression models founding the ones with the higher hazard ratio (HR) for all outcomes we evaluated except for new hospitalization because of HF both within 12 and 18 month compared to others variables evaluated (age, sex, haemoglobin, serum creatinine and troponin, systolic blood pressure, heart rate and ischemic etiology). NT-proBNP at discharge always are the one with higher HR compared to admission ones both in HFrEF patients and HFrEF patients.

Conclusions: NT-proBNP fittings during hospitalization are predictive of mortality, MACIE, new hospitalization for new hospitalisation but not for 12 months followup.

P1020
Choice of an anticoagulant affects endothelial function but not long-term prognosis in patients with acute decompensated chronic heart failure

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Objective: to estimate the effect of unfractionated heparin (UFH), enoxaparin or fondaparinux on long-term prognosis in patients, hospitalized with acute decompensated chronic heart failure (ADCHF).

Materials and Methods: The study included 60 ADCHF patients with sinus rhythm, mean age 69 ± 10 years, 35 women (58%), treated with standard ADCHF therapy. Patients with acute exacerbation of chronic diseases and active cancer were excluded from the study. The control group included 20 patients with compensated CHF (NYHA class II or III), mean age 68 ± 9 years, 11 (55%) women, who also received standard CHF therapy. On admission and after anticoagulant treatment all ADCHF patients were contacted by phone for end-points (rehospitalization and/or fatal event) within 12 months after hospitalization. Delta FMD ratios were the lowest in the heparin group (−2.15 ± 0.44), enoxaparin (R=0.13, p=0.81) or fondaparinux (R=0.17, p=0.44), enoxaparin (R=0.13, p=0.81) or fondaparinux (R=0.17, p=0.44, p=0.16). No significant correlation was found between the chosen anticoagulant: UFH (r=0.17, p=0.44), enoxaparin (r=0.13, p=0.81) or fondaparinux (r=0.17, p=0.16) and long-term prognosis.

Conclusion: In ADCHF patients and sinus rhythm, despite standard treatment, long-term prognosis is still poor. Though the choice of an anticoagulant can affect endothelial function, it does not improve their long-term prognosis by lowering the risk of rehospitalisation or/and death within 12 months. Key words: acute decompensated chronic heart failure, sinus rhythm, endothelial dysfunction, flow-mediated endothelium-dependent vasodilation

Introduction: Heart failure with recovered ejection fraction (HF-RecEF) has been recognised as a new classification with distinct clinical characteristics and prognosis. Data on Asian patients remained limited. This study aimed to characterise the HRRecEF population and compare it with those with persistently reduced left ventricular ejection fraction (LVEF).

Methods: This was a retrospective study looking at patients who were followed up in Heart Failure Clinic Hospital from April 2013 to December 2016. HRRecEF was defined as current LVEF ≥40% with previous documented LVEF < 40%; those with reduced LVEF (HFrEF) had current and previous LVEF < 40%.

Results: Due to limitation of resources, only 74 clinic patients had repeat echocardiograms. From this, 35 patients had HFrEF and 26 patients had HRRecEF. Median age was 62 (IQR 52 - 71), Males (n=40, 65.6%) and Malay race (n=33, 54%) predominated in both groups. Hypertension (p=0.006) and COPD (p=0.028) appeared to be more common comorbidities in the HRRecEF group. Systolic blood pressure < 130mmHg (p=0.008) and lower baseline atrial natriuretic (ALT) (p=0.034) have been associated with recovery of LVEF. There was also improvement of NYHA class noted in patients with HRRecEF. Hospital readmission rates were significantly lower in the HRRecEF group (p=0.029). No mortality was recorded in both groups.

Discussion: The results highlight the importance of risk factor control, especially hypertension and smoking, as part of heart failure management. The significance of ALT as a biomarker of recovery is yet to be determined; but this serves as precursor to future studies.

Conclusions: In this cohort of patients with HRRecEF, patients have better outcomes with fewer admissions, however future studies need to be conducted to understand further the nature of this subset of patients.

P1022
Heart failure: an open door for infections?

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Background: Chronic heart failure (CHF) is the most common cause of hospitalization in people over 65 years old, carrying a severe impact on life quality and expectancy. Patients with CHF remain at a systemic inflammatory state, frequently presenting high levels of tention, C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) as well as inflammatory cytokines (IL-6, IL-8, TNF alpha). Previous studies have suggested that patients with CHF have a higher incidence of infections. One of the proposed underlying mechanisms is the peripheral tissue hypoxia, which leads to suppression of the cellular immunity and activation of the anti-inflammatory pathways.

Methods: Retrospective analysis of the patients with heart failure admitted to an Internal Medicine ward in the period of one year (between August of 2015 and August of 2016).

Purpose: Clinical audit of a cohort of patients admitted with heart failure to evaluate the relationship between CHF and the incidence of infections.

Results: 225 patients were included. The average age was 78 years old, the majority was female (n=125, 55%) and the average length of hospital stay was 16 days. The most common HF etiologies were hypertensive (33%) and ischemic (26%), being HF with preserved ejection fraction predominant (n=124, 55%). The most frequent causes for HF decompensation were infection, disease progression and anemia. Of the total of 225 patients, 201 (89%) presented with decompenated HF and from these 133 (66%) had an infection, whereas 24 (11%) had no signs or symptoms of infections. The most common infections were pneumonia, urinary tract infection and skin infections. The most frequent causes for infection in both groups of patients were caused by Staphylococcus aureus (n=89, 34%). No significant correlation was found between the occurrence of infection and LVEF, NYHA class or body mass index.

Conclusion: According to literature, patients with CHF are likely to have a higher risk of infection, being this one of the most frequent causes of HF decompensation. However, in our study, there’s no evidence of a statistically significant relationship between decompensated HF and frequency of infection.
Progressive retrogression of systolic LV function. No showed significant association with deterioration of LV function. The maximal of systolic heart failure the polysomnographic oxygen saturation parameters has 

\[ (T_{\text{maxA/H}}) \text{ and } \text{EF}(r = \text{-0.51}, p < \text{0.01}) \]

of life were evaluated (degrees: none, slight, moderate, very high). Results: Were studied 38 pts (76% (n = 29) male, mean age 58 ± 9 years). SD was diagnosed in 79% (n = 30-Group A) of the pts, with a prevalence of 79% (n = 7) in females. The age and CAD were associated with the prevalence of sexual dysfunction. (Figure 1) There was no difference between the two groups in relation to the others comorbidities (Hypertension, atrial fibrillation, Diabetes mellitus, Dyslipidemia, PAD) as well as to therapeutics, namely betablockers and BNP level. The severity of HF, in terms of ejection fraction and NYHA class, were not associated with a higher prevalence of SD. Sixty percent of the pts (n = 18) of Group A considered that SD had a “moderate” impact on their quality of life. Conclusion: Sexual dysfunction is a frequent comorbidity in pts with HF and should be valued by the doctors. By the importance in quality of life and prognosis, the evaluation of sexual function should be part of the rehabilitation program for pts with cardiovascular disease. The continuation of the study, including more pts will allow more conclusions.

**Table 1**

<table>
<thead>
<tr>
<th>Variable</th>
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<tr>
<td>Age (years)</td>
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<td>Mean age (years)</td>
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**P1025**

Sexual dysfunction: a reality in the patient with heart failure

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Introduction: Sexual dysfunction (SD) is a frequent comorbidity in patients (pts) with cardiovascular disease, being the association with coronary artery disease (CAD) and peripheral arterial disease (PAD) well established. The prevalence in pts with heart failure (HF) is unclear, especially in females. This comorbidity is still underestimated by the doctors, despite their impact on quality of life. Aim: To determine the prevalence of SD in a population with HF and to characterize this population. To evaluate the impact of SD on quality of life. Methods: Anonymous questionnaires for evaluation of sexual function (Female Sexual Function Index: FSFI; International index of erectile function) were applied, prospectively, to pts followed in a HF clinic. Patients aged > 70 years were excluded, taking into account the high prevalence of SD in this age group. The population was divided in two groups - Group A: with SD; Group B: without SD - and characterized according to baseline characteristics, comorbidities, degree of systolic dysfunction, NYHA class and therapy. The prevalence of SD and the impact on quality of life were evaluated (degrees: none, slight, moderate, very high). Results: Were studied 38 pts (76% (n = 29) male, mean age 58 ± 9 years). SD was diagnosed in 79% (n = 30-Group A) of the pts, with a prevalence of 79% (n = 23) in males and 78% (n = 7) in females. The age and CAD were associated with the prevalence of sexual dysfunction. (Figure 1) There was no difference between the two groups in relation to the others comorbidities (Hypertension, atrial fibrillation, Diabetes mellitus, Dyslipidemia, PAD) as well as to therapeutics, namely betablockers and BNP level. The severity of HF, in terms of ejection fraction and NYHA class, were not associated with a higher prevalence of SD. Sixty percent of the pts (n = 18) of Group A considered that SD had a “moderate” impact on their quality of life. Conclusion: Sexual dysfunction is a frequent comorbidity in pts with HF and should be valued by the doctors. By the importance in quality of life and prognosis, the evaluation of sexual function should be part of the rehabilitation program for pts with cardiovascular disease. The continuation of the study, including more pts will allow more conclusions.
Background and Aim: Quality of life is one of the most important end-points in heart failure (HF) patients. The Minnesota Living with HF Questionnaire (MLHQF) is the most frequently used measurement for assessing the quality of life (QoL) in HF patients. This questionnaire had been translated and validated into the Albanian language. We used this questionnaire to evaluate the QoL in HF patients in Kosovo.

Methods: The study subjects were 103 consecutive HF patients (63±10 years, 56 female, 48% hypertensive and 26% ischaemic etiology, classified as NYHA I–III) admitted in outpatient or in-patient clinics at our University Clinical Centre. At the moment of evaluation the patients were clinically stable and on optimized drug therapy. Relationships were tested between questionnaire score and different clinical and demographic factors.

Results: There was no difficulty in the administration of the Albanian version of MLHQF or in the patient’s understanding of the questions. The overall median score of MLHQF was 51 (mean 50±18). A strong correlation was found between MLHQF and NYHA functional class (p=0.002), and it was with a higher score in female patients (p=0.015). The other biochemical and clinical indices did not correlate with MLHQF. The MLHQF did not differ between different etiologies of HF patients.

Conclusions: The Albanian version of the MLHQF proposed in this study proved to be valid for HF patients and served as a new and important instrument for assessing QoL in Kosovo’s patients. The MLHQF was mildly higher in our patients compared with previous studies. The questionnaire score correlate with functional NYHA class, reflecting the severity of the disease, and is higher in female gender.

P1027 Chronic systolic heart failure rehospitalization rates study from OPTIMIZE HF program: data from two centers
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Heart failure (HF) hospitalization rates considerably decreased in western Europe, but little is known about trends in eastern European countries. OPTIMIZE HF program is a prospective study aiming to assess rehospitalization rates of uncompli- cated chronic systolic heart failure patients after discharge from hospital during 12 month period in eastern European countries. A total of 177 patients from two University hospitals with HF hospitalization were recorded. (median age 63 years, 36 % female ). Mean NYHA functional class on admission was 2.7 and on discharge 2.2. During hospital period patient education programs were conducted for lifestyle and self monitoring of key measurements. Patients were on ambulatory follow up after 15, 30, 90, 180 days from discharge. After a first HF hospitalization any HF readmission rates within 90, 100 and 1 year were 15.1, 27.1 and 34.4 % respectively. The most common comorbidities were arterial hypertension (77.6 %) and chronic kidney disease (40.6 %). Permanent atrial fibrillation was found in 16.4 % patients on admission. In 72.3 % of cases, coronary artery disease was the main etiology of HF. Mortality after 1 year period was 22.5 %, 77.7 % of patients were on beta blocker, 88,1 % - on RAAS inhibitors and 33 % - on warfarine.

Conclusions: Rehospitalization trends and mortality may be comparable with west- ern European matalization data due to adherence to guideline based pharma- cotherapy, education programs for patients, frequent outpatient monitoring visits.

P1028 Gender-specific descriptions of chronic heart failure
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Aim: To evaluate gender-specific etiology, clinical presentation and treatment of chronic heart failure (CHF).

Methods: 200 hospitalized patients with CHF (100 men and 100 women) were included in a retrospective cross-sectional study conducted in our Regional Clinical Hospital. Statistical criteria such as Mann-Whitney, chi-square and Fisher’s exact tests were used.

Results: Women with CHF were older than men (61.9 ± 9.8 vs 58.1 ± 12.8 years, p=0.019), had higher heart rate at admission (83 ± 16 vs 77 ± 15,3 beats per minute, p=0.003) and lower glomerular filtration rate calculated by Cockcroft-Gault (77.2 ± 28.9 vs 91.5 ± 30.9 ml/min, p<0.001). Coronary heart disease was the main reason of CHF, in men it was more common than in women (77% vs 63%, p=0.045). The frequency of hypertension (20% vs 30%), chronic rheumatic heart disease (2% vs 5%) was the same. Clinical manifestations of heart failure depending on sex have not been identified. The most frequent clinical symptoms were dyspnea (89% men and 81% women), fatigue (49% men and 57% women), tachycardia (48% men and 53% women). Symptoms such as decreased ability to work (30% of men and 25% women) and edema (9% of men and 13% women) were less common. Women more often demonstrated class 3 NYHA (40% vs 29% of men, p=0.019). The prevalence of left heart failure class 2 NYHA was higher in men (45% men and 48% women, p=0.322). The prevalence of left ventricular diastolic dysfunction was independent of sex (57% of men and 62% of women). Ejection fraction (EF) of the left ventricle in women was somewhat higher than in men (65.2 ± 10.4% vs 61.5 ± 9.8%, p=0.015), while the number of patients with a reduced EF was similar in men (12%) and women (8%). Pulmonary hypertension was found in 65% of men and 43% of women, p=0.024. Diabetes mellitus was more common in women (18% vs 7% in men, p=0.033). In men and women equally often were used β-blockers (82% and 83%), antiplatelet agents (76% and 80%), ACE inhibitors (23% and 22%), ARBs (85% and 41%), aldosterone antagonists (19% vs 28%), cardiac glycodies (9% and 7%) while in women diuretics more often were prescribed (51% vs 32% of men, p=0.010).

Conclusions: Gender-specific descriptions of chronic heart failure are higher age of female patients, more frequent formation of functional class 3 disease in women, more prevalent in women cohort of diabetes mellitus and lower – pulmonary hyper- tension. Differences in treatment depending on gender practically not observed, and the attention is drawn to the incomplete line therapy to current clinical guidelines for chronic heart failure, necessitating ongoing optimization of therapeutic measures.

P1029 Cognitive function in chronic heart failure: relation to clinical variables
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Background: Cognitive impairment is observed in 30-80% of chronic heart failure (CHF) patients pts) and closely correlates with age and severity of disease. Never- theless, evidence of association between cognitive function (CF) and other clinical characteristics in CHF is still lacking.

Objective: To establish the relationship between CF and clinical variables and comorbidities in CHF.

Methods: 45 stable CHF pts, NYHA II–IV with left ventricular ejection fraction (LVEF) <40% were examined. CF was evaluated with standard MMSE and Shulte tests. Besides routine examination, the 6-minute walk test and interview on the HADS depression questionnaire were performed.

Results: Cognitive dysfunction (abnormal MMSE and Shulte tests) was observed in 68.8% of patients. There were no impact of sex, LVEF, hemoglobin level, diabetes, and, surprisingly, of atrial fibrillation on the results of CF tests. Simultaneously, CF testing results were significantly worse in NYHA III-IV vs NYHA II patients (p=0.042 for MMSE and p=0.002 for Shulte test), at age <60 vs ≥60 years (p=0.010 for MMSE and p=0.003 for Shulte) and in hypertensives vs non-hypertensives (p=0.0027 for MMSE, p=0.020 for Shulte). Both MMSE and Shulte tests significantly correlated with the 6-m walk test distance (r=0.30, p=0.021 and r=0.21, p=0.044, respectively) and with the HADS depression score (r=−0.46, p=0.003 and r=−0.33, p=0.003, respectively).

Conclusions: In stable CHF patients, besides high NYHA class and age ≥60 years, cognitive impairment is associated with history of hypertension, worse exercise tol- erance and highest depression score.

P1030 Microalbuminuria and glomerular filtration rate in chronic heart failure: relation to clinical variables
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Background. In contrast to glomerular filtration (ejection fraction < 40%) were examined, MAU was detected by immunu- turbidimetric method. GFR was calculated by CKD EPI equation.

Methods: 45 stable patients with CHF (NYHA II–IV, with left ventricular systolic dysfunc- tion ejection fraction < 40%) were examined, MAU was detected by immuno- turbidimetric method. GFR was calculated by CKD EPI equation.

Results: MAU (albumin 30-299 mg/24 hours) was observed in 100% of pts. There was no impact of age, sex, hypertension, diabetes or atrial fibrillation on MAU level. MAU was higher in NYHA III–IV vs NYHA II patients: 66 (62-120) vs 158 (50-290) mg/24 hours respectively, (p<0.001). Moreover, MAU level directly correlated with uric acid (p=0.34, p=0.024) and myeloperoxidase activity (r=0.37, p=0.012). Clin- ically relevant renal dysfunction (GFR < 60 ml/min/1,73 m2) was observed in 18 (40%) pts. In contrast to MAU, GFR was significantly lower at age ≥60 vs < 60 (p=0.001). In pts with diabetes and non-diabetes pts (p=0.012), in pts with hyper- tension vs normotensives (p =0.024). GFR was higher in NYHA II vs NYHA III-IV pts
**P1031**

Oral iron therapy improves functional capacity of heart failure patients with iron deficiency anemia

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**On behalf of:** Clinical Cardiology and Critical Care Division of National Cardiovascular Center Harapan Kita

**Background:** Anemia is a common morbidity in heart failure (HF). Intravenous iron is known to improve patient’s condition. However, it is expensive and invasive. This study investigated the effectiveness and safety of oral iron therapy in improving ferritin, transferrin saturation (Tsat), haemoglobin (HB) and functional capacity in systolic HF patients with iron deficiency anemia (IDA).

**Methods:** Double blind randomized controlled trial was conducted in National Cardiovascular Centre. Fifty-four subjects (age 18-75 y.o) suffering from HF (EF <50%) and IDA with GFR<30ml/min/1.73m2 were enrolled and randomized to placebo(n=27) or oral Ferrum Sulphus (FS=n=27) for 12 weeks. Primary outcome was functional capacity measured by 6-minute walk test distance (6MWT). Ferritin, Tsat, HB, NT-proBNP and side effects were documented.

**Results:** Forty-one subjects (placebo n=19, FS n=22) completed the study. Over 12 weeks, against baseline: HB: 11.2 ± 0.77g/dl (placebo; p = 0.016), 11.8 ± 0.81g/dl (FS; p = 0.005); Ferritin: 65 ± 9.31ng/ml (placebo; p = 0.000), 118 ± 22.15ng/ml (FS; p = 0.000); Tsat: 21 ± 9.91% (placebo; p = 0.000), 29 ± 9.51% (FS; p = 0.000); 6MWT: 412.9 ± 96.8 m (placebo; p = 0.000), 464.7 ± 98.2 m (FS; p = 0.000).

**Conclusions:** Oral FS therapy for 12 weeks increased ferritin, Tsat, HB levels and improved functional capacity of HF patients with acceptable minimal side effects. Oral FS might be a cheaper alternative to intravenous iron for low-to-middle income countries.

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**P1032**

Common polymorphism RS10519210, RS739843, RS6787362 in patients of Russian Federation with HFpEF after myocardial infarction

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**Introduction:** Conducting research of genome-wide studies (GWAS) in patients after MI may identify a group of patients with increased risk of HF and contribute to the development prevention measures.

**PURPOSE:** of the study: Explore the inhabitants of the North-West Federal District of Russia occurrence of polymorphic alleles HSPB7 (rs1736843), FRMD4B (rs6787362) and locus 15q25 (rs10519210), whose connection with the syndrome of heart failure has been established in the course of GWAS.

**Materials and Methods:** To study men - 30 - 65 years old MI 3 months ago. The main group included 260 patients with HF-I-IV functional class, LVEF (Simpson) ≤ 40%, in reference group - 246 patients, without HF and LVEF (Simpson) > 50%.

The group of healthy people made 96 donors. We assessed anthropometric indices, clinical status, ECG, echocardiography, ECG monitoring. Genotyping by PCR was performed in “real time” (Applied Biosystems thermocycler 7500 Real Time PCR System).

**Results:** Two groups were comparable by prescription of hypertension (11.4 years versus 11.2 years), but different in its prevalence (68.5% and 83.1%, p = 0.01). In the main group there were more patients with heredity (54.23% and 22.88%, p < 0.01), more frequent AF (31.2% and 14.4%, p < 0.001), pulmonary embolism (12.5% and 0.4%, p < 0.001), left ventricular aneurysm (20.6% and 0.9%, p < 0.001). In the group with HFpEF there was a wide range of GFR (124.6 ± 259.4 ml/minute and 96.9 ± 53.1, p < 0.001), higher the pressure in the pulmonary artery (46.3 ± 48.7 mm Hg and 30.2 ± 24.8 mHg, p = 0.001).

There was significant difference between the occurrence of polymorphism rs1736843 on the HF and EF: CC genotype was detected in 48.1% of the patients, CT - 10.4% of the patients in the main group, in 80.9% and 4.2% in healthy group, accordingly (p1-2, 1-3 < 0.001), FRMD4B gene exceeded the threshold of significance and prevalence. Genotype AA was detected in the main group in 83.5% of the patients, GC, GG - none, in 87.8% and 2.9% in the reference group, in 89.6% and 0% in healthy group, respectively (p1- 2, 3- 2 < 0.01). Prevalence of USP39 gene in groups did not differ between individuals.

**Conclusions:** The data of the prevalence of the studied genotypes after MI are similar with those in European studies: polymorphisms HSPB7 (rs1739843) and FRMD4B (rs6787362) was significantly associated with development of CHF/EF.

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**P1033**

Recurrent heart failure-related hospitalizations in patients with mid-range ejection fraction

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**Introduction:** Despite current treatment with evidence-based drugs and devices, patients with heart failure (HF) are frequently admitted to the hospital because of symptom exacerbation, and once admitted, they are often readmitted. Long-term re-hospitalizations of patients with HF and left ventricular ejection fraction (EF) mildly reduced (HFmrEF) is not well known.

**Objective:** To assess HF-related recurrent hospitalizations in ambulatory patients with HFmrEF of different aetiologies attended in a multidisciplinary HF unit.

**Patients and methods:** 124 patients with HFmrEF were evaluated (89 men and 35 women). Mean age was 65.2 ± 12 years. Median duration of HF was 10.5 months [21-23.1 - 46.5]. Ischaemic aetiology was present in 57.3%. Eighty-seven (70.2%) and 31 (25%) patients were in NYHA class II and III respectively. We compared HF-related recurrent hospitalizations with those occurred in patients with reduced (HFrEF) and preserved (HFpEF) patients (836 and 92 respectively). We compared HF-related death was also assessed.

**Results:** At a mean follow-up of 5 ± 3.3 years, 72 HF-related hospitalizations in 28 patients with HFmrEF (22.6%) were registered. The crude incidence of HF-related recurrent hospitalizations was 1.15 (95%CI 0.80-1.45) per every 10 person-years. This number was significantly lower than that observed in 836 patients with HFrEF followed during 4.7 ± 3.1 years: 1.60 (95%CI 1.48-1.73) per every 10 person-years, p = 0.007; and than that observed in 97 patients with HFpEF followed during 3.9 ± 2.8 years: 2.97 (95%CI 2.44-3.58) per every 10 person-years, p < 0.001. Age- and sex- adjusted Cox regression survival curves for worsening HF-related cause of death showed significant better outcome in HFmrEF patients with in regard to HFpEF patients (HR 0.33 [95%CI 0.13-0.82], p = 0.02), but only a better trend regarding to HFrEF patients (HR 0.56 [95%CI 0.29-1.11], p = 0.1).

**Conclusions:** While worsening HF-related death was only slightly and non-significantly lower in HFmrEF patients than in HFrEF patients, HF-related
recurrent hospitalizations were significantly lower in the former. Patients with HFpEF showed the worse prognosis, both from the HF-related morbidity and mortality point of view.

P1034
Androgen status in non-diabetic elderly men with heart failure
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Purpose: We aimed to evaluate androgen status (serum testosterone (TT) and estimated free testosterone (eFT)) and its determinants in non-diabetic elderly men with heart failure (HF). Additionally, we investigated its associations with body composition, muscle strength, and long-term survival.

Methods: 73 non-diabetic men with HF and 20 healthy men aged over 55 years were studied. Echocardiography, 6-min walk test, grip strength, body composition measurement by DEXA method were performed. TT, sex hormone binding globulin, NN-proBNP, and adipokines (adiponectin and leptin) were measured. All-cause mortality was evaluated at 6-years of follow-up.

Results: Patients with HF and healthy controls were similar of age (67 ± 7 vs. 67 ± 7) and body mass index (28.8 ± 28.3 ± kg/m²). Androgen status (TT, eFT) was similar in elderly men with HF compared to healthy controls (4.79 ± 1.4 mg/ml and 0.409 ± 0.204 nmol/l, respectively). In HF patients, TT was positively associated with NT-proBNP (r = 0.377, p = 0.001) and adiponectin levels (r = 0.349, p = 0.002), while inverse association was noted with leptin (r = -0.413, p = 0.001). TT and eFT were independently determined by age, total fat mass and adiponectin levels in elderly men with HF (p < 0.05 for all). There was no correlation between androgen status with skeletal muscle mass and muscle strength. In a multivariate model, androgen status was not predictor for all-cause mortality at 6-years of follow-up.

Conclusion: In non-diabetic men with HF, androgen status is not altered and is not predictive of long-term outcome.

P1035
Clinical characteristics and management of hospitalized patients with heart failure, results from Mongolia
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Background: Heart failure is a major and growing public health concern in Mongolia. However, there is insufficient information of heart failure locally.

Methods: The aim of the study is to describe the clinical characteristics and management of hospitalized patients with heart failure in Mongolia.

Results: Total of 5325 patients case notes were analyzed from general hospitals of 18 out of 31 provinces (rural areas) and 3 out of 9 districts of the capital city, and also The Third State Central Hospital, the national reference hospital for cardiovascular disease. Patients were admitted during January 2013 to December 2015.

Results: 3515 patients (66%) were males, 1810 (34%) were females. The number of patients with heart failure was increasing, 1555, 1810 and 1960 patients in 2013, 2014 and 2015 respectively (p < 0.0001), respectively. The number of patients with heart failure was increasing, 1555, 1810 and 1960 patients in 2013, 2014 and 2015 respectively (p < 0.0001). Thirteen heart disease (41.1%), atrial hypertrophy (19.4%) and valvular heart disease (15.7%) were main causes of heart failure in Mongolian patients. The main co-existing risk factors were hypertension (50%), obesity (46%), atrial fibrillation (35%), smoking (26.5%), excessive alcohol consumption (16.7%) and diabetes mellitus (12.7%).

Conclusion: Heart failure poses a significant burden on the healthcare system in Mongolia. Major public health program targeting at improvement of general public education and heart failure management among medical professionals is needed.

P1036
Ambulatory blood pressure monitoring in heart failure with preserved ejection fraction patients
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Inadequate control of blood pressure (BP) is an important factor in the development of chronic heart failure (CHF) with preserved ejection fraction (HFpEF). There is evidence that the level of mean 24-h blood pressure (BP) values, using the office systolic BP (SBP), is independently associated with the development of HFpEF.

Purpose: To study 24-h profile of blood pressure in elderly hypertensive patients with HFpEF.

Methods: 120 patients (mean age 67.8 ± 1.2 years), 30 pts with essential hypertension (EH) with no signs of heart failure and 90 pts with EH complicated by HFpEF underwent ambulatory blood pressure monitoring (ABPM), Doppler echocardiography, 6-minute walk test.

Results and discussion: The increased values of office BP were determined in both group patients, but mean 24-h, daytime and nighttime BP values were significantly higher in HFpEF patients compared to hypertensive patients. Office diastolic BP (DBP) values were comparable in two groups and did not exceed the recommended range. Therefore, mean 24-h DBP values slightly exceeded the upper limits in both groups. The distance of 6-minute walk test does not correlate with office BP levels. There is no limiting impact of high blood pressure (in the range up to 154.3 ± 1.4 mm Hg) on physical activity in patients with initial stages of CHF.

Conclusions: HFpEF patients demonstrated insufficient control of both office and 24-h BP. 82.6% of HFpEF pts were characterized by pathological types of BP circadian rhythm with dominating non-diurnal type.

P1037
A comparison of non-invasive methods of measuring body composition in patients with heart failure, a report from SICA-HF.
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Funding Acknowledgements: European Union Seventh Framework Programme [FP7/2007-2013]

Methods: To characterize body composition in 120 patients (mean age 70 ± 10 years, mean left ventricular ejection fraction (LVEF) 44 ± 10%, and median N-terminal pro B-type natriuretic peptide (NT-proBNP) 845 [interquartile range: 355-1368ng/l] with CHF enrolled in the "Studies investigating co-morbidities aggravating HF, heart failure" (SICA-HF). We measured body composition using a multi-frequency segmental body composition analyser (BIA) and dual-energy X-ray absorptiometry scan (DEXA) on the same day.

Results: Mean fat mass (FM) was 27.2 ± 11.6 kg by BCA and 31.2 ± 12.1 kg by DEXA (mean difference -4.0 kg (95% limits of agreement: -10.2, 2.2), 5% of values outside lower limit of agreement); mean muscle mass (MM) was 56.6 ± 10.9 kg by BCA and 47.7 ± 9.5 kg by DEXA (mean difference of 8.9 kg (95% limits of agreement: 1.9, 15.9, 3% of values outside limit of agreement)). Mean bone mass (BM) was 3.0 ± 0.5 kg by BCA and 2.3 ± 0.7 kg by DEXA (mean difference of 0.5 kg (95% limits of agreement: -0.15, 1.4% of values outside limit of agreement)). There was
impairs the compliance between doctor and patient. The influence of depression on attributes to incorrect assessment of their condition by patients, which significantly HF and comorbid DM type 2 significantly depends on the symptoms of HF. Consultation by psychiatrist worsening of symptomsof HF, but not the manifestationsof

Conclusions: There are differences in the measurements of FM, MM and BM in 20 patients with LVEF ≥50%, the second group – 22 patients with LVEF 40-49%, the third group – 20 patients with LVEF <40%. Patients themselves filled out the Minnesota questionnaire quality of life with HF (MLHQF) and the depression scale of Beck (BDI). All studies conformed to the principles of the Declaration of Helsinki of the World Medical Association.

Results: In the analysis of questionnaires MLHQF was observed that every patient noted a worsening of QL including due to the presence of depression, and were asked to fill the BDI. The dates presented in Table 1. According to the presented dates, it should be noted that the QL and depression level of patients is much worse depending on the progression of symptoms of HF. Indicators of blood glucose were consistent with the state of compensation and subcompensation and did not significantly affect the QL and depression level in patients of each group. The level of depression ranged from mild in the first group to moderate in the second and third groups. Patients were offered a psychiatric consultation for the correction of depressive states, but agreed to counseling only 42% in - 40% in patients of the third group. Most patients argued the rejection of consultation by psychiatrist worsening of symptoms of HF, but not the manifestations of depression.

Conclusions: Violation of the QL and increase in level of depression in patients with HF and comorbid DM type 2 significantly depends on the symptoms of HF. Contributing to incorrect assessment of their condition by patients, which significantly impairs the compliance between doctor and patient. The influence of depression on the violation of QL in this category of patients requires further study.

Table 1.

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>LVEF≥50% (n=20)</th>
<th>LVEF 40-49% (n=22)</th>
<th>LVEF &lt; 40% (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLHQF, scores</td>
<td>53.3±2.83</td>
<td>63.6±2.44*</td>
<td>78.4±2.5***</td>
</tr>
<tr>
<td>BDI, scores</td>
<td>14.3±1.13</td>
<td>16.1±1.56</td>
<td>19.4±1.91*</td>
</tr>
</tbody>
</table>

Note: The probability of indicators difference to the value ofLVEF≥50%: *(p<0.05)**, ***(p<0.001)***. The probability of indicators difference to the value ofLVEF 40-49%: ##*(p<0.001)###.

P1038

The quality of life and level of depression of patients with heart failure and comorbid diabetes mellitus type 2

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Purpose - to study the QL and level of depression in patients with different stages of HF and comorbid diabetes mellitus (DM) type 2.

Materials and methods: Were examined 63 patients with HF and comorbid DM type 2, mean age 62.5±0.08 years. The patients were divided into three groups depending on left ventricle ejection fraction(LVEF). The first group included 20 patients with LVEF≥50%, the second group – 22 patients with LVEF 40-49%, the third group – 20 patients with LVEF <40%. Patients themselves filled out the Minnesota questionnaire quality of life with HF (MLHQF) and the depression scale of Beck (BDI).

All studies conformed to the principles of the Declaration of Helsinki of the World Medical Association.

Results: In the analysis of questionnaires MLHQF was observed that every patient noted a worsening of QL including due to the presence of depression, and were asked to fill the BDI. The dates presented in Table 1. According to the presented dates, it should be noted that the QL and depression level of patients is much worse depending on the progression of symptoms of HF. Indicators of blood glucose were consistent with the state of compensation and subcompensation and did not significantly affect the QL and depression level in patients of each group. The level of depression ranged from mild in the first group to moderate in the second and third groups. Patients were offered a psychiatric consultation for the correction of depressive states, but agreed to counseling only 42% in - 40% in patients of the third group. Most patients argued the rejection of consultation by psychiatrist worsening of symptoms of HF, but not the manifestations of depression.

Conclusions: Violation of the QL and increase in level of depression in patients with HF and comorbid DM type 2 significantly depends on the symptoms of HF. Contributing to incorrect assessment of their condition by patients, which significantly impairs the compliance between doctor and patient. The influence of depression on the violation of QL in this category of patients requires further study.

Table 1.

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>LVEF≥50% (n=20)</th>
<th>LVEF 40-49% (n=22)</th>
<th>LVEF &lt; 40% (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLHQF, scores</td>
<td>53.3±2.83</td>
<td>63.6±2.44*</td>
<td>78.4±2.5***</td>
</tr>
<tr>
<td>BDI, scores</td>
<td>14.3±1.13</td>
<td>16.1±1.56</td>
<td>19.4±1.91*</td>
</tr>
</tbody>
</table>

Note: The probability of indicators difference to the value ofLVEF≥50%: *(p<0.05)**, ***(p<0.001)***. The probability of indicators difference to the value ofLVEF 40-49%: ##*(p<0.001)###.

P1039

Duration of heart failure, hospitalization rate and treatment compliance in elderly heart failure patients with anemia of chronic diseases.

NI Solomakhina1; D Shchekochikhin1; ES Nakhodnova1; ZV Taranova2; BDCA (r = 0.79, p < 0.001). The probability of LVEF ≥50%: *(p<0.05)**, ***(p<0.001)***. The probability of indicators difference to the value ofLVEF 40-49%: ##*(p<0.001)###.

P1040

The study psychological state of patients with chronic heart failure

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Purpose. To study the psychological state of patients with postinfarction cardioclsie-rosis complicated FC I-II chronic heart failure (CHF).

Methods: The study included 42 men with CHF CHD. Assessment of psychologi- cal status was performed using Zung Self-Rating Depression Scale and the scale of reactive and personal anxiety Spielberg-Harlin. To assess the psychological protection technique was used “Index lifestyle” - Plutchik-Kellerman LISt.

Results: For patients with heart failure has been characterized by an increased degree of denial of existing problems, displacement (with the exception of the idea of consciousness and related emotions), projection, conjugated with aggression and intellectualization, the control of different emotions and excessive dependence on a rational interpretation of the situation. Affective disorders such as anxiety and depression appeared closely linked (p = 0.50; P < 0.001) and were typical of younger patients (p = 0.46; p < 0.05 and r=−0.66; P<0.001, respectively). The emergence of depression was proportional to the severity of clinical symptoms (γ = 0.46; P < 0.05). With the denial of the existence of compensation were associated severity: the higher the show turned out to be the negation of patients with CHF, the expres- sions of anxiety and depressive disorders.

Conclusions: Thus, there was an association between the severity of depression and the severity of disease in patients with CHF.

P1041

Global analysis of survival of patients of the study remadene randomized prospective submitted to the DMP with follow-up of 16 years

FDC Fatima Das Dorez2; VS Issa1; PR Chizzola1; GE Conceicao1; SF Ayub1; EA Bocchi2

1Heart Institute, São Paulo, Brazil

Introduction: The survival of patients with a diagnosis of heart failure is limited around 50% in five years survive, and may present a worse prognosis for most types of cancer.

Objectives: This investigation includes extension of the prospective, randomized, REMADHE study with intervention group, submitted to a telephone education and monitoring program, with analysis of the survival of both groups (control and intervention) from October 1999 to December 2016

Results: 412 patients, 60.5% (MIS), with mean left ventricle ejection fraction of 34.7 ± 10.5% and mean age of 50.8 ± 11.7 years, etiology (9%): 23.5 ischemia, 18.4 idiopathic, 14.6 chagasic, 13.3 hypertensive, with mean left ventricle ejection fraction of 34.7 ± 10.5% and mean age of 50.8 ± 11.7 years, 4 alcohol, 26.2 others. The survival was 5.5 ± 4.6 years.

Conclusion: Despite the technological and pharmacological advances, heart failure still presents as a syndrome of high mortality.

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ADVANCED HEART FAILURE

P1042
Ways of reducing mortality in waiting list of heart transplant
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1Federal Almazov North-West Medical Research Centre, Heart Failure, Saint-Petersburg, Russian Federation; 2Federal Almazov North-West Medical Research Centre, Saint-Petersburg, Russian Federation

From 2010 to 2016 in Federal Almazov North-West Medical Research Centre in waiting list of heart transplant (WLHTx) included 151 patients (pts). Heart Transplantation (HTx) was performed in 79 pts, 6 pts refused to transplantation, 19 pts out of the WLHTx (due to the improvement of the appearance or contraindications to HTx), 36 pts died and 12 pts continue to expect a HTx. From 2010 to 2015, the mortality on the waiting list decreased from 33% to 7.5% per year. Purpose: To identify predictors of death in patients WLHTx.

Methods: The mean age of patients was 46 ± 13 years, men - 72% (n = 108). The etiology of heart failure in patients WLHTx: coronary artery disease in 48% of patients (n = 72), DCM - 39% (n = 59), non-compact myocardium - 7% (n = 11), others the Commission - 6% (n = 9). CHF 4 [3,4], GFR 20.6 [14,32] ml/min/1.73 m², natriuretic peptide, hemoglobin, serum sodium, serum creatinine, serum albumin, VO2peak 11.4 ± 2.9 ml/kg/min, PCWP 19 [14,24] mmHg, TPG 98 [9.14] mmHg, cardiac index (CI) 2.9 ± 0.5 l/min/m², pulmonary vascular resistance (PVR) 3 [0.32; 4.2] Wood units. Duration in WLHTx 10 [7.4; 19]3 days. In WLHTx received therapy: combined diuretic therapy - 100%, spironolactone - 100%, beta-blockers - 82% (n = 35), ACEI/ARA 52% (n = 78), Amiodaron - 60%, inotropes - 49% (n = 74), 12 pts (10%) implanted CRT-D, 48 pts (32%) – ICD, BiVAD (EXCOR) - 9 patients (6%), physical therapy - 100%. All patients were divided into 2 groups: 1 group (n = 116) patients survived in WLHTx, 2 group (n = 35) - patients who died. Since 2010 it received 378 proposals of potential heart donors. After further examination of the donor, perform coronary angiography and echocardiography evaluation of visiting medical team of our Center the number of effective donors was 35. Results: deceased patients compared with surviving patients at the time of inclusion in WLHTx possessed higher CHF FC [4 [4,4] and 3 [3,4], respectively; p = 0.004), low GFR (64 [22; 502] and 22 [14; 31], p = 0.008) greater frequency of usage of diuretic therapy (71% and 42%, p = 0.04), high bilirubin (TBIL) level (34 [23; 47] and 17 [14; 28], p = 0.001), ALT (52 [23;20] and 21 [4; 31], p = 0.008), low-sodium (129 [8; 139] and 139 [8; 139] ± 5; p = 0.03), shorter duration before the outcome (29 [10; 45] and 108 [3; 204], p = 0.001). Thus, the dead patients for inclusion in WLHTx were initially more severe group of patients. From the selected predictors (CHF FC, GFR, RLA, Hb, TBL, ALT, AST, sodium, inotropes, days WLHTx) in the patient’s death WLHTx greatest force an outcome (death) were: bilirubin (r=0.49; p = 0.01), CHF FC (r=0.47; p = 0.001), sodium (r=-0.43; p = 0.03), ALT (r=0.37; p = 0.008), GFR (r=-0.36; p = 0.008). Conclusions: Predictor of death in patients WLHTx are symptoms of right heart failure (hepatic, renal dysfunction) and FC CHF. To increase the percentage of survival to HTx required increase in the frequency of implantation of MCS, increasing the number of effective donors, including from donors with expanded criteria (single-vessel coronary disease with the technical possibilities of MCS, increasing the number of effective donors, including from donors with expanded criteria, AVB (IIA/IIIb) or their branches visualized on coronary angiography. In the WLHTx due to the improvement of the appearance or contraindications to HTx, 36 pts died and 12 pts continue to expect a HTx. From 2010 to 2015, the mortality on the waiting list decreased from 33% to 7.5% per year. Purpose: To identify predictors of death in patients WLHTx.

Methods: The mean age of patients was 46 ± 13 years, men - 72% (n = 108). The etiology of heart failure in patients WLHTx: coronary artery disease in 48% of patients (n = 72), DCM - 39% (n = 59), non-compact myocardium - 7% (n = 11), others the Commission - 6% (n = 9). CHF 4 [3,4], GFR 20.6 [14,32] ml/min/1.73 m², natriuretic peptide, hemoglobin, serum sodium, serum creatinine, serum albumin, VO2peak 11.4 ± 2.9 ml/kg/min, PCWP 19 [14,24] mmHg, TPG 98 [9.14] mmHg, cardiac index (CI) 2.9 ± 0.5 l/min/m², pulmonary vascular resistance (PVR) 3 [0.32; 4.2] Wood units. Duration in WLHTx 10 [7.4; 19]3 days. In WLHTx received therapy: combined diuretic therapy - 100%, spironolactone - 100%, beta-blockers - 82% (n = 35), ACEI/ARA 52% (n = 78), Amiodaron - 60%, inotropes - 49% (n = 74), 12 pts (10%) implanted CRT-D, 48 pts (32%) – ICD, BiVAD (EXCOR) - 9 patients (6%), physical therapy - 100%. All patients were divided into 2 groups: 1 group (n = 116) patients survived in WLHTx, 2 group (n = 35) - patients who died. Since 2010 it received 378 proposals of potential heart donors. After further examination of the donor, perform coronary angiography and echocardiography evaluation of visiting medical team of our Center the number of effective donors was 35. Results: deceased patients compared with surviving patients at the time of inclusion in WLHTx possessed higher CHF FC [4 [4,4] and 3 [3,4], respectively; p = 0.004), low GFR (64 [22; 502] and 22 [14; 31], p = 0.008) greater frequency of usage of diuretic therapy (71% and 42%, p = 0.04), high bilirubin (TBIL) level (34 [23; 47] and 17 [14; 28], p = 0.001), ALT (52 [23;20] and 21 [4; 31], p = 0.008), low-sodium (129 [8; 139] and 139 [8; 139] ± 5; p = 0.03), shorter duration before the outcome (29 [10; 45] and 108 [3; 204], p = 0.001). Thus, the dead patients for inclusion in WLHTx were initially more severe group of patients. From the selected predictors (CHF FC, GFR, RLA, Hb, TBL, ALT, AST, sodium, inotropes, days WLHTx) in the patient’s death WLHTx greatest force an outcome (death) were: bilirubin (r=0.49; p = 0.01), CHF FC (r=0.47; p = 0.001), sodium (r=-0.43; p = 0.03), ALT (r=0.37; p = 0.008), GFR (r=-0.36; p = 0.008). Conclusions: Predictor of death in patients WLHTx are symptoms of right heart failure (hepatic, renal dysfunction) and FC CHF. To increase the percentage of survival to HTx required increase in the frequency of implantation of MCS, increasing the number of effective donors, including from donors with expanded criteria (single-vessel coronary disease with the technical possibilities of MCS).
P1046
Is sildenafil treatment associated with higher rate of vasoplegic syndrome after heart transplantation?
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1Hospital de la Santa Creu i Sant Pau, Cardiology Department, Barcelona, Spain; 2Hospital de la Santa Creu i Sant Pau, Cardiac Surgery Department, Barcelona, Spain; 3Hospital de la Santa Creu i Sant Pau, Anesthesiology Department, Barcelona, Spain; 4Hospital de la Santa Creu i Sant Pau, Cardiac Surgery Department, Barcelona, Spain.

Background. Pulmonary hypertension (PH) prior to heart transplantation (HTx) increases the risk of right ventricular dysfunction after HTx. Sildenafil has been postulated as a non-invasive treatment to reduce PH in candidates to HTx. Due to its systemic effects, sildenafil could induce bleeding and vasoplegia in the acute post-HTx and increase mortality.

Purpose: To assess the effect of sildenafil on vasoplegia at 24h after HTx. A composite endpoint (vasoplegia and haemorrhagic shock) was also evaluated.

Methods: We analysed a retrospective cohort of 63 HTx since 2012 to 2016. Patients were classified according to their haemodynamic situation at 24h post-HTx: I) Stable haemodynamic; II) Cardiogenic shock; III) Hypovolemic status; IV) Haemorrhagic shock; V) Vasoplegia. Vasoplegia was defined as: mean arterial pressure < 60 mmHg with vasodeconstrictors or < 60 mmHg despite them, with cardiac index ≥ 2.5 l/min/m2 and central venous pressure ≥ 10 mmHg.

Results: Sixteen patients (25%) were treated with a mean dose of 88 mg/24h of sildenafil prior to HTx. Receptor age and sex, donor age, proportion of urgent HTx and ischaemic time were similar in the two groups. Other important variables are showed in Table. Comparing the haemodynamic status of the two groups at 24h post-HTx, sildenafil group presented non-significant tendencies of less incidence of cardiogenic shock (6 vs 13%/p = 0.7), higher rate of haemorrhagic shock (19 vs 8%/p = 0.4), and vasoplegia (37 vs 21%/p = 0.2). The composite endpoint was significantly higher in the sildenafil group (66 vs 29%/p = 0.05). However, both groups had similar acute mortality (12.5 vs 12.8%/p = 0.97). Regression analysis identified a tendency of sildenafil treatment as predictor of vasoplegia (OR 3.2 [95% CI 0.84–12.47] p = 0.08).

Conclusions: 1) Treatment with sildenafil prior to HTx was associated with higher rate of bleeding and vasoplegia in the first 24h after HTx. 2) However, sildenafil was not associated with increased acute mortality.

Table. Characteristics of two groups.

<table>
<thead>
<tr>
<th></th>
<th>Sildenafil group (n = 16, 25%)</th>
<th>Control group (n = 47, 73%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous cardiac surgery, n (%)</td>
<td>5 (31.3)</td>
<td>6 (12.8)</td>
<td>0.093</td>
</tr>
<tr>
<td>Ischaemic aetiology, n (%)</td>
<td>11 (68.8)</td>
<td>14 (29.8)</td>
<td>0.006</td>
</tr>
<tr>
<td>Baseline mean pulmonary pressure (mmHg), x (SD)</td>
<td>38.7 (9.3)</td>
<td>28.9 (7.9)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Baseline transpulmonary gradient (mmHg), median (Q1-Q3)</td>
<td>9.8 (7.8–17.5)</td>
<td>7.4 (4.9–9.8)</td>
<td>0.005</td>
</tr>
<tr>
<td>Baseline Woods units, median (Q1-Q3)</td>
<td>2.8 (2.3–4.7)</td>
<td>1.8 (1.1–2.5)</td>
<td>0.002</td>
</tr>
<tr>
<td>Treatment with ACEI or ARB, n (%)</td>
<td>11 (68.8)</td>
<td>27 (57.4)</td>
<td>0.425</td>
</tr>
<tr>
<td>Systemic vascular resistance index at 24h, median (Q1-Q3)</td>
<td>1258 (1029–1802)</td>
<td>1361 (1196–1647)</td>
<td>0.657</td>
</tr>
<tr>
<td>Use of noradrenalin at 24h, n (%)</td>
<td>11 (68.8)</td>
<td>26 (55.3)</td>
<td>0.346</td>
</tr>
</tbody>
</table>

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Cardiac allograft vasculopathy (CAV) is one of the main limiting factors for long-term survival after heart transplantation (HTx). CAV is usually a silent phenomenon, being sudden death or heart failure the first manifestation of the disease. So, invasive monitoring with routine coronary angiography is recommended to detect CAV. The aim of the present study was to evaluate the usefulness of some biomarkers to detect CAV in HTx recipients.

Methods: This is a single center cross-sectional study in HTx patients who had undergone routine CAV assessment by coronary angiography or by coronary multi-slice computed tomography (MSCT) between January 2012 and April 2015. Blood samples were collected at the time that angiography or MSCT were performed.

Results: 96 HTx patients were included. Mean time after HTx was 9 ± 7 years. 49 patients had CAV (CAV1 in 26, CAV2 in 6, and CAV3 in 17 patients). In the univariate analysis patients with CAV had significantly higher cTnTs values (93 ± 33.9 ng/L vs 18 ± 16.9 ng/L; p = 0.008) and sAXL values (79 ± 42 ng/L vs 65 ± 24 ng/L; p = 0.038) than patients without CAV. Patients with severe CAV 2-3 had also higher cTnTs and sAXL values (74 ± 39 vs 20 ± 18 ng/L; p < 0.001 and 92 ± 54 vs 66 ± 23 ng/L; p = 0.001, respectively) than patients without CAV or mild CAV. After adjusting for clinical variables related to CAV, multivariate analysis identified hs-TnT values as the only biomarker associated with CAV along with younger age at HTx. The ROC curve identified cTnTs > 21 ng/L as the best cut-off value associated with the presence of CAV-2-3, with an area under the curve the 0.733 (p = 0.001) and a sensitivity of 65%, specificity 79%, positive predictive value 59%, negative predictive value 86%. There were no significant differences in Lp-PLA2 and GDF15 values between patients with and without CAV.

Conclusion: Monitoring sAXL and cTnT could be useful for identifying heart transplantation patients with CAV development. In our study, cTnT values > 21 ng/L identify a group of HTx patients with low risk of CAV.

Atrial Fibrillation

P1048
Value of cTnT-hs and sAXL for coronary allograft vasculopathy diagnosis after heart transplantation
S Sonia Mirabet Pérez1; J Ordóñez Llanaos1; P García De Frutos2; L Lopez Lopez2; V Brossa Locat2; R Leta Pefetraca1; E Solé1; J García Picart3; A Effer2; M Tauroen1; E Roca Minguéu1
1Hospital de Sant Pau, Barcelona, Spain; 2Department of Cell Death and Proliferation, BSCB-ICDBAPS, Barcelona, Spain

Background: Cardiac allograft vasculopathy is one of the main limiting factors for long-term survival after heart transplantation (HTx). CAV is usually a silent phenomenon, being sudden death or heart failure the first manifestation of the disease. So, invasive monitoring with routine coronary angiography is recommended to detect CAV. The aim of the present study was to evaluate the usefulness of some biomarkers to detect CAV in HTx recipients.

Methods: This is a single center cross-sectional study in HTx patients who had undergone routine CAV assessment by coronary angiography or by coronary multi-slice computed tomography (MSCT) between January 2012 and April 2015. Blood samples were collected at the time that angiography or MSCT were performed.

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Conclusion: Monitoring sAXL and cTnT could be useful for identifying heart transplantation patients with CAV development. In our study, cTnT values > 21 ng/L identify a group of HTx patients with low risk of CAV.

P1049
Quality of life in advanced heart failure—disconnect between patients’ and clinicians’ perceptions, independent of clinician experience
R Roalyn Prichard1; PJ Newton1; PM Davidson2; S Goodall3; PS Macdonald4; FL Zhao5; CS Hayward1
1St Vincent’s Heart, Hospital, Lung Health Clinic, Sydney, Australia; 2University of Technology, Sydney, Faculty of Health, Sydney, Australia; 3Johns Hopkins University of Baltimore, Nursing, Baltimore, United States of America; 4University of Technology, Sydney, Centre for Health Economic Research and Evaluation, Sydney, Australia

Background: Quality of life (QoL) is an important consideration for advanced heart failure (AHF) patients and clinicians making decisions about complex therapies, as well as policy makers seeking to fund cost effective treatments. But it is rarely formally assessed outside clinical trial settings. This initial data from a prospective study of frailty and QoL in a pre heart transplant cohort, explores how well clinicians treating AHF patients in a quaternary transplant centre predicted patient reported QoL.

Methods: Patients undergoing frailty assessment (including cognitive and depression screening) completed the EQ5D 5L questionnaire. Clinicians interacting with those patients were asked to complete a proxy-patient version of the EQ5D 5L questionnaire. The clinician estimates and patient reported scores were assessed for correlation.

Results: Only mild to moderate correlations between proxy and patient reported utility scores were observed as correlation (Spearman and Bland Altman analyses) completed the EQ5D 5L questionnaire. Clinicians interacting with those patients were asked to complete a proxy-patient version of the EQ5D 5L questionnaire. The clinician estimates and patient reported scores were assessed for correlation.

Conclusion: There remains a disconnect between patient and proxy clinician assessment of QoL, independent of clinician experience. Introducing a brief QoL questionnaire to routine patient assessments, may help to identify the outcomes that matter most to the patients.
Conclusion: HsC-reactive protein is a significant predictor of mortality in patients with atrial fibrillation versus those without atrial fibrillation. HsCRP showed an OR of 13.77% of pts with atrial fibrillation versus 4.93% in those without atrial fibrillation.

PURPOSE: To determine the type of antithrombotic treatment (oral anticoagulation [OAC] and antiplatelet [OAP]) in a “real-world” contemporary observational dataset of patients with AF and to highlight the differences in patients with a history of HF versus no HF and also among the three subtypes of HF (heart failure with reduced ejection fraction [HFREF], heart failure with mid-range ejection fraction [HFrEF], and heart failure with preserved ejection fraction [HFP EF]).

Methods: We conducted successive prospective studies of hospitalized patients to cardiology department of a tertiary hospital with any diagnosis and excluding non-valvular AF. Subjects with HF were classified in three groups according to their UVEF (HFrEF, HFP EF, HFP EF).

Comparisons were made between patients with and without HF, and among HF subtypes.

Results: A total of 510 patients were enrolled between December 2015 - December 2016, of whom 232 (45.5%) had documented HF (HFrEF: 63%, HFP EF: 21%, HFP EF: 16%). Monotherapy with OACs was prescribed in 73% of the cases. In the group of patients with HF (48%) versus those without HF, at discharge, there was a trend (p = 0.15) for administration of NOACs over VKAs in HFpEF patients (59% vs 42%) compared to HFrEF (37% vs 29%). There was a common co-administration of OACs and OAPs in the HFrEF subgroup (36%), which was significantly higher compared to the HFrEF patients (9%, p < 0.05) but not significantly higher compared to the HFP EF patients (22%, p = 0.18).

Conclusions: In the “real life” clinical setting, one tenth of hospitalized patients with AF were under OAP, which is not supported by the current ESC Guidelines, while a significant number of patients received combination therapy with OACs and OAPs. Patients with a history of HF were less likely to receive NOAC therapy at discharge compared to patients without HF. Patients with HFP EF were more likely to be under co-administration of OACs and OAPs in comparison to HFP EF patients.

P1052

Clinical implications from the interdependence between heart failure and atrial fibrillation

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Background/Introduction: Heart failure (HF) and atrial fibrillation (AF) represent two relevant diseases that are growing in cardiovascular medicine. They share common risk factors and aspects of pathophysiology leading to common cardiovascular events – hospitalization from HF (hospHF) or acute coronary syndrome (hospACS) and death from cardiovascular cause (CVm) and non-cardiovascular cause (nCVm). The assessment of the recovery of heart failure systolic function (LVFSF) (defined as EF increase > 10% with respect to the initial value) and size (Q) (defined by quotient between the follow-up [FU] and the initial value of the indexed left ventricle end-diastolic diameter).

Results: Included 290 pts, with a mean age of 60.56 ± 13.25 years and male predominance (75.2%). The prevalence of ischemic etiology was 41%. The mean initial EF was 29.2 ± 10.8%. The FU was 39.5 ± 18 months, with a mean EF during FU of 34.9 ± 12.5%. G1 consisting of 99 pts and 191 in G2. There was a more advanced age in G1 (64.2 vs 58.7 years, p < 0.001) and a predominance of males in both groups (p < 0.01).

Conclusion(s): The prevalence of HFREF was 29.2 ± 10.8%. The FU was 39.5 ± 18 months, with a mean EF during FU of 34.9 ± 12.5%. G1 consisting of 99 pts and 191 in G2. There was a more advanced age in G1 (64.2 vs 58.7 years, p < 0.001) and a predominance of males in both groups (p < 0.01).

Aroussah1; E Michel1; G Fotios1; G Divid1; D Vasedel1; E Kots1; P Tsokra1; E Forciod1; J Tzanou1; A Karlis1; I Doundoulak1; G Giannasoulou1; H Karvounis1; A Tzikas1

1AHEPA General Hospital, Thessaloniki, Greece

On behalf of: MISOC Investigators

Backgroud: Several studies have evaluated the prevalence of heart failure (HF) at risk of stroke. According to the 2016 ESC AF guidelines non-vitamin K oral anticoagulants (NOACs) are recommended in preference to Vitamin K antagonists (VKAs) in patients with atrial fibrillation (AF) and heart failure with preserved ejection fraction (HFP EF).

Purpose: To determine the type of antithrombotic treatment (oral anticoagulation [OAC] and antiplatelet [OAP]) in a “real-world” contemporary observational dataset of patients with AF and to highlight the differences in patients with a history of HF versus no HF and also among the three subtypes of HF (heart failure with reduced ejection fraction [HFREF], heart failure with mid-range ejection fraction [HFrEF], and heart failure with preserved ejection fraction [HFP EF]).

Methods: We conducted successive prospective studies of hospitalized patients to cardiology department of a tertiary hospital with any diagnosis and excluding non-valvular AF. Subjects with HF were classified in three groups according to their UVEF (HFrEF, HFP EF, HFP EF).

Comparisons were made between patients with and without HF, and among HF subtypes.

Results: A total of 510 patients were enrolled between December 2015 - December 2016, of whom 232 (45.5%) had documented HF (HFrEF: 63%, HFP EF: 21%, HFP EF: 16%). Monotherapy with OACs was prescribed in 73% of the cases. In the group of patients with HF (48%) versus those without HF, at discharge, there was a trend (p = 0.15) for administration of NOACs over VKAs in HFpEF patients (59% vs 42%) compared to HFrEF (37% vs 29%). There was a common co-administration of OACs and OAPs in the HFrEF subgroup (36%), which was significantly higher compared to the HFrEF patients (9%, p < 0.05) but not significantly higher compared to the HFP EF patients (22%, p = 0.18).

Conclusion(s): In the “real life” clinical setting, one tenth of hospitalized patients with AF were under OAP, which is not supported by the current ESC Guidelines, while a significant number of patients received combination therapy with OACs and OAPs. Patients with a history of HF were less likely to receive NOAC therapy at discharge compared to patients without HF. Patients with HFP EF were more likely to be under co-administration of OACs and OAPs in comparison to HFP EF patients.
P1055
Increased left atrial volume predicts atrial fibrillation recurrence after transcatheter ablation: a systematic review and meta-analysis
I Ibadete Bytyci1; G Bayракар1; MY Henein2

Background and Aim: Left atrial (LA) enlargement is associated with atrial fibrillation (AF) incidence and outcome. Trans-catheter ablation has become an established treatment for symptomatic atrial fibrillation (AF) patients who are refractory to drug therapy. However, AF recurrence and the need for repeat procedure are common in these patients. Although a number of predictors of AF recurrence have already been proposed, patient selection remains controversial. The aim of this meta-analysis was to analyze the potential association between LA volumes and AF recurrence after ablation.

Methods: We systematically searched PubMed-Medline, EMBASE, Scopus, Google Scholar and the Cochrane Central Registry, up to December 2016 in order to select clinical trials and observational studies, which reported the predictive role of LA maximal volume (LAVmax) and LAVmax indexed (LAVI) for AF recurrence after catheter-ablation. 3259 patients from 31 studies with paroxysmal AF (PAAF), persistent (PeAF) or longstanding persistent AF (LL-PEAF) were included.

Results: The pooled analysis showed that after 10.8 ± 7.0 months follow-up, patients with AF recurrence had larger LAVmax and LAVI in comparison with those without AF recurrence, with a weighted mean difference (WMD) of 16.21 (95% CI 11.70 to 20.73, P < 0.0001) and 4.19 (95% CI 2.97 to 5.42, P < 0.0001). In subgroup analysis, the difference in LAVI was present according to the type of AF; in PAAF WMD was 2.08 (95% CI 0.48 to 3.55, P = 0.01), in PeAF/LL-PEAF was 3.55 (95% CI 0.68 to 6.43, P=0.0007), with no significant difference between the two subgroups (Ch2=0.08, df = 0.01, P = 0.36).

Conclusions: Left atrial maximal volume and indexed volume correlate with atrial fibrillation recurrence after catheter ablation.

Figure 3. Comparison of LAVI with weight
mutations associated with LV hypertrophy were detected in 10% (32%). An excessive level of fibrosis may explain the high risk of ventricular fibrillation, and stresses the need for early reconstructive surgery as a primary prevention of sudden cardiac death (SCD).

**P1058**
Aortic stenosis and transthyretin cardiac amyloidosis: the chicken or the egg? A Arrueta Galat1; AG Guettel1; DB Bodize2; MS Slama3; MD Djio3; DM Zeitoun4; OM Millieres5; DA Attala6; JLM Morin7; TD Darry8
1 University Hospital Henri Mondor, Cardiology, Creteil, France; 2 University Hospital of Bordeaux, Bordeaux, France; 3 Hospital Bichat-Claude Bernard, Paris, France; 4 Centre Cardio-logique du Nord, Saint Denis, France; 5 University Hospital of Poitiers, Poitiers, France; 6 University Hospital Henri Mondor, Creteil, France

**Background:** Aortic stenosis (AS) and transthyretin-cardiac amyloidosis (TTR-CA) are both frequent in elderly. The combination of these two diseases has never been investigated.

**Aims:** To describe patients with concomitant AS and TTR-CA.

**Methods:** Six cardiologic French centers identified retrospectively cases of patients with severe or moderate AS associated with TTR-CA hospitalized during the last six years.

**Results:** Sixteen patients were included. Mean ± SD age was 79 ± 6 years, 81% were men. 60% were NYHA III-IV, 31% had carpal tunnel syndrome and 56% had excessive level of fibrosis may explain the high risk of ventricular fibrillation, and stresses the need for early reconstructive surgery as a primary prevention of sudden cardiac death (SCD).

**Conclusions:** The combination of AS and TTR-CA may occur in elderly patients.

**P1060**
Quality of life in outpatients with hypertrophic cardiomyopathy. M. Jacquelin1; A. Duva Pental1; A. Cosines1; P. Lapierre1; E. Hebbard2; M. Ferret2; H. Ridou2; D. Montaign1; N. Lamloub3; P. De Giroits3
1 CHRU Lille, Service d’Explorations Fonctionnelles Cardio-vasculaires, Lille, France; 2 CHRU Lille, Service de Cardiologie, Lille, France; 3 CHRU Lille, Service d’Addictologie, pôle de Psychiatrie, Lille, France; 4 CHRU Lille, Service de Santé Intensifs Cardiologiques, Lille, France

**Background:** Hypertrophic cardiomyopathy (HCM) is a relatively common genetically transmitted heart disease associated with sudden cardiac death, heart failure and atrial fibrillation (AF). Quality of life (QoL) provides subjective information completing traditional measures of health. Very few studies have assessed QoL in HCM patients.

**Purpose:** To assess QoL in HCM patients and to identify factors associated with QoL.

**Methods:** A single-center prospective observational study was conducted in HCM outpatients referred to a University Hospital between March 2015 and March 2016. QoL was assessed by the Short Form 36 Health Survey (SF36) and psychological well-being with the Hospital Anxiety and Depression (HAD) questionnaires. Socio-demographic, clinical, biological, and echocardiographic data were collected.

**Results:** 78 questionnaires were analyzed. Physical component score (PCS) and mental component score (MCS) of the SF36 were significantly lower in patients with HCM compared to French population (PCS = 44.4 ± 10.3 versus 50.4 ± 9.9, p < 0.01; MCS = 46.8 ± 9.9 versus 48.8 ± 9.9, p = 0.017). Impaired physical QoL was independently predicted by 6 variables that accounted for 60% of the variance: low education level (p = 0.006), impact of disease on a child project, (p < 10^-4), high NYHA functional class (p < 10^-4) and high score at the HAD depression subscale (p < 0.032). Impaired mental QoL was independently predicted by 5 variables that accounted for 54% of the variance: family history of HCM (p < 0.013), syncope or presyncopal symptoms (p < 0.013), high number of medications (p = 0.005), and high score at the HAD anxiety (p < 10^-4) and depression subscale (p < 10^-4).

**Conclusion:** Physical and psychological QoL are clinically and statistically impaired in patients with HCM. Identification of QoL predictors suggest potential targets to provide more comprehensive health-care strategies for HCM patients.
Patients underwent exercise testing on a cycle ergometer before and after par- participation to a standard group-based CR program. The CR program was con- sidered as feasible if the patient could participate in ≥10 training units without adverse events. The CR program was considered as beneficial in case of a rela- tive increase in peak oxygen consumption (VO2) and/or in maximal workload after CR of ≥15%.

**Results:** Twenty-seven patients were included (68 ± 12 years, 81% male). Mean left ventricular (LV) ejection fraction was 49.8 ± 12.9%, and mean LV wall thickness was 17 ± 3 mm. The majority of the patients had LV amyloidosis (N=16, 59%). Two-third of the patients had a pacemaker. The maximum workload at the initial exercise test was 49 ± 40 W.

Cardiac rehabilitation was feasible in 19 patients (70%). Patients with feasible CR as compared to patients with CR failure had more pacemaker (84% vs. 25%; p=0.0061), lower NT-proBNP (2239 ± 860 vs. 860 ± 813 ng/l; p=0.035), and a longer initial exercise test (260 ± 263 vs. 154 ± 63 sec; p=0.0195). Age and type of amyloidosis were not significantly associated with CR feasibility.

Among the patients with feasible CR, nine (47%) showed significant functional benefit with a 36% (2 ± 10W) increase in maximal workload after CR, as compared to 0 ± 17% (2 ± 10W) among those without benefit. Benefit was not significantly associated with the number of training units (27 ± 16 vs. 22 ± 14, n.s.). Benefit was associated with age (63 ± 13 vs. 73 ± 11 years, p=0.05), NT-proBNP (1080 ± 851 vs. 10516 ± 9810 ng/l, P<0.05), creatininemia (92 ± 36 vs. 158 ± 83 μmol/l, p<0.05), and LVEF (57 ± 1 ± 10%, p<0.05), but not with the type of amyloidosis neither with the degree of LV hypertrophy.

**Conclusions:** The presence of a pace-maker seems to facilitate cardiac rehabilita- tion in CA. Elderly CA patients with impaired LVEF seem not to benefit from CR with respect to functional capacity. The type of amyloidosis and the degree of LV thickening are neither associated with CR feasibility nor with functional benefit.

**P1062**
Surprise after a successful fibronectin therapy in acute stroke

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**Introduction:** Stroke is the third leading cause of death worldwide, and almost 80% of the total cases of strokes are ischemic strokes. Cardiogenic embolism accounts for approximately 20% of ischemic strokes. The most frequent source of cerebrovascular embolism is the mitral valve. Other sources of emboli can be more rare, genetic disease, caused by intrauterine arrest of compaction of the myocardial fibres, resulting in multiple trabeculations, typically the apex in the LV myocardium.

**Case report:** A 56-year-old regular alcohol drinker patient without significant medical history was admitted, 11.5 hours after the onset of symptoms, with ictal left-sided mild hemiparesis and dysarthria. Urgent brain CT scan didn’t identify bleeding or early signs of stroke. Thrombolysis was performed within 2 hours. Control CT scan at 24 hours showed extensive lesions in the territory of the right middle cerebral artery. Patient’s hemiparesis was completely resolved 2 days after intervention. Echocardiography revealed previously unknown severe left ventri- cle dysfunction (EF: 24%), diffuse hypo-kinesis of the apex, and extended apical trabeculation with intratrabecular thrombi. The cardiac MRI showed typical morpho- logical pattern of non-compaction cardiomyopathy, but it also supposed ischemic etiology, based on extended, irreversible damaged areas of myocardium (delayed contrast enhancement). With regard to the recent neurological event coronary CT angiography was performed, which identified significant stenosis of LAD and Cx, with extensive calcification. Besides of the tailored, evidence-based heart failure and secondary prevention therapy, we introduced oral anticoagulant therapy as well. The patient was discharged in stable condition (NYHA I-II.), and scheduled for a follow-up MRI and elective revascularization.

**Conclusion:** Close cooperation between neurologist and cardiologist is crucial during stroke care. In the background of the stroke severe cardiac diseases can often be found. Fast cardiological diagnosis can improve the survival of the patient, can change the treatment or, as in our case, also requires a complex approach.

**P1063**
A new de novo mutation in the MYH7 gene causing dilated cardiomyopathy with mild myopathy in pediatric patient

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**Introduction:** Dilated cardiomyopathy (DCM) is characterized by left ventricular enlargement and systolic dysfunction. The estimated prevalence of DCM is 1:3,000 and about 35% of patients will have familial disease. For children it is much rare condition and its annual incidence is estimated to be 0.58 cases/100,000 children. Early-onset sporadic DCM is usually considered as a recessive form of disease with 25% risk of recurrence.

**Patient and methods:** The patient is Russian boy 2 y.o. with dilated cardiomy- opathy and primary weaknesses of axial muscles. The proband was examined by pediatrician, neurologist, and geneticist. The clinical evaluation included medical his- tory taking, echocardiogram, creatine phosphokinase (CK) measurement and elec- tromyography. The genetic evaluation included whole genome sequencing (WGS) for the patient, with following confirmation by the Sanger sequencing of cDNA for the patient, with following confirmation by the Sanger sequencing of cDNA, cascade familial screening, and predictive in silico analysis of possible clinical impact. Probands’ DNA was extracted from the muscle sample and converted into cDNA using standard molecular methods.

**Results:** WGS revealed a novel genetic variant c.5655 + 5G>C in the MYH7 gene. Splice site damage was predicted by NetGene2 and SpliceSitePredictor tools. Analysis of cDNA shows the skipping of exon 38 without frameshift (p.1854_1858del). Diagnosis of the MYH7-related myopathy was established based on the clinical evaluation and genetic finding. De novo origin of c.5655 + 5G>C variant was con- firmed after the testing of parent’s DNA samples. We consider the genetic vari- ant c.5655 + 5G>C as a pathogenic mutation causing dilated cardiomyopathy and myopathy.

**Conclusion:** Mutation c.5655 + 5G>C in the MYH7 gene causes MYH7-related myopathy with unusually early manifestation. Severe de novo mutations in the MYH7 gene could be responsible for some early-onset DCM with myopathy. It is impor- tant to clarify de novo status, because those mutations have a benign prognosis for following family planning.

**P1064**
The effect of the CHF optimal medical treatment on clinical and functional parameters in pts with peripartum and idiopathic dilated cardiomyopathies

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**Introduction:** To study the effect of six-month CHF optimal medical treatment (OMT) clinical and hemodynamic parameters of pts with idiopathic (IDCM) and peripartum (PPCM), dilated cardiomyopathies (DCM).

**Materials and methods:** The study included 93 pts with dilated cardiomyopathy. It was conducted ECG EchoCG, X-ray cardiometry, 6-minute walk (BMW), and the
assessment of the clinical condition (ACC) by Mawer for CHF pts before and after treatment. All pts received the standard treatment of heart failure and were randomized into two groups: the first group included 50 pts with peripartum cardiomyopathy (mean age 28.2 ± 8.8 years), in the second - 43 pts with idiopathic dilated cardiomyopathy (mean age 38.1 ± 2.1 years; p < 0.001).

Results: At the time of study entry, all pts were stabilized on the CHF OMT. By the end of the treatment the dynamics of reduction of heart rate in both groups was significantly (respectively 32.3% versus 29.7%, both p < 0.01), which was accompanied by improved performance of 6MWt in 2.1 times (from 194 ± 10.1 to 412, 5 ± 12; m; p < 0.001) in pts with PPCM and 2.2 times (from 186 ± 12 to 412 ± 12, 5; m; p < 0.001) for pts with idiopathic forms of the disease, which are accompanied by an improvement of the clinical condition by ACC (10, 0.3 to 3.4 ± 0.3 points and 9.9 ± 0.3 to 3.8 ± 0.2 points, both p < 0.01), a decrease FC HF (with 3.4 ± 0.1 to 1.7 ± 0.1, p < 0.01), and 3.3 ± 0.1 to 1.6 ± 0.1, (both are p < 0.01), respectively PPCM and DCM. Basic therapy HF exerted similar effect on intracardiac hemodynamics, but reliable results were obtained in PPCM pts, increased on 23.2% (from 37 ± 1.3 to 45.6 ± 2.9) in particular left ventricular (LV) ejection fraction; p < 0.001) reduction in the EDV on 4.8% (from 6.5 ± 0.1 to 6.2, 1 ± 0.1; p < 0.05), the ESD on 15.2% (from 5.3 ± 0.1 to 4.6 ± 0.1; m; p < 0.001) in comparison with idiopathic forms of DCM pts, LVEF increased only on 11.7% (from 54 ± 1.5 to 38 ± 1.6%, p < 0.05) with decreasing of ESD on 3.5% (from 5.8 ± 0.1 to 6.5 ± 0.1; m; p < 0.05), while EDLUV was practically unchanged. It should be noted that in 19 (36%) pts during treatment with PPCM fully normalized LVEF, which was not observed in the control gr.

Conclusions: Standard therapy for heart failure in 6 months have unidirectional impact on clinical and hemodynamic parameters in both grs, but pts suffering from PPCM showed a significant improvement in myocardial contractility and reduced linear size of the heart.

P1065
Cardiac troponin T in patients with dilated cardiomyopathy
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On behalf of: FATIMA investigators
Funding Acknowledgements: Portuguese Foundation for Science and Technology [PTDC/BCM-MEC/0965/2012]

Background: Dilated cardiomyopathy (DCM) is a genetic heterogeneous entity, with variants described in more than 45 genes, including cardiac troponin T gene (TNNT2) in approximately 3% of the cases. As next generation sequencing becomes more widely available, establishing causality for genetic variants becomes increasingly relevant.

Purpose: We aimed to determine the genetic variations in TTN2 in DCM patients.

Methods: We evaluated 107 unrelated patients with idiopathic DCM (ICD) or familial DCM (FDCM). Detailed clinical data were obtained. Echocardiographic, resting and 24-h ECG and CMR parameters were collected. Molecular analysis included LMNA/C, MYH7, MYBPC3, TNN2, ACTC1, TPM1, CSRP3, TCAP, SGCD, PLN, MYL3, TNN3, TAZ and LBBD3 genes. Patients with mutations in TTN2 gene were comprehensively analyzed.

Results: Six variants in TTN2 gene were found in 7 (6.5%) patients (5 men, mean age 42 ± 13, 4 cases of FDCM). One variant has been previously described in a DCM family (Arg717Trp) and another in association with increased left ventricular (LV) thickness (Ile288Val). One variant (His1095Yr) was present in two patients. Two patients presented 2 genetic variants (TCAP Glu105Gln + TTN2 His1095Yr and MYBPC3 Arg44His + TTN2 Ser715Phe). Arg717Trp was classified as likely pathogenic and the remaining of uncertain significance.

Mean age at diagnosis was 31 ± 17 years (vs 39 ± 13 of the remaining patients, p = 0.022) and they were mildly symptomatic (5 in NYHA class I and 2 in NYHA class II). One had previous hospitalization from HF, one received an ICD and another had had previous heart transplant. Mean LVEDD was 60.7 ± 9 mm (vs 64 ± 9 m; p = 0.257), LV ejection fraction 40.2 ± 9% (vs 52 ± 11%; p = 0.018) and one patient presented right ventricular (RV) impairment. All were in sinus rhythm and one had left bundle branch block (LBBB). At a median follow-up of 20 months (IQR 13) none presented adverse events.

The patient with the likely pathogenic variant was a 53-year-old man, with FDCM, in NYHA class II that presented LBBB, RV dysfunction and underwent ICD implanta
tion. Patients with double variants, TCAP + TTN2 (DCM) and MYBPC3 + TTN2 (DCM), were both in NYHA class I; LVEF/LVEDD were 39%/61mm and 49% /61mm and neither had RV impairment; the latter presented noncompaction criteria and family history of death from HF.

Conclusions: In our series, variants in TTN2 were more common than previously published. Our patients presented an early onset but, contrasting to the literature, they had higher LVEF and the clinical course was not very aggressive in most instances. This illustrates the uncertainties related to specific genotype/phenotype association and genetic causality in DCM.
with reduced EF (HVFE). HVFE presented features of a less advanced disease: lower NYHA II–III classes (5 vs. 29% in HVFE vs. HVFE group respectively, p=0.001), lower left bundle branch block (20% vs. 35%, p=0.001), less left ventricular end–diastolic volume (69(59;82) vs. 100(81;123) ml/m², p=0.001), lower rate of right ventricular dysfunction (9 vs. 21%, p=0.001), of moderate–severe mitral regurgitation (13 vs. 42%, p=0.001), and of restrictive pattern (8 vs. 37%, p=0.001). Furthermore, during a median follow–up of 50(10;118) months, HVFE group presented a lower rate of all–cause mortality/heart transplantation (9.1% vs. 36% in HVFE, p<0.001) and of sudden cardiac death or malignant ventricular arrhythmias (4.5% vs.15.2%, p<0.001). Finally, 29 out of 175 HVFE patients (7%) evolved to HFREF after a median follow–up of 70(25;43) months, consistently worsening their long–term prognosis.

Conclusions: HVFE identifies a consistent subgroup of DCMs diagnosed in an earlier stage and presenting an apparent better evolution. However, some HVFE DCMs patients evolving into HFREF despite medical therapy and this evolutions leads a worse prognosis.

P1069 Continuous positive airway pressure (CPAP) effect on blood pressure in patients with obstructive sleep apnea syndrome (OSAS)

G Giorgiana Dediu1; A Balaceanu1; A Iancu2; GA r o n1; S Rujinski3; M Bogdan3

You can view the abstract of this paper here.

P1070 Plasma microRNA-155 as biomarker of left ventricular hypertrophy in chronic kidney disease patients. Preliminary study.

D Klimczak1; T Pilecki2; D Zachowiska2; A Kwicka2; M Kuch2; L Pasczyk2

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P1071 Features of left ventricular remodeling in patients with hypertensive cardiomyopathy with and without metabolic syndrome

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You can view the abstract of this paper here.
P1072 Circulating fibrosis biomarkers and transcriptome profile in patients with hypertrophic cardiomyopathy

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Introduction: There are limited data on the prognostic significance of fibrosis in patients (pts) with hypertrophic cardiomyopathy (HCM). The aim of the study was to evaluate profile of circulating fibrosis biomarkers and candidate gene expression in myocardial tissues depending on the severity of myocardial remodelling in pts with obstructive HCM.

Materials and Methods: 15 pts (56.1 ± 9.7 yrs old) with obstructive HCM after septal myectomy were included. 15 pts without heart pathology were examined as control group (57.8 ± 8.9 yrs). ECHO, cardiac MRI with contrast enhancement, histological and immunohistochemical biopsy analysis, circulating fibrosis biomarkers (TGFβ1, MMP2, MMP9, TIMP-1, galectin-3, sST2, CITP, PICP, PIIINP, NT-proBNP) were performed for all pts. Six candidate genes (MMP2, MMP9, TIMP1, TGFβ1, Ga3, SSTR2) were selected for the study. mRNA content was determined by quantitative PCR after RT-qPCR.

Results: Pts with HCM have max LVOT gradient (85 ± 20 mm Hg), max wall thickness (22.9 ± 6 mm), IMMLV (159 ± 72 g/m2) and late gadolinium enhancement (LGE) according MRI data. Increased serum PICP, PIINP levels were revealed in pts with HCM in comparison with the controls. A positive correlation was found between NT-proBNP, galectin-3 and sST2 serum levels. Upreregulated expression of MMP2, TIMP1, TGFβ1, Ga3, Ga3, Ga3 was detected, while MMP9 and SSTR2 gene expression was downregulated in HCM myocardial tissue. We also found that downregulated MMP9 mRNA expression was associated with elevated serum MMP-9 level.

Conclusions: Better understanding of pathological processes in the myocardial tissue leading to fibrosis development might provide a clue for novel arrhythmia or heart failure outcomes biomarker discovery.

Clinical characteristics of patients

<table>
<thead>
<tr>
<th>Galactin-3, ng/ml</th>
<th>Patients with HCM, M=15 The control group M=10</th>
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<tbody>
<tr>
<td>8.70±1.28</td>
<td>6.54±2.14</td>
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<tr>
<td>MMP-2, ng/ml</td>
<td>275 (228;369)</td>
</tr>
<tr>
<td>1483 (1054;1827)</td>
<td>531 (227;547)</td>
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<tr>
<td>TIMP-1, ng/ml</td>
<td>153.5±38.3</td>
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<tr>
<td>148.6±41.2</td>
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<tr>
<td>The ratio MMP-8:TIMP-1</td>
<td>9.87 (7.11;13.3)</td>
</tr>
<tr>
<td>GTP, ng/ml</td>
<td>0.635±0.36</td>
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<tr>
<td>0.440±0.138</td>
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<tr>
<td>PICP, ng/ml</td>
<td>39.08±6.25</td>
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<tr>
<td>101.4±29.2</td>
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<tr>
<td>PIINP, ng/ml</td>
<td>11.19 (11.13;4)</td>
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<tr>
<td>6.62 (5.8)</td>
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<td>TGFβ1, ng/ml</td>
<td>20.2±3.9</td>
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<td>15.8±5.1</td>
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<tr>
<td>sST2, ng/ml</td>
<td>26.2±4.8</td>
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<tr>
<td>20.3±3.7</td>
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</tbody>
</table>

P1073 Pregnancy hypertension is alternative pathway for the development of heart failure.

S Bile1; A Prugia1; E Petralia1; A Abaza2
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Background. The combination of increased pressure and volume in pregnancy hypertension explains may be the tendency to eccentric hypertrophy of the LV but it may represent the early manifestation of a cardiomyopathic process.

Purpose: To assess heart’s structural effects of pregnancy hypertension in the third trimester of pregnancy.

Methods: The study involved 250 pregnant women in the third trimester of pregnancy without hypertension and another disease before pregnancy. ECG, BP weight gain, BMI, laboratory analysis have all been carried out. Transthoracic and echocardiographic evaluations were performed. Results: From the analysis of echocardiographic data resulted that in pregnancy hypertension eccentric and concentric ventricular remodelling occur with diastolic dysfunction and left atrial size is increased. Women with hypertension during pregnancy had significant altered diastolic function compared to normotensive. We found lower E/A ratio (p < 0.046),longer DTe (p = 0.003) and significantly longer (VRT< p < 0.001) lower (Vp< p = 0.012) increase E′/a′ ratio (p < 0.001), and E′/a′ ratio (p < 0.001). LV end-diastolic (168 ± 3.2) and end-systolic (89 ± 1) volume increased during pregnancy compared to normotensive (151 ± 16 / 58 ± 8). p < 0.001 but these women had normal systolic function. A significant statistical relation was found between LA and geometric remodelling (r = 0.215, p = 0.0001) as well as between LA and diastolic dysfunction (r = 0.267, p < 0.001).

Conclusions: In the present study, the EH of the LV may represent the early manifestation of a cardiomyopathic process. This alternative pathway for the development of heart failure is supported by studies that have demonstrated eccentric hypertension to be associated with more severe systolic dysfunction compared with concentric hypertrophy. In spite of the fact that this has not been observed in our cases, the possibility cannot be excluded that this form of the geometric remodeling might cover up a mute form of LV’s contractile insufficiency.

P1074 Polymorphism of aldosterone synthase gene and left ventricular hypertrophy in patients with arterial hypertension and hypertensive cardiomyopathy

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Introduction: The activation and remodeling of renin-angiotensin-aldosterone system is very important in the pathogenesis of development and progression of hypertensive cardiomyopathy (HC) in patients with arterial hypertension (AH). The influence of polymorphisms of aldosterone synthase gene on arterial hypertension and degree of left ventricular hypertrophy (LVH) at the present time is actively studied. The purpose of the study: the analysis of genotype distribution of the polymorphism C-344T of aldosterone synthase gene and assessment of degree of left ventricular hypertrophy depending on the presence of “normal” or “pathological” genotypes of this polymorphism in patients with arterial hypertension and hypertensive cardiomyopathy in Ukrainian population.

Materials and Methods: We examined 240 patients with AH and HC (ESC/ESH 2013). The analysis of polymorphism C-344T aldosterone synthase gene was determined by PCR. Subsequently, the patients were divided into two subgroups depending on the presence of “normal” (CC) or “pathological” (CT + TT) genotypes. In each subgroup we additionally studied the degree of LVH by echocardiography.

Results: and discussion: in the surveyed group of patients with AH and HC the frequency of “normal genotype” (CC) was (47,5%/114) patients, “pathological genotype” (CT + TT) – (52,5%/126). Subgroup 1 (CC) included 114 patients, subgroup 2 (CT + TT) - 126 patients. According to echocardiographic data, in subgroup 2 (“pathological genotype” CT + TT) IMMLV was (142,3±3,4) gm2/m2, in subgroup 1 (“normal genotype” CC) IMMLV was (130,4±3,2) gm2/m2, p = 0,015. The presence of “pathological” genotype was accompanied by significantly more expressed left ventricular hypertrophy and high IMMLV.

Thus, in the surveyed group of patients with arterial hypertension and hypertensive cardiomyopathy in Ukrainian population the “normal” and “pathological” genotypes of polymorphisms C-344T of aldosterone synthase gene were observed with almost equal frequency. The presence of “pathological” genotype is associated with more expressed left ventricular hypertrophy and can be used to predict the severity of hypertensive cardiomyopathy in patients with arterial hypertension.

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heart failure related to the sudden rise of the post load is almost constant. Because transient systolic heart failure and/or mitral regurgitation were rare in these patients. Conclusion: The occurrence of hypertensive acute pulmonary edema may be life-threatening. The Doppler echocardiography is systematic and, as in any acute heart failure, it is possible within 48 hours, so as to not miss a transient systolic dysfunction or ischemic mitral regurgitation.

P1077

T2 mapping by cardiovascular magnetic resonance in acute and recovered myocarditis: potential role in clinical surveillance

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Background: Cardiovascular magnetic resonance (CMR) is a versatile imaging modality that allows assessment of myocardial oedema suggestive of active inflammation. Ongoing inflammation due to viral myocarditis is implicated in the progression to inflammatory dilated cardiomyopathy in one third of cases. Conventional CMR imaging relies upon qualitative visual analysis of T2-weighted images, but recent advances in T2 mapping have improved sensitivity and allow quantitative analysis on a pixel-wise level. In this study, we aimed to evaluate the role of T2 mapping to detect low-levels of ongoing cardiac inflammation at different stages of disease.

Method: Patients were recruited prospectively with confirmed acute myocarditis (chest pain, troponin elevation, unobstructed coronary arteries and CMR evidence of myocardial oedema; 11 inpatients, mean age 34.2 ± 10 years, all male), and retrospectively with a past history of confirmed acute myocarditis (12 patients, mean age 35 ± 13 years, all male, time from acute presentation 5.7 ± 3.9 years). All patients underwent CMR on a 3T system (MAGNETOM Skyra, Siemens), and troponin-I and BNP were measured on the same day. Prospective patients were additionally re-assessed at 3-months. T2 mapping was performed using T2-prepared balanced steady-state free-single shot-images with 4 T2-prep times (0–75ms), TE/TR=1.1/2.5ms, flip-angle=35°, GRAPPA x2, 6/8ths partial Fourier, 1.9x2.2x8mm balanced steady-state free-single shot-images with 4 T2-prep times (0–75ms), TE/TR=1.1/2.5ms, flip-angle=35°, GRAPPA x2, 6/8ths partial Fourier, 1.9x2.2x8mm resolution, 360x285mm field of view. A global region of interest was manually drawn by a single blinded observer in the basal ventricular slice. Results were compared with 9 healthy volunteers (mean age 27 ± 6 years, 56% male).

Results: In patients with acute myocarditis, mean global T2 was 42 ± 1.4msec compared to 40 ± 1.3msec in healthy volunteers (p = 0.005). No difference was found between T2 values at presentation and 3-month follow-up (p = 0.1) despite normalisation of troponin in all patients at 3 months. In the retrospective group, mean T2 had normalised to 40 ± 1.5msec with preserved ventricular function, comparable to healthy volunteers. Unlike troponin, BNP remained mildly elevated in 3 patients (mean 23ng/mL at 3 months, but none in the retrospective group.

Conclusion: Our findings suggest that T2 values remain persistently elevated at 3-months following acute presentation despite normalisation of cardiac troponin levels. Persistent inflammation is known to increase risk of relapse. Further investigation is required to assess whether T2 mapping provides a useful biomarker in this small but important subset of patients.

Figure
Conclusions:

The effectiveness of therapy and was unfavorable prognostic factor. Negative viral genome in blood/myocardium; the presence of virus reduced effectiveness (67.7% and 37.3%, p < 0.001) of all-cause mortality (2.64 (95% CI 1.44-4.86)) and the need for surgical treatment (95%CI 0.38-0.80)) were found only in IST group. Significant changes of LV size and LVEF due to IST were achieved both in virus-negative and virus-positive patients. Antiviral therapy (acyclovir, gancyclovir, IV immunoglobulin) allowed to achieve virus elimination of myocarditis in 73.1% of virus-positive patients and in 30.7% of virus-negative patients.

Results:

Pure viral myocarditis was diagnosed only in 7% of patients, immune - in 59%, mixed - in 34%. The anti-heart antibody level was equally high and did not differ significantly from the virus and the virus-negative-positive patients. Antiviral therapy (acytlovir, gancyclovir, IV immunoglobulin) allowed to achieve virus elimination of myocarditis in 6% of patients (24 virus-positive and 61 virus-negative); neostigmin (n= 63, 20; 40 mg/day), hydroxychloroquine (n= 45, 200 mg/day), azathioprine (n = 8, 100 [75; 150] mg/day) of myocarditis and non-IST patients were differed by NYHA class (3 [2; 3] v 31.5%, p < 0.001) and by 12.2), increase of LVEF (30.3±10.6 v 25.3±9.2%, p = 0.05). The mean follow-up was 12 [6; 20] months. Significant (p < 0.05) decrease of LV EDD (6.5±0.7 to 6.2±0.7, p < 0.05), SPAP (45.3±16.2 to 34.4±12.2), increase of LV EF (30.3±10.6 to 39.2±11.6), and significantly lower mortality (16.8% and 56.3%, p < 0.01) was found only in IST group. Significant changes of LV size and LVEF due to IST were achieved both in virus-negative and virus-positive patients. Virus-positive patients had significantly higher mortality (42.3 v 16.0%, p < 0.001) and significantly lower mortality (16.8% and 56.3%, p < 0.01) of all-cause mortality (2.64 (95% CI 1.44-4.86)) and the need for surgical treatment (95%CI 0.38-0.80)).

Conclusions:

IST in patients with myocarditis is effective both with positive and negative viral genome in blood/myocardium; the presence of virus reduced effectiveness of therapy and was unfavorable prognostic factor.

P1079

Regulation of serum sRAGE shedding proteases ADAM-10 and MMP-9 in myocarditis and dilated cardiomyopathy

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Funding Acknowledgements: German Heart Foundation and HGFMIOR 2016

Purpose: Myocarditis can result in dilated cardiomyopathy and heart failure. RAGE (receptor for advanced glycation end products) plays a central role in multiple inflammatory and autoimmune diseases generating oxidative stress and inflammatory responses. Soluble RAGE (sRAGE) comprising only the RAGE ectodomain mainly derives from proteolytic RAGE cleavage by the peptidase ADAM-10 (A Disintegrin and Metalloproteinase-10) and MMP-9 (Matrix Metalloproteinase-9), which both can be inhibited by TIMP-1 (Tissue Inhibitor of Matrix Metalloproteases-1). sRAGE is regarded as an anti-inflammatory decoy receptor neutralizing RAGE ligands. Inhibition of RAGE activation via sRAGE has been shown to attenuate experimental autoimmune myocarditis. The aim of this study was to evaluate the serum levels of active ADAM-10 and MMP-9, their inhibitor TIMP-1 and sRAGE levels in patients with myocarditis and post-infarct dilated cardiomyopathy.

Methods: Serum samples from patients with endomyocardial biopsy proven acute or chronic myocarditis (n=20) and patients with post-infarct dilated cardiomyopathy (n=20) were analyzed for sRAGE, active ADAM-10, active MMP-9 and TIMP-1 by Western blot. Healthy volunteers served as controls (n=20, age-matched). Endomyocardial biopsies were investigated by histopathological analysis and immunohistochemistry; viral genomes were detected by PCR and in situ hybridization.

Results: sRAGE serum levels were significantly decreased in patients with myocarditis as compared to healthy controls (46%) decrease. Active ADAM-10 and active MMP-9 were also significantly decreased in myocarditis (55% and 34% decrease versus healthy controls). TIMP-1 showed an opposite regulation with significantly increased serum levels in patients with myocarditis (50% increase versus controls). In post-infarctive DCM ADAM-10 and MMP-9 activity was restored. TIMP-1 levels decreased to levels similar to controls and sRAGE levels were significantly improved.

Conclusions: Myocarditis is associated with decreased levels of anti-inflammatory serum sRAGE, with decreased levels of sRAGE-producing active proteases ADAM-10 and MMP-9 and increased levels of their inhibitor TIMP-1 as a possible mechanism affecting sRAGE serum levels in this pathological setting. These new observations might help develop new diagnostic and therapeutic strategies in preventing autoimmune myocarditis.

P1080

Changes in left ventricular ejection fraction in the first year after the diagnosis of inflammatory cardiomyopathy and its prognostic significance

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Introduction: An improvement in left ventricular (LV) systolic function is seen in approximately 60% of patients with biopsy-proven inflammatory cardiomyopathy (ICM). The improvement in LV function should be associated with a better prognosis.

Objective: To evaluate changes in LV ejection fraction (LVEF) during comparison to the diagnosis of ICM and to assess the prognostic significance of early LVEF changes.

Patients and methods: 86 patients with biopsy proven ICM (77% men, 23% women), LVEF at diagnosis 24.3±7.2%; mean age 44.5±12.6 years, NYHA 2.5±0.6, time from onset of symptoms to diagnosis was 2.3±2.2 months. ICM was defined as the presence of 14 LCA + cells/mm² and/or >CD3 + cells/mm² of the biopsy sample. Echocardiographic controls were carried out at the time of diagnosis (V0) and then in third (V3), sixth (V6) and twelfth (V12) months after diagnosis endomyocardial biopsy.

Results: LVEF improved in the 3rd month to 35.8±9.5%, at 6 months to 39.3±12.1% and in the 12 months to 42.2±12.1% (all p < 0.001 versus baseline). Improvement in LVEF was significant between V0 and V3 were 14.4 ±9.7% (p < 0.001) and 6 months to 42.2% (p < 0.001) and created 63% of the overall improvement in the first year. LVEF increased by 3.8±7.3% (p < 0.001) between controls V3 and V6, and by 1.8±7.7% (p=0.070) between the V6 and V12 visits. LVEF value at control V3 was a significant prognostic factor for occurrence of the combined endpoint (HR: 0.43; 95% CI: 0.28 to 0.66) based on the 10% increase in LVEF. Similarly, LVEF improvement by 10% between controls V3 and V6 has emerged as the significant prognostic factor (HR:0.51; 95% CI: 0.34 to 0.76).

Conclusion: LVEF improvement occurs dominantly in the first 3 months after the diagnosis which makes almost 2/3 of the entire improvement in one year follow-up. Absolute value of LVEF at 3-month control and the change of LVEF in first three months were proved as the predictors of long-term prognosis.

P1081

Immunomodulatory treatment reduces intramyocardial inflammation in patients with virus-negative inflammatory cardiomyopathy resulting in an improvement of LVEF in long-term follow-up: a 10 years observe

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Aim: To analyse the long-term outcome after immunosuppressive treatment of patients with virus-negative chronic myocarditis or inflammatory cardiomyopathy (ICM).

Methods: and Results: We investigated 114 patients with endomyocardial biopsy (EMB)-proven virus-negative chronic myocarditis or CMI, who were treated with prednisone and azathioprine for 6 months. Myocardial inflammation was assessed by quantitative immunohistology (IH). We examined hemodynamic measurements after 6 month and long-term follow-up periods of up to 10 years (median 10.5 month [95% Confidence Interval (CI) 11.69 – 59.16]). At follow-up, the patients showed a significant improvement of left ventricular ejection fraction (LVEF) from baseline after 6 month period (LVEF rising from 44.6±17.3% to 51.8±15.5%, p = 0.006) and in the long-term follow-up (LVEF 52.1±15.6%, p = 0.006). Simultaneously, EMB-analysis revealed significant reduction of quantified inflammatory infiltrates (CD3 + cells 16.0±29.09 to 8.2 ±9.0/mm², p = 0.002; CD2 + cells 12.6±20.01/mm² to 6.1 ±8.47/mm², p = 0.001; perforin + cells 3.94 ±4.65/mm² to 1.30 ±1.47, p = 0.001), and cell-adhesion molecule HL-1 (9.91 ±5.55/Area Fraction (AF) to 6.65 ±2.81(AF, p = 0.001)). In a subgroup analysis, Patients with initial LVEF (<45% in n = 53) significantly increased with LVEF at follow-up (29.3±8.6% to 41.7 ±13.2% in 42 ±1.13%, p < 0.001, Group 1), defined as CMI. Patients with initial LVEF >45%–60% (n = 25) significantly improved further or recovered completely.
Predictors for adverse events during hospitalization in patients with clinically suspected acute myocarditis: right ventricular systolic function and T wave inversion

Posters Session 2

P1082

Predictors for adverse events during hospitalization in patients with clinically suspected acute myocarditis: right ventricular systolic function and T wave inversion

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Background: Previous studies on biopsy-proven myocarditis referred to tertiary center could not reflect clinical course of acute myocarditis in real world due to selection bias. Purpose: we sought to determine predictors of serious adverse events, using serial check of electrocardiography, echocardiography and biomarkers during hospitalization in patients with clinically suspected acute myocarditis or myocarditis.

Methods: We enrolled 20 patients admitted with clinical suspicion of acute myocarditis or acute myopericarditis. Coronary angiogram was performed to rule out acute coronary syndromes. We performed serially electrocardiography and echocardiography during hospitalization. Right ventricular systolic dysfunction (RVSD) was defined as decrease of tricuspid annular plane systolic excursion (TAPSE) < 15 mm) or RV dilatation. Cardiac enzymes, B-type natriuretic peptides (BNP), and inflammatory markers were measured. We defined serious events as death or percutaneous cardiopulmonary support (PCPS) use during admission. Results: Mean age was 42 years (male, 70%). Full duration myocarditis occurred in 5 patients (25%), of whom 3 patients survived. (PCPS) was applied to 3 patients, of whom 1 patient died. In total, six patients (30%) died within 3 months. Therefore, serious adverse events during PCPS use and death occurred in 8 patients (40%). In all patients, mean value of initial left ventricular ejection fraction (LVEF), and septal wall thickness and posterior wall thickness were 41±13%, 12.5±3.0 mm, 12.5±2.4 mm, respectively. We confirmed elevation of mean value of LV wall thickness and LV mass index at initial examination and subsequently significant decrease of mean value of LV wall thickness during follow-up examinations in all patients. Especially, group without serious adverse event revealed significant decrease of LV wall thickness between initial and follow-up examinations, but group with serious adverse events did not. Those findings indicated recovery from initial edema in no adverse event group. P1082.

P1084

Cardiopsychiatry: the new cardiology?

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Introduction: Clozapine is the most effective drug for treatment-resistant schizophrenia, decreasing morbidity & mortality. Clozapine-associated tachycardia is a very frequent side-effect however & a common reason for discontinuation of the drug. Studies have suggested that such tachycardia can indicate the development of myocarditis. We sought to look at our practice to determine how/what decisions were made by the reviewing cardiologists in those referred solely for tachycardia.

Method: Retrospective study of 16 referrals to a tertiary cardiology unit of patients whom had developed a tachycardia on starting clozapine: None had LV systolic dysfunction or evidence of myocarditis.

Results: Average heart rate (HR) on review was 105 ± 14bpm. All patients were in sinus rhythm. Median LVEF was 55%. There was no significant difference in HR in those with (109 ± 7bpm; 31%) & without palpitation (107 ± 2bpm; p = 0.43). 17 cardiologists were involved in decisions relating to patient management (mean visits 3.7). Rate control was used in 44%; Four different agents were used (Table 1). There was no significant difference in HR in those treated (102 ± 12bpm) vs untreated (112 ± 8bpm; p = 0.56). 40% of symptomatic patients were treated 45% of asymptomatic patients were treated. No patient died of cardiac causes during 6 years of follow-up.

Discussion: There are no guidelines to dictate management of clozapine tachycardia. Our study illustrates vastly varied treatment approaches to this complication. Decisions to treat appears to be clinician-dependant & not based on HR or symp-tomatology. When the decision to rate control was made, agent of choice also appears to be clinician dependent. Clozapine was often discontinued despite rate-control. Absence of clozapine use leads to a well-described higher mortality in treatment resistant schizophrenia, however the benefits of rate control in clozapine tachycardia is unknown. We propose a multidisciplinary approach to the management of those clozapine, similar to Cardiology; the emerging field with proven positive patient outcomes. This would facilitate evidence-based guidelines for all forms of clozapine cardiotoxicity and timely management, taking into account the implications of stopping life saving psychiatric therapy.

Table 1

<table>
<thead>
<tr>
<th>Rate control used</th>
<th>% (number) of clozapine tachycardia patients treated, total 9 (56%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bisoprolol</td>
<td>19% (2)</td>
</tr>
<tr>
<td>Hydrochloride</td>
<td>13% (2)</td>
</tr>
<tr>
<td>Abendol</td>
<td>6% (1)</td>
</tr>
<tr>
<td>Propranolol</td>
<td>6% (1)</td>
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</tbody>
</table>

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Cardiac dysfunction as a complication of Trastuzumab therapy in patients with erb2-positive breast cancer is currently assessed by measurement of systolic function predominantly of the left ventricle (LV). Effects on right ventricular (RV) function are less well established. Thirty-seven consecutive breast cancer patients with erb-2 overexpression (mean age 55 ±13 years) who received treatment with Trastuzumab were enrolled in this study. Echocardiographic examinations including 2-D, M-mode and tissue Doppler measurements, as well as 2D speckle tracking analysis performed at baseline and repeated after 2 months. In 22 of these patients Trastuzumab were enrolled in this study. Echocardiographic examinations including 2-D, M-mode and tissue Doppler measurements, as well as 2D speckle tracking analysis performed at baseline and repeated after 2 months. In 22 of these patients Trastuzumab resulted in a significant reduction of LV Global Longitudinal Strain (LVGLS) from -21.66 ±5.9, 45% to -18.59 ±0.008 (p = 0.045). However, common echocardiographic indices, such as LV ejection fraction (LVEF), Tricuspid Anular Plaque Systolic Excursion (TAPSE) and S’ wave of the tricuspid valve, as well as the dimensions of the RV were not significantly changed in these patients (Table 1). Furthermore, no significant correlation was found between ΔLVEF (change) and ΔRVGLS and/or ΔRVFWLS and ΔTAPSE, ΔS’ wave or ΔRV dimensions. In the 15 remaining patients (60,55%) LV and RV deformation-mechanics and classical indices of systolic performance were not significantly changed after the first dose of trastuzumab (Table 2). Trastuzumab affects deformation mechanics of the RV simultaneously and in a similar way as the LV. Speckle tracking appears to be more sensitive than traditional echo indices in detecting this form of cardiotoxicity.

**P1085**

**Cardiotoxicity: the path to surgery**

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**Background:** Neuroendocrine tumors can cause the rare carcinoid syndrome (0.5 -2.0 cases / million / year), characterised by diarrhea and flushing. Development of carcinoid heart disease with valve destruction is the major negative prognostic factor in these patients. The only effective cardiac treatment is valve replacement. However, the selection of candidates and determination of optimal timing remain unclear. Presymptomatic valve operation has not been associated with late survival benefit. Prospective trials are not available for this rare entity.

**Purpose:** We wanted to document the diagnostic process of carcinoid heart disease patients who underwent valve surgery, as well as their outcome and follow-up, in order to define gaps in current practice.

**Methods:** We retrospectively analysed the medical records of all carcinoid heart disease patients who underwent valve replacement in the largest tertiary cardiology and oncology center in Belgium between 2000 and 2016.

**Results:** All patients (n = 15), mean age 64, underwent tricuspid valve surgery. In 14 of them (93%) an additional valve was replaced, most often the pulmonary valve (p = 0.05). Two patients underwent quadruple valve replacement, one of them for proven left sided carcinoid involvement. Thirteen patients had liver metastases, and symptoms of heart failure were present in 87% (7/13) at the time of cardiac diagnosis. In hospital mortality was 27% (4/15). The survival after 3 and 12 months was 80% and 53% respectively. From those who left the hospital, 70% experienced an improvement of the functional status to NYHA I-II at time of the first follow-up. In patients who did not improve, mortality was 100% six months after surgery. Perioperative mortality was mainly due to infectious complications associated with prolonged critical illness. Thereafter, 3 cases were considered cardiac deaths. Mean preoperative right ventricular (RV) function (TAPSE) was better in the patients who survived more than 12 months (21mm) than in those who died between 3 to 12 months after surgery (16mm). The former group had a shorter mean interval from diagnosis of the carcinoid syndrome to cardiac diagnosis than the latter (13 versus 105 months). A lower mean preoperative chromogranin level was associated with a lower chance of peroperative death and a longer postoperative survival.

**Conclusion:** Mortality after valve surgery for carcinoid heart disease remains high. A possible cause is late cardiac referral of these oncology patients, whose generally poor condition makes differentiation between general fatigue and heart failure symptoms very challenging without echocardiography. We propose a systematic and multidisciplinary approach to all carcinoid syndrome patients. Our aim for the future is to identify an ‘intermediate’ group suitable for surgery. Patients with mild heart failure symptoms in combination with severe tricuspid regurgitation but without RV dilatation or dysfunction may be the target population.
P1087
Comparison between the two score systems of surveillance, epidemiology and end results (SEER) and national surgical adjutant breast and bowel project (NSABP) in predicting the risk of trastuzumab-rela
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Background: Trastuzumab in an important treatment in patient with breast cancer and overexpress epidermal growth factor-2. Incidence of cardiac toxicity in patients treated with trastuzumab varies according to the patients factors. We aimed to compare two score systems of Surveillance, Epidemiology and End Results (SEER) and National Surgical Adjuvant Breast and Bowel Project (NSABP) in predicting the risk of trastuzumab induced cardiotoxicity in patients with breast cancer.

Methods: Among 458 consecutive patients who treated with trastuzumab between Mar 2011 and Apr 2015, 315 patients (314 female, mean age 51.1 ± 9.7) with breast cancer were available for calculating both score and included in present study. Cardiotoxicity defined as >15% absolute decrease in left ventricular ejection fraction (LVEF) from baseline and <57% of coronary artery disease, 1.0% of heart failure, 0.6% of atrial fibrillation). Mean score of NSABP and SEER was 60.8 ± 14.2 and 2.2 ± 0.7. In univariate Cox proportional analysis model demonstrated only NSABP score is a significant predictor for cardiotoxicity. Receiver operating curve analysis showed area under curve of 0.715 and 0.501 for NSABP and SEER score in predicting trastuzumab-related cardiotoxicity. NSABP score showed better performance in predicting cardiotoxicity compared with SEER (p = 0.004).

Results: NSABP score predicts trastuzumab-related cardiotoxicity better than SEER score in patients with breast cancer and low-comorbidity, probably because SEER score is more largely based on comorbidity factors than NSABP score.

P1088
Minimally invasive treatment for malignant pericardial effusions with poor prognosis
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Introduction and purpose: It is becoming more prevalent in our hospitals to attend patients with right-sided heart failure symptoms due to malignant pericardial effusions. They also have a high recurrence rate after traditional treatment with pericardiocentesis. We sought to confirm the efficacy and feasibility of percutaneous balloon pericardiotomy (PBP) as the initial treatment of choice for these effusions.

Methods: A consecutive series of PBP carried out in a single center in all cases with ADHF. Changed creatinine level (Cr) in 7 days (1.5 fold) or changed Cr for <0.5 mg/dL (25%). The PBP procedure was successful, there were no acute complications, and it was well tolerated at the first attempt. There were no infectious complications during follow-up. One patient presented evidence of hemodynamic compromise on TTE. In all cases, the procedure was successful, there were no acute complications, and it was well tolerated at the first attempt. Eight patients needed a new pericardial procedure: 3 had elective pericardial window surgeries and 5 had a second PBP. Eighty per cent of patients died during follow-up 7 days by median from the PBP regarding their oncological disease.

Conclusion: PBP is a simple and safe technique that can be effective in the prevention of recurrence in many patients with severe malignant pericardial effusion. The characteristics of this procedure make it particularly useful in this group of patients to avoid more aggressive, poorly tolerated approaches, since they have a very poor prognosis regarding to their oncological disease.

variable With AKI(n = 71) Without AKI(n = 207) P value
Males, % 53.5 43.5 0.14
Mean age, years 72.9 ± 10.5 72.2 ± 10.2 0.52
Mean SBP at admission, mmHg 137.0 (105.5-182.0) 114.4 (96.3-138.7) < 0.001
Mean EF, % 50.2 ± 13.7 50.0 ± 13.1 0.94
Minimal Cr. at hospitalization, μmol/L 108.0 (86.5-152.0) 105.2 (92.0-125.5) < 0.001
Mean SBP at admission, mmHg 141.6 ± 29.9 140.0 ± 30.2 0.86
Mean DBP at admission, mmHg 83.5 ± 13.2 83.3 ± 14.1 0.89
Mean EF, % 50.2 ± 13.7 50.0 ± 13.1 0.94
Patients with SBP < 125 mmHg, % 29.6 32.5 0.64
Hospital mortality, % 18.3 3.0 < 0.001

SBP-systolic blood pressure; DBP-diastolic blood pressure; EF-Ejection Fraction; Cr-Creatinine level

P1089
Acute kidney injury among patients hospitalized with acute decompensated heart failure: is it a frequent worsening factor of prognosis?
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Introduction: Major registries (ADHERE, ESC-HF Pilot) had showed that the presence of cardioenal syndrome type I worsens prognosis of patients with acute decompensated heart failure (ADHF).

Purpose: To study the prevalence of acute kidney injury (AKI) among patients with ADHF and evaluate the prognosis of hospitalized patients.

Methods: Between July/2014 and July/2015, we studied a total of 308 hospital cases with ADHF. Changed creatinine level (Cr) in 7 days (1.5 fold) or changed Cr for >25%. The predictors of hospital mortality among patients with AKI had a negative correlation with DBP at admission (OR=0.41; 95% CI 0.29-0.54; p < 0.001), and a negative correlation with maximal Cr level at admission (OR=1.009; 95% CI 1.003-1.014; p = 0.002).

Conclusion: About one of four patients hospitalized with ADHF can develop AKI. Most important predictor of AKI was DBP at admission. Hospital mortality increases in 7.4 folds among patients with AKI (95% CI 2.8-19.3; p < 0.001). The predictors of hospital mortality among patients with ADHF and AKI are DBP and Cr level at admission.
one. Very high informational content (l2=6.0) is given to the duration of CHF(=9.59), CHF FC (l = 8.03), cardiac cachexia syndrome (= 7.16). High predictive value (6.01<2.10) to the severity of anemia (l = 5.88), left ventricular edema and dyspnea (l = 5.66), acute myocardial infarction (l = 1.96), post-infarction left ventricular aneurysm (= 1.82), patient age (l = 2.58), severity of CKD (l = 3.28) and the presence of type 2 diabetes mellitus (l = 1.16). Moderate predictor properties (1.00<0.50) identified in relation to BMI (l = 0.82), history of stroke (l = 0.76) and the presence of permanent atrial fibrillation (l = 0.50).

Conclusion: Clinicoclinonometric indicators revealed a high predictive informational content about the effectiveness of therapeutic correction of anemia with CHF and CKD and using an oral form of Fel(t)hydroxide polymealtose complex that allows to include them into predictive algorithms. Main informative criteria: the duration and severity of CHF; cardiac cachexia formation on a background of biventricular cardiac decompensation, progression of renal dysfunction, severity of anemia, which leads to the desirability and feasibility of application of these criteria at all levels of preventive and curative care with the aim of stratification effectiveness of treatment strategies.
Purpose of the study: to determine the impact of contrast-induced acute kidney injury (CI-AKI) on overall survival, survival without fatal cardiovascular events and rate of development large adverse cardiovascular events (MACE: cardiovascular death, acute coronary syndrome, stroke).

Materials and methods: retrospective study including 148 patients who were directed for elective percutaneous coronary intervention from 2009 to 2011. CI-AKI was diagnosed and classified according to RIFLE-AKI criteria. The risk of CI-AKI was evaluated on a scale R. Mechnan. Prevention of contrast-induced nephropathy (CIN) was carried out according to the recommendations for the prevention of contrast-induced nephropathy ESC 2010. Long-term outcomes were evaluated in 5-7 years after these interventions.

Results: CI-AKI was found in 23 patients (15.5%), which had an increase in serum creatinine at the 37.8±19.7 umol/l (42.5%). In the analysis of long-term outcomes found that after seven years of follow-up after interventions overall survival in the group of patients without CI-AKI was 86.7%, in patients with CI-AKI - 72%, the rate of survival without fatal cardiovascular events in the group of patients without CI-AKI was 89.4%, in patients with CI-AKI - 80%, the frequency of large cardiovascular events (MACE) in the group of patients without CI-AKI was 38.9%, in patients with CI-AKI - 45%. According to the analysis of Kaplan-Meier curves long-term overall survival and survival without fatal cardiovascular events after endovascular coronary intervention in patients without the development of periprocedural CI-AKI was significantly higher than in the group of patients with CI-AKI (p<0.05). Conversely, frequency of large cardiovascular events (MACE) was significantly higher in the group of patients with CI-AKI compared with the group without the periprocedural CI-AKI (p<0.05).

Conclusion: development of periprocedural CI-AKI associated with adverse long-term outcomes after percutaneous coronary intervention.

P1095
Renal function injury in patients with chronic heart failure and permanent atrial fibrillation depending on brain natriuretic peptide.

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Aim: to study interconnection between renal function injury and NT-proBNP in patients with chronic heart failure (CHF) and permanent atrial fibrillation (AF).

Methods: and materials: 60 patients with CHF and permanent AF were examined. Renal filtration function was evaluated using serum creatinine, estimated glomerular filtration rate (eGFR) by CKD-EPI, and serum cystatin C level. Patients were divided into 3 groups depending on NT-proBNP level. The first group consisted of patients who had NT-proBNP > 125 ng/ml (18.3% of all); the second one was of patients with NT-proBNP from 125 to 800 ng/ml (46.7% of all); and the third group included patients with NT-proBNP ≥ 800 ng/ml (35.0% of all).

Results: in the group of NT-proBNP of normal range the average serum creatinine was 83.72±10.05 umol/L, eGFR 68.82±13.18 mL/min/1.73m2, cystatin C level 1063.41±350.11 mg/L. In the second group in patients with NT-proBNP 125-800 ng/ml the average serum creatinine was 86.71±15.15 umol/L, eGFR 61.15±14.83 mL/min/1.73m2, cystatin C level 1568.76±297.64 mg/ml. In the group of NT-proBNP > 800 ng/ml the average serum creatinine was 91.92±15.11 umol/L, eGFR 52.22±20.17 mL/min/1.73m2, cystatin C level 1911.78±414.33 mg/ml. Statistics analysis with comparison of three groups showed reliable difference in cystatin C level (p<0.001). There were no reliable differences between groups in serum creatinine and eGFR (p=0.330 i.e., p=0.150, respectively). Correlation analysis showed moderate indirect interconnection between NT-proBNP and eGFR (r=0.51, p=0.003); and moderate direct interconnection between NT-proBNP and cystatin C (r=0.60, p<0.001).

Conclusion: in patients with CHF and permanent AF, the progressive worsening of renal function injury (evaluated using cystatin C) revealed along with myocardial stress increase according to NT-proBNP.

P1096
Characteristics, treatments and outcomes of hospitalized and ambulatory heart failure patients with chronic obstructive pulmonary disease in the ESC heart failure long-term registry

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Background: Endothelial dysfunction (ED) is characterized by impaired bioavailability of vasodilatory substances, favoring inflammation, vasoconstriction, increased vascular permeability, platelet aggregation, thrombosis and atherosclerosis. It is also an independent predictor of cardiovascular events. ED is highly prevalent in patients with COPD caused by tobacco (TS) and biomarkers of oxidative stress, the leading etiologies of COPD in Mexico. However, it is unknown whether there is a difference in ED between both etiologies of COPD.

Purpose: to assess the differences in endothelial function among COPD patients from tobacco and biomass.

Methods: A cross-sectional study was conducted in ambulatory patients (age 18 or older) with a diagnosis of COPD GOLD-I-II. Subjects with mixed COPD-etiologies were excluded. Patients were divided into COPD by TS or BS, and underwent medical history and physical examination. ED was assessed using photoplethysmography. Endothelial dysfunction was considered with a pulse wave time of maximum amplitude / total time (TMA/TT) index <0.30. Multiple linear regression was performed to
determine the effect of the type of COPD on endothelial function.

Results: 97 patients were evaluated (age: 72.16 ± 9.95 years), of whom, 53.6% were women. In the BG group, women predominated (80.7% vs 24.1%, p < 0.001), they were older (76.1 ± 9.1 vs 69.2 ± 9.5, p < 0.001), had a higher prevalence of hepato-jugular reflux (60% vs. 20.7%, p < 0.022), and of heart failure (28% vs. 16.7%, p = 0.113), compared to those in the TS group. The overall prevalence of ED was 78.9%. Prevalence rate was higher in those with BS compared to TS (83.7% vs 75 %, p = 0.299), although according to multiple linear regression, patients with BS had 0.04 more TAT/TT index than TS subjects (β = 2.3 ± 9.5%, p = 0.001).

Conclusions: ED is higher in patients with COPD from biomass smoke than in patients from tobacco smoke. Although, the prevalence between the two groups was not statistically different, the patients in the BS group had a higher prevalence of heart failure, especially right heart failure.

P1098

Relationship between endothelial dysfunction and forced expiratory volume in first second (FEV1) in chronic obstructive pulmonary disease patients

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BACKGROUND: The characteristic of Chronic Obstructive Pulmonary Disease (COPD) is the chronic inflammation in the small airways and alveoli, this takes to a limitation of the flux that is not reversible. Cardiovascular disease especially heart failure (HF) represents a high mortality and morbidity, being the cause of a worse prognosis in these patients. Has recently been found that an injury of the endothelium can contribute to emphysema and COPD and indirectly relates that the damage in the pulmonary vasculature can develop such emphysema and COPD.

Aim: To evaluate the relationship between endothelial dysfunction and respiratory function in patients with COPD and HF.

Methods: Cross-sectional study, with 117 patients. The endothelial dysfunction was determined by Photoplethysmography evaluating the amplitude, maximum amplitude time (MAT), total time of wave (TT), and the relation between both MAT/TT index, > 30

Results: We evaluated 117 patients (mean age 71.4 ± 11.09, the 60.7% of them had endothelial dysfunction (ED) and 56.8% were female. Those patients with ED have higher prevalence of cardiovascular disease (47.9% vs 9%, p < 0.005). Pulmonary Arterial Hypertension (PAH) 21.6% vs 3% comparing it with those without ED. No significance difference were found in sex, age, weight, height, arterial hypertension, diabetes, obesity. A linear regression determined that these patients with ED has 11% less of FEV1 comparing with those without ED. (p=11.251 p = 0.05)

Conclusion: The patients with ED had a lower FEV1 compared with those without ED. In patients with EPOC those with ED will have a worse degree of EPOC and in which turn to the hypothesis that the ED is not only local but instead is capillary, alveolar and systemic.

P1099

Association between heart failure and nonalcoholic fatty liver disease

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Background: The characteristic of Chronic Obstructive Pulmonary Disease (COPD) is the chronic inflammation in the small airways and alveoli, this takes to a limitation of the flux that is not reversible. Cardiovascular disease especially heart failure (HF) represents a high mortality and morbidity, being the cause of a worse prognosis in these patients. Has recently been found that an injury of the endothelium can contribute to emphysema and COPD and indirectly relates that the damage in the pulmonary vasculature can develop such emphysema and COPD.

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Results: We evaluated 117 patients (mean age 71.4 ± 11.09, the 60.7% of them had endothelial dysfunction (ED) and 56.8% were female. Those patients with ED have higher prevalence of cardiovascular disease (47.9% vs 9%, p < 0.005). Pulmonary Arterial Hypertension (PAH) 21.6% vs 3% comparing it with those without ED. No significance difference were found in sex, age, weight, height, arterial hypertension, diabetes, obesity. A linear regression determined that these patients with ED has 11% less of FEV1 comparing with those without ED. (p=11.251 p = 0.05)

Conclusion: The patients with ED had a lower FEV1 compared with those without ED. In patients with EPOC those with ED will have a worse degree of EPOC and in which turn to the hypothesis that the ED is not only local but instead is capillary, alveolar and systemic.

P1100

Liver stiffness assessed by transient elastography is associated with congestion in patients with decompensated heart failure

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Objective: Heart failure (HF) has a negative impact on liver leading to hepatic fibrosis or even cirrhosis. Studies dealing with assessment of liver stiffness (LS) in decompensated heart failure (HDF) are relatively few and have contradictory results. The aim of the study was to assess LS by the transient elastography (TE) on admission and its associations in patients with HDF.

Methods: LS was measured using TE (FibroScan Echosens, France) in 94 patients with DFH on admission (60 male, 72 ± 10 years (M ± SD), arterial hypertension 96%, myocardial infarction 55%, atrial fibrillation (AF) 61%, diabetes mellitus 46%, known chronic kidney disease 29%, chronic anaemia 30%, left ventricular ejection fraction (EF) 40 ± 14%, EF < 40% 28%, NYHA IV 41%). Ten valid measurements were required with success rate of >65%. LS≥5 kPa was considered normal and LS >5.9, 7.2, 9.5 and 12.5 kPa are considered fibrosis (F1-F3 METAVER score) and cirrhosis (F4) according to thresholds in studies with chronic liver disease. Mann-Whitney test was performed, and p < 0.05 was considered statistically significant.

Results: The median value of LS was 13.1 (interquartile range 7.4-26.0) kPa. Normal LS was observed in 16.9% of patients. Abnormal LS ≥5.9, 7.2, 9.5 and 12.5 kPa occurred in 8.6, 13.8, 51.1% and 51.1% of patients respectively. Patient with vs without LS <12.5 kPa had higher incidence of ischemic HF (79 vs 65%, p < 0.05), chronic anaemia (42 vs 19%, p < 0.01), glomerular filtration rate <60 ml/min/1.73 m2 (11 vs 55%, p < 0.05), chronic AF (45 vs 36%, p < 0.05), NYHA IV (52 vs 35%, p < 0.05).

LS ≥12.5 kPa was associated with high incidence of signs of congestion: periph- eral oedema (98 vs 87%, p < 0.05), rales (94 vs 74%, p < 0.001), jugular venous distension (44 vs 32%, p < 0.05), hepatomegaly (69 vs 35%, p < 0.01), ascites (33 vs 10%, p < 0.001), severe mitral and tricuspid regurgitation (58 vs 19% and 58 vs 10%, p < 0.001 for both) and higher diameters of inferior vena cava (25 ± 6 vs 21 ± 7 mm, p < 0.05), right and left atriums (64 ± 13 vs 59 ± 15 mm, p < 0.05) and 51 ± 11 vs 47 ± 11 mm, p < 0.001), right ventricular and diastolic diameter (33 ± 3 vs 30 ± 5 mm, p < 0.001), pulmonary artery pressure (58 ± 18 vs 45 ± 13 mmHg, p < 0.001), higher levels of N-TproBNP (4650 (1200;7009) vs 4319 (2500;4961) ng/ml, p < 0.001), serum urea (10.1 (7.3;13.8) vs 7.4 (5.9;9.8) mmol/l, p < 0.05) and creatinine (109 (100;129) vs 105 (88;125) mmol/l, p < 0.05). Patient with LS ≥12.5 kPa had higher rate of vasopressor therapy (10.4 vs 0%, p < 0.01) and longer length of stay (9 (8;15) vs 9 (8;12) days, p < 0.05).

Conclusions: Abnormal LS was occurred in 84.1% of patients with DFH. LS ≥12.5 kPa was associated with signs of congestion and right-sided HF, higher rate of vaso- pressor therapy and longer length of stay.
were treated with inotropes and none were receiving mechanical circulatory support. Median (IQR) trastanamise (ALT) was 32 (22-53) UI/L, alkaline phosphatase (ALP) 82 (83-122) UI/L and the International Normalized Ratio (INR) 1.1 (1.0-1.3). In univariate analysis, ALT related to pulmonary capillary wedge pressure (PCWP; \( p=0.016 \), \( p<0.05 \)), but not to central venous pressure (CVP), cardiac index (CI), or mean arterial pressure (MAP). For ALP, there was only a significant relation to CVP (\( p=0.019 \), \( p=0.004 \)). In a sub-group analysis excluding those receiving warfarin (\( p=0.86 \)), INR related to all four hemodynamic parameters: PCWP (\( p=0.011 \), \( p<0.0001 \)), CVP (\( p=0.019 \), \( p=0.0001 \)), CI (\( p=-0.073 \), \( p=0.0008 \)), and MAP (\( p=-0.0033 \), \( p=0.031 \)). In multivariate analyses including the four hemodynamic parameters, only the associations with CVP remained significant: ALP and CVP (\( p=0.031 \), \( p=0.0002 \)), and INR (\( p=0.013 \), \( p=0.002 \)).

**Conclusions:** In advanced HF patients treated with contemporary medical HF therapy, CVP was associated with both markers of biliary excretion and liver synthesis function. Decongestion may be most important to improve liver function in advanced HF.

**P1102 Increased liver stiffness by virtual touch quantification method can predict poor clinical outcomes in patients with heart failure**

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**Background:** Heart failure (HF) is often associated with liver congestion, which has been proposed to increase liver stiffness. Tissue elastography using virtual touch quantification method (VTQ) is a new noninvasive method to measure liver stiffness in HF patients.

**Purpose:** This study sought to determine the prognostic impact of liver stiffness quantification method in HF patients with reduced ejection fraction (HFrEF).

**Methods:** Thirty two HFrEF patients aged 54.5 ± 18.8 years, 23male, left ventricular ejection fraction 34.0 ± 16.6%, plasma brain-type natriuretic peptide 1090 ± 1551 pg/ml due to ischemic (n=5) or non-ischemic (n=27) cardiomyopathy were studied. Liver stiffness was measured from shear-wave velocity (Vs [m/s]) by VTQ. Studied patients were divided into 2 groups according to the median value of Vs; low (\(<1.46 \text{ m/s}; \text{n}=16 \) ) and high (\( \geq 1.46 \text{ m/s}; \text{n}=16 \) ) Vs groups, and the composite adverse cardiac events of all-cause mortality, ventricular assist device (VAD) implantation, and hospitalization for worsening HF were compared.

**Results:** During a median follow-up of 547 days, 13 (40%) adverse cardiac events were observed. Liver stiffness was independently correlated with late H/M ratio in patients with systolic heart failure and sleep disorder breathing.

**Conclusions:** Increased liver stiffness measured by VTQ can predict poor outcome in HF patients.
**P1104**

A comparison between patients with central and obstructive sleep apnea in patients with heart failure: SICA-HF

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**Background:** Sleep-disordered breathing (SDB) is a very common comorbidity in patients with heart failure (HF).

**Purpose:** The aim of this study was to demonstrate the characteristic differences between central (CSA) and obstructive (OSA) sleep apnea and to evaluate the mortality rate in patients with CSA.

**Methods:** We prospectively enrolled 111 outpatients (age: 67.6 ± 10.2 years, sex: 81 men [73%], body mass index: 27.9 ± 4.4 kg/m², New York Heart Association class: 2.3 ± 0.7) with stable HF as part of SICA-HF study from 03/2010 till 09/2013. Echocardiography, sputometry, DEKA-scan and polypgraphy (portable monitoring) assessments using the Embletta and Nox-Devices were done in all patients. We re-analyzed the tests of the polypgraphy visually (manually) in cooperation with the department of sleep medicine at our hospital. SDB was defined as apnea/hypopnea index (AHI) ≥ 5 episodes/hour of sleep. CSA was defined as central AHI > 50% of the total AHI. The same was applied for OSA.

**Results:** We found that 74 patients have SDB (66.7%), 16 (55.2%) patients with HFREF (LVEF ≤ 50%) and 55 patients (87.1%) with HFrEF showed SDB. Overall, 24 patients had CSA (21.6%), 47 patients showed OSA (42.3%) and 3 patients had mixed sleep apnea (2.7%). Compared to OSA, patients with CSA showed more advanced systolic heart failure as determined by reduced left ventricular ejection fraction (LVEF, 42 ± 15% vs. 29 ± 9%, p = 0.001), dilated left ventricle (left ventricle end-diastolic diameter (LVIDd): 64 ± 11 vs. 60 ± 9 mm, p = 0.006) and thin walls of the left ventricle (interventricular septum diameter in diastole (IVSd): 11.9 ± 2.5 vs. 10.7 ± 2.3 mm, p = 0.04; posterior wall diastolic diameter (PVD): 10.8 ± 2.1 vs. 9.6 ± 2.0 mm, p = 0.02). Furthermore, CSA had worse renal function (GFR: 61 ± 13.8 vs. 52.8 ± 15.8 ml/min, p = 0.045) and reduced fat mass in the arms and legs (arms: 31.1 ± 10.9 vs. 26.7 ± 9.9%, p = 0.005; legs: 32.6 ± 11 vs. 27.6 ± 7, p = 0.047). CSA tended to be more common among patients with a coronary artery disease (p = 0.095). On polypgraphy, CSA patients showed higher severity of SDB than those with OSA (higher AHI: 16.2 ± 5 vs. 10.7 ± 2.3 episodes/hour, p = 0.001), and a higher oxygen desaturation index (ODI): 14.7 ± 11.7 vs. 28.0 ± 11.3 episodes/hour, p = 0.0001). Compared with those without SDB, CSA patients had lower oxygen saturations (ODI: 88.7 ± 5.5 vs. 92.1 ± 2.9%, p = 0.004). CSA was predictive of higher mortality compared to those with no SDB (p = 0.03).

**Conclusions:** CSA is a very common comorbidity in patients with HF. CSA is associated with a higher mortality rate, more advanced stage of systolic heart failure and with more severe SDB.

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**P1105**

Sleep apnea and long-term prognosis of acute myocardial infarction

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**Background:** Sleep-disordered breathing (SDB) is a very common comorbidity in patients with heart failure (HF).

**Purpose:** The aim of this study was to demonstrate the characteristic differences between central (CSA) and obstructive (OSA) sleep apnea and to evaluate the mortality rate in patients with CSA.

**Methods:** We prospectively enrolled 111 outpatients (age: 67.6 ± 10.2 years, sex: 81 men [73%], body mass index: 27.9 ± 4.4 kg/m², New York Heart Association class: 2.3 ± 0.7) with stable HF as part of SICA-HF study from 03/2010 till 09/2013. Echocardiography, sputometry, DEKA-scan and polypgraphy (portable monitoring) assessments using the Embletta and Nox-Devices were done in all patients. We re-analyzed the tests of the polypgraphy visually (manually) in cooperation with the department of sleep medicine at our hospital. SDB was defined as apnea/hypopnea index (AHI) ≥ 5 episodes/hour of sleep. CSA was defined as central AHI > 50% of the total AHI. The same was applied for OSA.

**Results:** We found that 74 patients have SDB (66.7%), 16 (55.2%) patients with HFREF (LVEF ≤ 50%) and 55 patients (87.1%) with HFrEF showed SDB. Overall, 24 patients had CSA (21.6%), 47 patients showed OSA (42.3%) and 3 patients had mixed sleep apnea (2.7%). Compared to OSA, patients with CSA showed more advanced systolic heart failure as determined by reduced left ventricular ejection fraction (LVEF, 42 ± 15% vs. 29 ± 9%, p = 0.001), dilated left ventricle (left ventricle end-diastolic diameter (LVIDd): 64 ± 11 vs. 60 ± 9 mm, p = 0.006) and thin walls of the left ventricle (interventricular septum diameter in diastole (IVSd): 11.9 ± 2.5 vs. 10.7 ± 2.3 mm, p = 0.04; posterior wall diastolic diameter (PVD): 10.8 ± 2.1 vs. 9.6 ± 2.0 mm, p = 0.02). Furthermore, CSA had worse renal function (GFR: 61 ± 13.8 vs. 52.8 ± 15.8 ml/min, p = 0.045) and reduced fat mass in the arms and legs (arms: 31.1 ± 10.9 vs. 26.7 ± 9.9%, p = 0.005; legs: 32.6 ± 11 vs. 27.6 ± 7, p = 0.047). CSA tended to be more common among patients with a coronary artery disease (p = 0.095). On polypgraphy, CSA patients showed higher severity of SDB than those with OSA (higher AHI: 16.2 ± 5 vs. 10.7 ± 2.3 episodes/hour, p = 0.001), and a higher oxygen desaturation index (ODI): 14.7 ± 11.7 vs. 28.0 ± 11.3 episodes/hour, p = 0.0001). Compared with those without SDB, CSA patients had lower oxygen saturations (ODI: 88.7 ± 5.5 vs. 92.1 ± 2.9%, p = 0.004). CSA was predictive of higher mortality compared to those with no SDB (p = 0.03).

**Conclusions:** CSA is a very common comorbidity in patients with HF. CSA is associated with a higher mortality rate, more advanced stage of systolic heart failure and with more severe SDB.

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**P1106**

The CHA2DS2-VASc score predicts cardiogenic shock in patients presenting with ST-segment elevation myocardial infarction

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**Background:** All factors included in the CHA2DS2-VASc score have been associated with increased risk of ST-segment elevation myocardial infarction (STEMI), but their potential to predict hemodynamic status at presentation with STEMI has not been evaluated to date.

**Purpose:** We aimed to investigate the ability of the CHA2DS2-VASc score to predict the presence of cardiogenic shock (CS) on admission for STEMI.

**Methods:** We evaluated data from 428 consecutive patients admitted for STEMI. For each patient, all factors included in the CHA2DS2-VASc score were assessed, and the CHA2DS2-VASc score was calculated. Association of these factors with the presence of CS on admission was assessed.

**Results:** 4.90% of STEMI patients presented CS at admission. Due to selection criteria, all patients presented vascular disease. Age, female sex, history of hypotension, diabetes mellitus, and stroke were not significantly different between patients with and without CS (all p>0.05). However, patients with CS had more frequently a history of heart failure (p < 0.01) and higher CHA2DS2-VASc scores (42±6 vs. 32±4, p = 0.03). In multiple regression analysis, the CHA2DS2-VASc score remained an independent predictor of CS (9±14, p = 0.004).

**Conclusions:** With the exception of a history of heart failure, none of the other factors included in the CHA2DS2-VASc score correlated with the presence of CS on admission for STEMI. Meanwhile, the CHA2DS2-VASc score was a strong, independent predictor of CS. The sum of cardiovascular risk factors, rather than each factor alone, may be a better predictor of hemodynamic impairment in STEMI patients.
Introduction: Contrast-induced acute kidney injury (CI-AKI) is a common complication of intra-arterial administration of iodinated radiographic contrast medium that may prolong hospitalization, increase costs, short- and long-term morbidity and mortality. The prevalence of CI-AKI are not well defined. The aim of the study was to evaluate the prevalence of CI-AKI in patients undergoing PCI using different definitions.

Methods: 502 patients (346 male, 64 ± 12 years (M ± SD), arterial hypertension 92%, previous myocardial infarction 38%, diabetes mellitus DM 22%, known chronic kidney disease 19%, anemia 16%, heart failure 62%, left ventricular ejection fraction 40 ± 16%) who underwent PCI (stable angina pectoris (SAP), n = 50, unstable AP (UAP), n = 12, non-ST-segment elevation myocardial infarction (UAP/NSTEMI), n = 236; STEMI, n = 216) were examined. CI-AKI was assessed according KDIGO 2012 Guidelines and previously the most frequently used definition (25% increase of serum creatinine (SCR) from baseline or 0.5 mg/dl increase in absolute value within 48-72 hours of contrast administration. Mann-Whitney test was performed. P < 0.05 was considered statistically significant.

Results: According KDIGO 2012 definition incidence of CI-AKI was 18 %, in SAP patients 12%, UAP/NSTEMI, 15%; STEMI, 20%; p < 0.001. According previously used definition incidence of CI-AKI was: total population 20%, SAP; 16%; UAP/NSTEMI, 16%; STEMI, 18%, p < 0.001. Conclusions: The highest prevalence of CI-AKI both on the 2012 KDIGO Guidelines and earlier version was highest among the STEMI patients with primary PCI.

P1108
Non-cardiac comorbidities in HFrEF, HfmrEF and HfPEF - findings from BIOSTAT-CHF
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Funding Acknowledgements: CVON 2014-11 RECONNECT

Background: Comorbidities play a major role in heart failure. Whether prevalence and prognostic importance of comorbidities differ between heart failure with preserved ejection fraction (HFrEF), mid-range (HfmrEF) or reduced ejection fraction (HfPEF) is unknown.

Methods: Patients from the index (n = 2516) and validation cohort (n = 1738) of The BIOlogy Study to Tailored Treatment in Chronic Heart Failure (BIOSTAT-CHF) were pooled for the present analysis. Seven non-cardiac comorbidities were assessed; diabetes mellitus, thyroid dysfunction, obesity, anemia, chronic kidney disease (CKD), COPD and stroke. Patients were classified into 6 groups based on ejection fraction: HFrEF (< 40%), HfmrEF (40-50%) and HfPEF (> 50%), and having less or more than 3 comorbidities. Impact of each comorbidity on all-cause mortality was evaluated by population attributable risk (PAR).

Results: Patients with known LVEF and complete comorbidity data were included (n = 3499). Most prevalent comorbidity was CKD, with a prevalence of 50%. All comorbidities had a higher prevalence in HfPEF except for stroke. Patients with 3 or more comorbidities had higher all-cause mortality rates in HFrEF (hazard ratio (HR) 1.57, P < 0.001) and HfmrEF (HR 1.39, P = 0.001), but not in HfPEF (HR 1.02, P = 0.920). Highest PARs were seen for CKD in all HF groups, whereas obesity has an inverse PAR in HfPEF. Diabetes and stroke contributed significantly in HfPEF (11% and 6%) but were not significant in HfmrEF (-1% and 0%).

Conclusions: Overall, comorbidities are more prevalent in patients with HfPEF, but having more comorbidities is associated with an increased all-cause mortality in HfPEF and HfmrEF, but not in HFrEF. CKD has the highest impact on mortality in all groups. History of stroke and diabetes have a significant impact on all-cause mortality in HfPEF, in contrast to HfmrEF and HFrEF.
Background: Abnormalities of thyroid function has been demonstrated to be associated to heart failure (HF) progression in patients affected by chronic heart failure (CHF). It's not clear the impact of a reduced thyroid function on long term outcome of this group of patients.

Aim of the study: To evaluate the impact of hypothyroidism (HT-H) on the progression of HF during a long-term follow-up.

Methods: From 2006 to 2015, we evaluated 675 consecutive CHF outpatients (523 males, 84 ± 18 years) in stable clinical conditions (1) monthly and in conventional therapy. They have been carefully documented the presence of thyroid diseases. During follow-up, thyroid function has been evaluated every 4 months, more frequently (every 6 weeks) in patients receiving Levothyroxine or with high TSH levels, to optimize the TSH values in the normal range. The onset of HT-H during follow-up was defined as detection of TSH values above the upper limit. When HT-H was detected, thyroid replacement therapy was started according to guidelines. During follow-up were also evaluated hospitalizations related to exacerbation of HF and death.

Results: 455 patients (67.7%) were euthyroid at the enrollment and for the entire duration of follow-up, 80 patients (11.8%) there was previous diagnosis of HT-H and in 40 patients (5.9%) the HT-H was detected at the time of the enrollment. During follow-up, 52 patients (7.7%) developed HT-H. The remaining were affected by hyperthyroidism or low T3 syndrome. To avoid confounding effects due to the other thyroid abnormalities, we compared patients in euthyroid status at the enrollment and during follow-up and those with HT-H at the enrollment. Among those, during follow-up, median value of EFT (47 months, maximum 123 months), 133 patients died and 186 experienced at least one hospitalization due to acute decompensated HF. At univariate Cox regression analysis, a significant association between HT-H and the events, i.e. mortality for all causes (HR: 1.60; 95% CI: 1.08-2.38; p: 0.019) and hospitalization for HF worsening (HR: 2.13; 95% CI: 1.54-2.96; p: 0.001) was found. At multivariate Cox regression analyses, HT-H remained associated only with HT-H hospitalization (HR: 1.58; 95% CI: 1.09-2.29; p: 0.015) but not with mortality (HR: 1.05; 95% CI: 0.67-1.65; p: 0.819), after correction to LVEF < 35%, GFR < 60 ml/min/1.73m², NTproBNP > 1000 pg/ml, NYHA II/III/IV < 95 mmHg. Figure shows Kaplan-Meier curves for events of patients in euthyroid status at the enrollment and during follow-up and of patients with HT-H at the enrollment.

Conclusion: In a long-term follow-up, HT-H is independently associated with hospitalization due to HF worsening but not with mortality. We hypothesized that HT-H is able to induce hemodynamic instability leading to hospitalization, but its correction with thyroid hormone therapy could in part blunt its impact on patients/survival.

Poster Session 2

P1111

Epicardial obesity as a factor of structural and functional heart remodeling

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Background: Epicardial fat is considered as an independent risk factor, regardless of the severity of obesity in general. Several studies have demonstrated the possibility of myocardial lesion in epicardial obesity (EO) as a result of mitochondrial dysfunction and oxidative stress, apoptosis of cardiomyocytes, inflammation and fibrosis, disorders of adipokines and cytokines secretion.

Purpose: The aim is evaluate the association of EO with the presence of structural and functional heart remodeling.

Methods: 158 normotensive men without cardiovascular diseases were examined (age 48.7 ± 2.0, body mass index 31.6 ± 3.3 kg/m2, waist circumference 106.1 ± 5.7 cm). The diagnostic tests included the lipid and glucose profiles evaluation, echocardiography, functional daily blood pressure monitoring with evaluation of arterial stiffness indicators (average daily aortic pulse wave velocity, augmentation index). Epicardial fat was visualized behind right ventricular free wall in B-mode at the parasternal position along left ventricular long axis at the end of systole. EO was diagnosed when epicardial fat thickness (EFT) was equal to or exceeded 1.7 mm. In patients with EO (n = 27) higher values of left ventricular mass index (119.4 ± 8.9 g/m² vs 100.4 ± 15.9 g/m², p < 0.001), left atrial volume indexed to body surface area (22.3 ± 3.4 ml/m² vs 20.1 ± 2.2 ml/m², p < 0.01), average daily aortic pulse wave velocity (8.4 ± 0.4 m/s vs 7.8 ± 0.4 m/s, p < 0.001), augmentation index (39.4 ± 12.2 % vs 46.3 ± 15.6 %, p < 0.01) were found. Compared groups did not differ in the systolic and diastolic blood pressure levels (118.4 ± 7.4/74.3 ± 4.8 mm Hg vs 117.5 ± 5.3/73.2 ± 4.2 mm Hg). In the EO group left ventricular hypertrophy and left ventricular diastolic dysfunction were detected more frequently: 25.9 % vs 6.2 % (p < 0.01) and 66.7 % vs 11.1 % (p < 0.01) respectively.

Conclusion: EO is associated with the parameters characterized the structural and functional heart remodeling. Higher values of left ventricular mass and left atrial vol-

Poster Session 2

P1112

The correction of TSH with thyroid replacement therapy is associated with a better outcome in chronic heart failure patients

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Background: It has been previously demonstrated that thyroid hormone deficiency is associated with a worse outcome in patients affected by chronic heart failure (CHF). However, few data are available about the effects of thyroid replacement therapy on the prognosis of patients.

Aim of the study: The aim of the study was to evaluate the relationship among thyroid replacement therapy, correction of thyroid stimulating hormone (TSH) serum levels and outcome of a series of CHF outpatients.

Methods: We screened CHF outpatients in stable clinical conditions (>1 month) and in conventional therapy. All patients underwent a baseline clinical evaluation, a 12-lead ECG, an echocardiogram and routine blood tests. Thyroid hormones were assessed at the enrolment and routinely during follow-up (every 3–4 months or every 6–8 weeks if TSH level was altered at the previous control). All patients with history or newly diagnosed hypothyroidism were managed by endocrinologists. We considered hypothyroidism corrected when TSH serum levels were normalized by thyroid replacement therapy (levothyroxine).

Results: Out of 712 patients, in 180 patients (121 males, 67 ± 12 years, left ventricular ejection fraction, LVEF, 33 ± 10%, NYHA class 2.5 ± 0.5, NTproBNP 2125 ± 2975 pg/ml, GFR-EPI 64 ± 22 ml/min/1.73m²) hypothyroidism was diagnosed. Twenty-four patients were excluded because they were lost at follow-up or died within the first 3 months or because endocrinologists did not prescribe levothyroxine for TSH values not high enough. Among the remaining 156 patients in which levothyroxine was prescribed, in 111 patients a normal TSH value was obtained. During a mean follow-up of 38 months, 29 patients died (25 for cardiovascular causes) and 62 experienced at least one admission for acute decompensated heart failure. The failure in TSH correction was associated with an increased risk of all cause of death (HR: 3.31; 95% CI: 1.59-8.66; p: 0.001) and of heart failure hospitalization (HR: 2.27; 95% CI: 1.36-3.78; p: 0.002). At Cox multivariate analysis the failure in TSH correction remained associated with all cause mortality (HR: 2.57; 95% CI: 1.20-5.51; p: 0.002) and with heart failure hospitalization (HR: 1.78; 95% CI: 1.05-3.01; p: 0.03) after correction for NYHA class 3, LVEF < 35%, NTproBNP > 1000, systolic blood pressure < 100 mmHg and GFR-EPI < 60. In the figure Kaplan Meier curves of patients with and without TSH correction are shown.

Conclusion: Our results support the possibility that hypothyroidism correction could improve the prognosis of CHF patients, although randomized controlled trials should be designed in order to demonstrate this hypothesis.
**P1113**

Thyroid hormones deficiencies and poor outcome in chronic heart failure outpatients

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**Background:** Impairment of thyroid function is by far the second most common endocrine comorbidity in patients suffering from chronic heart failure (CHF). However, the cut-off of TSH serum levels associated with worse outcome is still debated as well as the different impact of hypothyroidism and low T3 syndrome (LT3).

**Aim of the study:** to evaluate in a large sample of CHF patients the association between thyroid hormone deficiencies and poor outcome.

**Methods:** and results: From 2006 to 2015, we screened 712 consecutive CHF outpatients (551 males, 64 ± 14 years, left ventricular ejection fraction (LVEF) 33 ± 10%, NYHA class 2.3 ± 0.6, NTproBNP 2153 ± 4686 pg/mL, GFR-EPI 71 ± 25 ml/min/1.73m2) in stable clinical conditions (> 1 month) and in conventional therapy. All patients underwent assessment of thyroid stimulating hormone (TSH), free triiodothyronine (fT3) and free thyroxin (fT4). While 34 patients were excluded for hypothyroidism, among the remaining 678, 58 (9%) showed a TSH level above 10 microU/mL (HR: 2.96; 95% CI: 1.54-5.68; p: 0.001) and LT3 (HR: 3.33; 95% CI: 1.89-5.88; p: 0.001), but not high TSH (> 10 microU/mL, HR: 1.91; 95% CI: 1.06-3.46; p: 0.03) and LT3 (HR: 1.82; 95% CI: 1.18-2.83; p: 0.001), and LT3 (HR: 3.79; 95% CI: 1.91-7.54; p: 0.001). It showed to be a risk factor for mortality during the first year. A long-term survival analysis was performed (Kaplan-Meier method with similar results (Figure 1)).

**CONCLUSION:** In patients admitted with main diagnosis of heart failure, COPD has been shown to be a risk factor for both in-hospital and one-year mortality as well as renal failure is a risk factor for mortality at one year.

| Table 1 |
|-------------------|-------------------|-------------------|
| Frequency | Percentage |
| Age 78.2 ± 9.8 |                   |
| Man        | 127              | 49.6             |
| Woman      | 129              | 50.4             |
| Arterial hypertension | 238 | 93 |
| Diabetes    | 97               | 37.9             |
| Dyslipidemia| 106              | 41.4             |
| Smoking     | 13               | 5.1              |
| Obesity     | 45               | 17.6             |
| Prior cardiovascular disease -AMI | 61 29 32 5 | 23.8 11.3 12.5 2 |
| -Stroke     | -Acute pulmonary edema | 34 13.3 |
| Active infection | 46 46 46 | 18 18 18 |
| COPD        | 68               | 26.6             |
| Renal failure| 48               | 18.8             |
| Neoplastic disease | 14 14 14 | 5.5 5.5 5.5 |
| Atrial fibrillation | 109 109 109 | 42.6 42.6 42.6 |

**P1114**

Influence of chronic comorbidities on the mortality of patients admitted for heart failure in a general hospital.

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**BACKGROUND:** The influence of comorbidities in the prognosis of patients admitted due to heart failure is unclear.

**PURPOSE:** to study the influence of chronic comorbidities in in-hospital and long-term mortality of patients admitted with a diagnosis of heart failure.

**RESULTS:** The baseline characteristics of the sample are shown in Table 1. 23 patients died during their hospital stay, 52 of them died during the following year. Those variables that showed a relationship with in-hospital mortality in a Chi-square analysis were included in a binary logistic regression model: COPD (OR 2.68, p = 0.045) showed to be a risk factor for in-hospital mortality. In a proportional hazards model of Cox, COPD (HR 2.3, p = 0.02) and renal failure (HR 2.65, p = 0.003) showed to be risk factors for mortality during the first year. A long-term survival analysis was performed (Kaplan-Meier method with similar results (Figure 1)).

**CONCLUSION:** In patients admitted with main diagnosis of heart failure, COPD has been shown to be a risk factor for both in-hospital and one-year mortality as well as renal failure is a risk factor for mortality at one year.
**P1115 Different types of heart failure, different treatments?**
S Sara Blasco1; FJ Camacho1; L Obolo1; C Collado1; P Gonzalez1; JA Sanchez-Brotos1; I Perez1; E Martinez De Moren1; M Inivade1; M Maestra1; J Lonzao1; P Martinez Romero1; FJ Morales1

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**Introduction:** The latest Heart Failure and Cardiovascular Prevention ESC Guidelines have shown the benefits of empagliflozin in preventing and slowing down the progression of Heart Failure (HF) and reducing cardiovascular mortality. Our goal is to analyze whether the ESC Guidelines recommendations are being followed and if there are any differences according to the ejection fraction (HFpEF + HFrEF + HFNEF).

**Material and methods:** Prospective and descriptive study of type 2 diabetes patients hospitalized in the Cardiology Service from June 15th to December 31st, 2016, comparing patients with HFpEF, HFNEF and HFrEF.

**Results:** From June 15th to December 31st, out of a total of 121 diabetic patients hospitalized, 58 either had chronic heart failure or de novo HF. Average FESVI was 50%±14%, and according to the latest classification 29% had HFHFrEF,18% HFpEF, and 51% HFNEF. There were significant differences in regards to gender (77% males in HFpEF, 70% HFNEF, 50% HFrEF); HTA (77% of patients with HFpEF vs. 90% in patients with HFNEF and 86% in patients with HFrEF), and creatinine clearance (CrCl < 60 ml/min in 33% of patients with HFpEF vs. 60% in HFNEF and 53% HFrEF), while there were none in age (87 ± 10 in HFpEF, 72 ± 12 in HFNEF and 72 ± 10 in HFrEF), nor other cardiovascular risk factors such as dyslipidemia, smoking or obesity. All patients were being properly treated with Beta blockers, ACE inhibitor, and MRAs drugs. Still, nearly a 50% of the hospitalizations in all DM 2 patients were due to Heart Failure. Regarding previous anti-diabetic drugs, none of the patients were being treated with an SGLT2 inhibitor. 72% of HFrEF patients were under Metformin (22% on its own), 23% sulfonylureas, 11% DPP4 inhibitor and 44% under insulin. As for HFNEF, 80% were under Metformin (20% as single-drug treatment), 20% sulfonylureas, 10% DPP4 inhibitor drugs and 40% under insulin. And finally, 50% of HFpEF patients were under Metformin (13% on its own), 13% under sulfonylureas, 16% under DPP4 inhibitor drugs and 43% under insulin. Nevertheless, 55% of HFpEF patients, 40% of HFNEF patients and 23% of HFrEF had HbA1c levels out of the target range. At discharge, anti-diabetic treatment was modified in 19% of the patients, adding an SGLT2 inhibitor drug to 12% of the patients. We did not detect any complications, nor had to interrupt the treatment at the moment of publication.

**Conclusions:** We’ve detected that ESC guidelines aren’t being followed in the use of anti-diabetic drugs in patients with cardiovascular diseases, unlike other cardiovascular risk factors that have well-established treatment protocols. Most of our patients could benefit from the use of the SGLT2 inhibitor. In this regard, there were no differences found after treatment modifications, but longer tracking period and bigger sample size are needed to validate these findings.

**Cytokines and Inflammation**

**P1116 Inflammation and intestinal bacterial overgrowth in heart failure**
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**Background:** Intestinal bacterial overgrowth has been related with poor prognosis in heart failure (HF), however the pathophysiology of this association remains unclear. Along this line, some authors have postulated bacterial overgrowth might be implicated in the systemic inflammatory activation seen in HF. In this work, we aimed to determine whether inflammatory biomarkers were related with exhaled hydrogen (H2) and methane (CH4) after lactulose breath test as surrogates of intestinal bacterial overgrowth.

**Methods:** We enrolled 102 patients with advanced HF (stage C-D as per the ACC/AHA classification), NYHA II-IV and no signs of active infection. We analyzed plasma interleukin-1β (IL-1β), interleukin-6 (IL-6), interleukin-10 (IL-10), tumor necrosis factor alpha (TNF-α), C-reactive protein (CRP), procollagen (PCT), leukocytes and lymphocytes together with the assessment of exhaled H2 and CH4 after lactulose administration. Multivariable linear regression analysis was assessed to determine the risk factors that predicted the logarithm of the area under the receiving operator curve of H2 and CH4 (logAUC-H2 and logAUC-CH4, respectively).

**Results:** LogAUC-CH4 was modest and we found a correlation with IL-1β (r=0.21, p=0.032). TNF-α (r=0.23, p=0.018) and IL-10 (r=0.22, p=0.029).

**P1117 Predictive value of leucocyte count for in-hospital mortality in patients hospitalized for acute heart failure**
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1Institutes of Cardiovascular Diseases Prof. C.C. Iliescu, Bucharest, Romania; 2Duke University Medical Center, Durham, United States of America; 3Northwestern University, Chicago, United States of America

**Background:** A large randomized clinical trial showed that low lymphocyte count during hospitalisation for acute HF (AHF) is an independent predictor of poor outcomes in the early post discharge period, but the data regarding the relationship between total leucocyte count and prognosis in this setting is limited.

**Aims:** The aim of this study was to characterize the relationship between leucocyte count and in-hospital mortality in patients hospitalized for AHF.

**Methods:** RO-AHFS registry prospectively enrolled 3224 consecutive patients with primary diagnosis of AHF. This is a post-hoc analysis of 2984 patients who had leucocyte count available at admission. Patients were stratified by quartiles of leucocyte count measured at admission (Table 1). In hospital mortality was determined in each quartile and compared by regression analysis.

**Results:** In univariate analysis, no linear relationship has been found between leucocyte count and in hospital mortality due to cause mortality (HR=1.18 95% CI (0.93-1.28) P=0.43). When mortality was analysed by each quartile, patients in the highest quartile experienced the highest rate of adverse hospital events and the worst outcome as compared to the patients from the lowest quartiles. (Q2 vs Q1 HR=0.98 CI 95% (0.83-1.08) P=0.71; Q3 vs Q2 HR=1.07 CI 95% (0.96-1.16) P=0.60; Q4 vs Q3 HR=1.09 CI 95% (1.04-1.19) P=0.048).

**Conclusion:** In addition to other known predictors, stratification by leucocyte count may help to identify patients at risk for in-hospital mortality. Future research, including prospective studies, may refine determinants of this relationship.

**Table 1.**

<table>
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<tr>
<th>Variable</th>
<th>Q1≤4130/ mmc</th>
<th>Q2=5205-6970/ mmc</th>
<th>Q3=7728-9122/ mmc</th>
<th>Q4=9122/mmc</th>
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<tbody>
<tr>
<td>n</td>
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<td>746</td>
<td>746</td>
<td>746</td>
</tr>
<tr>
<td>Age (years)</td>
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<td>69.5±11.8</td>
<td>70.8±11.3</td>
<td>75.8±11.3</td>
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<td>Gender (female %)</td>
<td>43 ± 41</td>
<td>44 ± 39</td>
<td>39 ± 0.08</td>
<td>0.08</td>
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<tr>
<td>LVEF &lt;45 % ( %)</td>
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<td>68.9 ± 70.1</td>
<td>&lt;0.001</td>
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<tr>
<td>Diabetus mellitus (%)</td>
<td>31.4 ± 33.5</td>
<td>32 ± 33.1</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Ischmic etiolo ( %)</td>
<td>60.1 ± 61.4</td>
<td>61.9 ± 60.8</td>
<td>0.09</td>
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</tr>
<tr>
<td>De novo HF (%)</td>
<td>29 ± 28</td>
<td>26 ± 20</td>
<td>&lt;0.001</td>
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<tr>
<td>SBP (mmHg)</td>
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<td>136±29</td>
<td>140±31</td>
<td>135±22</td>
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<tr>
<td>Serum creatinine (mg/dl)</td>
<td>1.4±0.9</td>
<td>1.4±0.9</td>
<td>0.6</td>
<td></td>
</tr>
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</table>

**Baseline characteristics of sub groups of patients divided by quartiles of leucocyte count. LVEF left ventricular ejection fraction. HF heart failure. SBP systolic blood pressure. BMI body mass index.**
Funding Acknowledgements: Authors contributing to this paper are partly funded by a BMBF CSR-IRG grant, an ATTRACT SFSP grant and a KNAWI strategic grant

Background: Inflammation is a shared mechanism in coronary artery disease (CAD) and subsequent heart failure (HF) and circulating monocyte and lymphocyte counts predict CAD severity and outcomes.

Purpose: The aim of this study was to investigate whether the monocyte-to-lymphocyte ratio (MLR) correlates with biomarkers of HF and extent of CAD, as well as future HF hospitalizations in patients undergoing coronary angiography.

Methods: We studied 1754 patients undergoing coronary angiography for stable CAD, unstable angina or myocardial infarction. MLR was determined at blood draw prior to angiography and related across-sectionally to HF biomarkers (ejection fraction [EF], N-terminal pro-B-type natriuretic peptide [NTproBNP] levels) and CAD severity, as well as longitudinally with risk of HF hospitalizations during follow-up.

Results: The entire cohort, median (interquartile range) MLR was 0.32 (0.24-0.43). High MLR was defined as the upper quartile and significantly associated with non-stable CAD (unstable angina [Odds ratio=1.13; 95% CI (1.06-1.21]) or myocardial infarction [OR=1.10; 1.04-1.16]), more severe CAD (OR=1.39; 1.15-1.68), worse EF (OR=1.63; 1.29-2.05) and higher NTproBNP levels (p<0.07; 0.59-0.96), all p<0.001. The associations with non-stable CAD and NTproBNP remained highly significant after covariate adjustment. Over a mean follow-up of 1.3 years, 46 HF hospitalizations occurred. A high MLR was significantly and independently predictive of HF hospitalizations during follow-up (HR 2.1 [1.1-4.1], p=0.039) after adjustment for covariates.

Conclusions: MLR is strongly related to HF markers and predicts HF hospitalizations during follow-up in coronary angiography patients. This supports a key role of monocyte and lymphocyte-mediated inflammation in the progression towards HF in patients with CAD.
ATRIAL-VENTRICULAR DISJUNCTION (p = 0.38, p < 0.0001) were determinants of GLS.

Conclusion: In No-MR MVP with no other myocardial disease, MVP and associated abnormalities have a significant impact on LV structure and mechanics. The chronic increase in GLS may be the witness of myocardial wall function and structure remodelling in MVP independently of the presence of MR.

P1121
Outcomes of sutureless aortic valve replacement (SU-AVR) in moderate-to-high risk patients with unexplained postoperative thrombocytopenia
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On behalf of: Chula Cardiac Center

OBJECTIVES: The aim of this study was to compare perioperative and postoperative outcomes of first series SU-AVR and AVR in developing country.

Methods: We conducted a retrospective study of SU-AVR in moderate-to-high risk patients (pts). Data of those underwent AVR or SU-AVR from January 2013 to May 2016 were obtained. A 1:1 propensity matching with sex, age and Society of Thoracic Surgeons (STS) score in same period study of AVR group. Preoperative, intraoperative and post-operative echocardiograms (day 3-7) were obtained. Primary outcome was 30-day mortality. Secondary outcomes were perioperative, intraoperative outcomes and complications. After matching, demographics, comorbidities and outcomes of interest were compared using t-tests for categorical and continuous variables, respectively.

Results: 277 pts in both AVR and SU-AVR groups. Until now, there are 10 patients (5 were male, median age of 81.5 years) undergone SU-AVR with propensity compared to AVR in the same period of study. Sutureless valve were successfully implanted in 910 pts. The subjects were 50% male and 50% female with mean age at 81.5 years old. The median STS score in SU-AVR group was 5.77 (2.1-78) vs 5.81 (2.5-34.8) in AVR group. The most common presenting symptom was progressive dyspnea at mean functional class 3. The median Cardiopulmonary bypass (CPB) time was 120 min (48-276) in SU-AVR vs 148 min (103-261) in AVR, p = 0.51. The median cross-clamp duration was 93.5 min (37-157) in SU-AVR vs 124 min (73-168) in AVR, p = 0.14.

Postoperative: echocardiogram demonstrated impressive outcomes in SU-AVR group, defined as reduced mean pressure gradient from 53.1 to 12 mmHg without left ventricular impairment (from 57% pre-operatively to 61% post-operatively vs p = 0.41). 30-day mortality was 20% in both SU-AVR and matched AVR group (p = 1.00). All patient in SU-AVR developed postoperative thrombocytopenia. Platelets level decreased from 225 μl preoperatively to 94.5, 54.5, 50.1 at postoperative day (POD) 1, 2 and 3, respectively compared with 135.5, 93.4, 91.8 in AVR group (p = 0.04, 0.16 and 0.20, respectively). The maximal drop of platelets was found on POD 3. The requirement of platelets transfusion was higher in SU-AVR group compared to AVR (Leucocyte-poor platelet concentration 14.5 units vs 4 units) (p = 0.04).

Conclusion: There was no difference in 30-day mortality among moderate-to-high risk SU-AVR vs AVR. Despite SU-AVR was associated with favorable CPB and clamp time, SU-AVR found related to postoperative thrombocytopenia in all patients.

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some advantages compared to mechanical prostheses: absence of anticoagulation, low risk of endocarditis and thrombogenicity and equivalent survival. However, the durability and incidence of re-operation remains a major concern. The aim was to evaluate the long-term clinical and echocardiographic results of Ross procedure.

Methods: Single-centre retrospective study that included a cohort of 52 adult patients: mean age at surgery of 44 ± 12 years old, 58% men, 33% rheumatic disease and 29% congenital aortic disease. Clinical endpoints included global mortality and the need for valve re-operation due to failure of one graft. Echocardiographic follow-up included the presence of the aortic Ag or pulmonary Hg deterioration by at least moderate regurgitation or stenosis with a mean gradient 20 mmHg. The median clinical follow-up was 20 ± 3 years (1040 patients/year) and the echocardiographic follow-up was 19 ± 4 years.

Results: The indication for surgery was in 40% the predominance of AV stenosis, in 21% prevalence of regurgitation and 31% mixed aortic disease. The subcoronary approach proved to have excellent clinical and hemodynamic results with low rates of reoperation. Moderate aortic regurgitation was a frequent and concordant finding amongst other studies with no clinically significant impact on the mean follow-up and at the 20 years follow up mark.

Conclusion: In the long-term follow-up of the Ross procedure, the subcoronary approach proved to have excellent clinical and hemodynamic results with low rates of reoperation. Moderate aortic regurgitation was a frequent and concordant finding amongst other studies with no clinically significant impact on the mean follow-up and at the 20 years follow up mark.
Methods: From 1987 to 2013, 526 procedures with inoue balloon, double or single Ball balloon technique; 480 without PMC named primary MBV group (PMBVG) and 46 that have been submitted to PMC, the PMC group. The PMC group was older than PMBVG (42.7 ± 12.4 vs 36.9 ± 12.5 years, p = 0.0030). Gender, atrial fibrillation and NYHA functional class were similar. In PMBVG and PMCG, respectively, ES were 7.2 ± 1.4 and 7.7 ± 1.5 points (p = 0.0158) and mitral valve area (MVA) 0.94 ± 0.21 and 1.02 ± 0.22 cm² (p = 0.0699).

Results: Pre-MBV: mean pulmonary artery pressures (PAP) were 37.8 ± 14.2 and 37.8 ± 14.4 mmHg, p = 0.9515; mean gradient (MG) (19.6 ± 6.9 and 18.3 ± 6.9 mmHg, p = 0.2342; MVA 0.90 ± 0.21 and 0.93 ± 0.19 cm², p = 0.4092, respectively, when compare PMBVG and PMCG. Post-MBV: PAP were 26.8 ± 0.90 and 37.6 ± 3.3 mmHg, p = 0.1492; MVA 2.04 ± 0.42 and 1.92 ± 0.41 cm², p = 0.0801, respectively. Mitral regurgitation (MR) were similar pre and post-MBV. Sever MR post-MBV in 10 patients: 8 in PMBVG and 2 in PMCG, p = 0.0204. All theses were not found a siginificantly differences, the total group were divided in ES ≤ 8 and >8 groups: Pre-MBV: PAP 37.5 ± 13.9 and 39.3 ± 16.6 mmHg, p = 0.4041; MVA 19.7 ± 6.8 and 18.3 ± 7.3 mmHg, p = 0.1753; MVA 0.89 ± 0.31 and 0.94 ± 0.20 cm², p = 0.0090 respectively. Post-MBV: PAP 26.7 ± 1.01 and 28.0 ± 10.6 mmHg, p = 0.3735, MVA 5.5 ± 3.6 and 5.5 ± 3.3 mmHg, MVA 2.38 ± 0.42 and 1.90 ± 0.40 cm², p = 0.0090.

Conclusions: Mitral valve commissurotomy in MBV were compare and no differences were found in pre- and post-procedure, as mean pulmonary artery pressure, mean mitral gradient, mean valve area, and mitral regurgitation. Although PMBVG was older, with higher ES, its hemody- namics data were similar. When the entire group was divided based on echo scores, those with echo scores >8 had higher MV (p < 0.0005) and smaller mitral valve post-valvuloplasty. The valve anatomy were more important than prior commissurotomy.

P1127 Emergent balloon mitral valvotomy in pregnant women presenting with refractory pulmonary edema
M Majed Hassine1; M Boussada1; M Ben Messaoud1; M Mahjoub1; Z Dridi1; E De Teresa-Galvan1; E Munoz-Garcia1
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Background: Mitral stenosis is the commonest valvular heart lesion found in pregnancy. When severe, it leads to significant risk of mortality for both mother and fetus, since the hemodynamic adaptations to pregnancy are badly tolerated. Many pregnant women with mitral stenosis present in a critically II condition. The role of balloon mitral valvotomy (BMV) in such patients is ill-defined.

Objectives: We sought to evaluate the feasibility, efficacy and safety of emergent BMV in pregnant women with refractory pulmonary edema and to determine maternal and fetal outcome.

Methods: Of 88 patients undergoing BMV during pregnancy from January 1990 to December 2011 in Cardiology A Department of Monastir Hospital, 28 women underwent balloon mitral valvotomy. Of the 28 women, 15 were primiparas. Mitral valve (MV) was assessed using the Wilkins score which range from 1 to 11 points, with higher Wilkins scores, those with echo scores ≤ 4 groups: Pre-MBV: MPAP 37.5 ± 13.9 and 39.3 ± 16.6 mmHg, p = 0.4041; MVA 19.7 ± 6.8 and 18.3 ± 7.3 mmHg, p = 0.1753; MVA 0.89 ± 0.31 and 0.94 ± 0.20 cm², p = 0.0090 respectively. Post-MBV: PAP 26.7 ± 1.01 and 28.0 ± 10.6 mmHg, p = 0.3735, MVA 5.5 ± 3.6 and 5.5 ± 3.3 mmHg, MVA 2.38 ± 0.42 and 1.90 ± 0.40 cm², p = 0.0090.

Conclusions: The mitral valve commissurotomy in MBV were compare and no differences were found in pre- and post-procedure, as mean pulmonary artery pressure, mean mitral gradient, mean valve area, and mitral regurgitation. Although PMBVG was older, with higher ES, its hemodynamics data were similar. When the entire group was divided based on echo scores, those with echo scores >8 had higher MV (p < 0.0005) and smaller mitral valve post-valvuloplasty. The valve anatomy were more important than prior commissurotomy.

P1129 Long-term outcomes after TAVR in patients with severe aortic stenosis and a reduced left ventricular ejection fraction
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1Department of Cardiology , Malaga, Spain; 2University Hospital Virgen de la Victoria, Department of Cardiology, Malaga, Spain

Left ventricular systolic dysfunction is associated with increased peri-operative risk in patients undergoing surgical aortic valve replacement. Recently, Transcatheter Aortic Valve Replacement (TAVR) has emerged as an alternative to surgical aortic valve replacement for patients considered at high or prohibitive operative risk. We aim to analyze impact of a low ejection fraction in patients undergoing TAVR.

Methods: Between April 2008 and December 2016, 582 patients with symptomatic aortic valve stenosis who were considered high risk or non-surgical candidates underwent implantation with the auto-expandable prosthesis. Echocardiographic data were collected before and after the procedure. Impaired LV function was defined by a left ventricular ejection fraction (LVEF ≤ 50%).

Results: The patients with reduced LVEF had more comorbidities compared with normal function: Charlson index 4 ± 1.8 vs 3.2 ± 1.7, p = 0.001; Karnofsky index 49.8 ± 17 vs. 63.7 ± 17, p = 0.001), Frailty 30.8% vs. 19.2%, p = 0.009, worse Logistic EuroSCORE 27.1 ± 17 vs. 15.4 ± 9, p < 0.001, were more often males (66.0% vs. 36.4%, p = 0.001), more symptomatic (NYHA class IV 50.8% vs. 24.3%, p < 0.001), were younger (76.6 ± 9 vs. 80 ± 5, p = 0.001) and had a higher prevalence of prior coronary artery disease (63.5% vs. 46%, p = 0.001). Patients with reduced LVEF showed a good evolution of left ventricular ejection fraction over time (pre-procedure and 1 year): 33.8 ± 5 vs. 44.3 ± 11 vs. 54 ± 12%, respectively p = 0.001. No difference was observed between the 2 groups in mortality at 30-days (5.8% vs. 2.9%, p = 0.150). At a mean follow-up of 37 ± 25 months, there were no significant differences with late mortality (29.6% vs. 34.1%, p = 0.395).

Conclusions: In patients with severe aortic stenosis and a low ejection fraction, TAVI is associated with better LVEF recovery and the immediate and long-term outcome after TAVI not seem to differ between patients with an impaired and preserved LVEF.
Cardiac resynchronization therapy (CRT) is one of recent advancements in heart failure (HF) treatment. However, the clinical improvement has proved to be highly variable and insufficiently predictable. Despite application of established selection criteria, 20–40% of the patients do not respond to CRT. The aim of this study was to test a hypothesis on the influence of lead positioning in the ventricular walls on CRT response. We examined 53 first-time CRT recipients with NYHA class III-IV HF, with sinus rhythm, left bundle branch block, QRS duration <120 ms, left ventricular ejection fraction (LVEF) <35%. Response to CRT was defined in 6 months after operation as: a decrease in the LV end-systolic volume ≥15%, a relative increase in the LVEF, a decrease in the functional class of chronic HF. All patients were classified as responders (n = 28) or non-responders (n = 25). The anatomic inter-lead distance, the horizontal and vertical components (Fig. 1) were determined with using patient chest radiographs recorded in the antero-posterior (AP), 30° left anterior oblique (LAO) and 30° right anterior oblique (RAO) positions. All individual measurements for a patient were normalized by the end-diastolic LV linear dimension (LVLD) to take into account differences in the heart size between patients. A comparison between groups was made with using SPSS 22.0 software packages. The data are presented as Mean ± SD. The area under the ROC-curves (AUC) was used to assess diagnostic significance of the parameters. No correlation between the interventricular lead distance and response to CRT was found (Table 1). We could speculate that not only the leads position in the ventricles are essential for CRT success, but functional characteristics of myocardium and patho-physiological factors have to be accounted to predict CRT responders. These hypotheses will be further tested by our group.

**Table 1**

<table>
<thead>
<tr>
<th>Position</th>
<th>Inter-lead distance (normalized by the LVLD)</th>
<th>Responders</th>
<th>Non-responders</th>
<th>p (t-test)</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inter-lead distance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP</td>
<td>Anatomic</td>
<td>0.81 ± 0.4</td>
<td>0.75 ± 0.3</td>
<td>0.606</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Horizontal component</td>
<td>0.54 ± 0.4</td>
<td>0.54 ± 0.3</td>
<td>0.997</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Vertical component</td>
<td>0.48 ± 0.4</td>
<td>0.42 ± 0.3</td>
<td>0.564</td>
<td>0.58</td>
</tr>
<tr>
<td>LAO</td>
<td>Anatomic</td>
<td>1.08 ± 0.4</td>
<td>1.26 ± 0.4</td>
<td>0.184</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>Horizontal component</td>
<td>0.95 ± 0.5</td>
<td>1.11 ± 0.4</td>
<td>0.290</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>Vertical component</td>
<td>0.37 ± 0.3</td>
<td>0.46 ± 0.3</td>
<td>0.439</td>
<td>0.58</td>
</tr>
<tr>
<td>RAO</td>
<td>Anatomic</td>
<td>0.82 ± 0.4</td>
<td>0.69 ± 0.2</td>
<td>0.216</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td>Horizontal component</td>
<td>0.53 ± 0.4</td>
<td>0.43 ± 0.3</td>
<td>0.294</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Vertical component</td>
<td>0.53 ± 0.4</td>
<td>0.42 ± 0.3</td>
<td>0.384</td>
<td>0.51</td>
</tr>
</tbody>
</table>

**Conclusion:** Reduction in TA is a reliable index of RMR, which relates to MR response, and functional and echocardiographic improvement with CRT. Both LEBBB and non-ischemic etiology predict RMR.
P1132
Heart failure diagnostic sensor measurements during clinically stable epochs in ambulatory heart failure patients

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1Golden Jubilee National Hospital, Clydebank, United Kingdom; 2Cardiology Associates of North East Arkansas, Arkansas, United States of America; 3Washington Hospital Center, Washington, United States of America; 4East-Slovak Institute of Cardiovascular Diseases, Kosice, Slovak Republic; 5Boston Scientific, Research, Arden Hills, United States of America; 6Penn State Milton S Hershey Medical Center, Hershey, United States of America

On behalf of: MULTISENSE Study Investigators

Background: A multi-sensor algorithm based on implanted device based sensor data has been shown to detect impending worsening Heart Failure (HF) events. The objective of this analysis was to characterize the “normal” range of these sensor values when patients were estimated to be clinically stable, and compare it to pre-HF event periods.

Methods: The MULTISENSE trial enrolled 800 patients implanted with a COGNIS CRT-D and followed them up to 1 year. Device software was modified to permit collection of chronic diagnostic sensor data including heart sounds, respiration, thoracic impedance, heart rate and activity. HF status was assessed by in-office physical assessment at routine follow-up visits scheduled either every three months if the patients had remote monitoring, or 6-8 weeks if not. Patients were deemed to be clinically stable between successive follow-up visits if their NYHA classification was unchanged, weight change was within 5 lbs (2.27kg) and no adverse events were reported between the visits. Sensor data from clinically stable epochs were compared with 7 day average sensor data prior to independently adjudicated worsening HF events defined as HF admissions or unscheduled visits with intravenous HF treatment using 2 sample t-test.

Results: Of 900 patients, 616 patients yielded 1667 clinically stable epochs of duration 60 ± 22 days, while 88 patients had 146 HF events. Table summarizes sensor data during clinically stable epochs and prior to worsening HF as mean (μ) ± standard deviation (σ).

Conclusions: All individual HF diagnostic sensors used in the multi-sensor algorithm are different when patients are clinically stable versus when they are experiencing worsening HF events. Additional studies are needed to investigate if interventions in response to early recognition of these changes will reduce HF events.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Analysis</th>
<th>Multivariate Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ischemic etiology</td>
<td>4.083  1.709 - 9.759  0.012</td>
<td>3.130  1.169 - 8.380  0.021</td>
</tr>
<tr>
<td>Baseline QRS duration</td>
<td>0.998  0.987 - 1.010  0.197</td>
<td>4.083  1.709 - 9.759  0.012</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>1.216  0.481 - 3.075  0.042</td>
<td>1.040  0.481 - 3.075  0.042</td>
</tr>
<tr>
<td>LBBB morphology</td>
<td>2.545  1.052 - 6.160  0.023</td>
<td>2.545  1.052 - 6.160  0.023</td>
</tr>
</tbody>
</table>

Predictors of reversed mitral remodeling (RMR) after CRT.

Geometric indices and MR response

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lower burden in CRT-P vs CRT-D patients, with additional differences in the latter group between primary prevention indication (non-ischemic or ischemic etiology of heart failure) or secondary prevention indication for the ICD-component. Regression analyses revealed that the presence of advanced age, NYHA class IV, intolerance to beta-blockers and underlying non-ischemic cardiomyopathy independently associates with a reduced benefit of the primary prevention CRT-D on top of CRT-P.

Conclusions: The majority of contemporary heart failure patients as currently selected for CRT-P exhibit mainly non-cardiac driven mortality and low ventricular arrhythmia burden, suggesting little incremental value of the addition of a defibrillator.

### P1134
Risk reduction in cardiovascular deaths or hospitalizations in subgroups of CRT patients optimized using the SonR contractility sensor: RESPOND-CRT subgroups analyses

L. Piazzelli; J. Brachmann1; J. Brambilla1; J. Sacco2; S. Asbach3; H. Manyam3; M. Zecchin1; D. Debari1; J. Singh12
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On behalf of: RESPOND-CRT investigators

Funding Acknowledgements: The study was sponsored by LivNova CRM

Purpose: RESPOND-CRT is a prospective, double-blinded, multi-center, non-inferiority trial designed to assess the safety and efficacy of the SonR system in heart failure (HF) patients (pts) eligible for cardiac resynchronization therapy (CRT). SonR is a contractility sensor-based system that automatically adjusts atrio-ventricular (AV) and inter-ventricular (VV) timings according to pts needs.

Methods: After implant, pts were randomized (2:1) to receive repetitive, automatic AV and VV optimization with SonR versus AV and VV Echo-guided optimization at discharge. We conducted a secondary analysis on time to first event of cardiovascular (CV) deaths or CV hospitalizations in subgroups of pts with renal failure (RF - Glomerular Filtration Rate GFR < 60), and history of atrial fibrillation (AF). An adjusted Cox regression analysis was performed on all adjudicated events up to 24 months. The type of CV events is presented.

Results: The study randomized 998 pts to either SonR (n = 670) or Echo (n = 328). For CV deaths or CV hospitalizations, in pts with history of AF (153 patients), SonR was associated with 56% risk reduction (HR=0.44, 95%CI: 0.26-0.76, p < 0.01) and in pts with RF (165 patients), 44% risk reduction (HR=0.56, 95%CI: 0.36-0.88, p=0.001). HF and AV rhythm disorders were the main reasons for CV hospitalization (table).

Conclusions: CRT optimization using the SonR contractility sensor was associated with additional benefits through significantly reduced risk of CV deaths or CV hospitalizations in pts with history of AF or RF.

### Listings of CV deaths / hospitalizations

<table>
<thead>
<tr>
<th>Group</th>
<th>N=99</th>
<th>N=153</th>
<th>N=165</th>
<th>N=61</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF History patients</td>
<td>SonR -</td>
<td>Echo -</td>
<td>SonR -</td>
<td>Echo -</td>
</tr>
<tr>
<td>RF patients</td>
<td>N=165</td>
<td>N=54</td>
<td>N=104</td>
<td>N=61</td>
</tr>
<tr>
<td>ALL CV hospitalizations</td>
<td>32 (32.3%)</td>
<td>28 (51.9%)</td>
<td>44 (24.3%)</td>
<td>36 (59.0%)</td>
</tr>
<tr>
<td>- Cardiovascular death excluding HF</td>
<td>1 (3.1%)</td>
<td>0 (0.0%)</td>
<td>1 (2.3%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>- HF episode leading to death</td>
<td>1 (3.1%)</td>
<td>0 (0.0%)</td>
<td>3 (6.8%)</td>
<td>2 (5.6%)</td>
</tr>
<tr>
<td>- HF hospitalization</td>
<td>16 (50.0%)</td>
<td>16 (57.1%)</td>
<td>22 (50.0%)</td>
<td>19 (52.8%)</td>
</tr>
<tr>
<td>- Atrial rhythm disorder</td>
<td>4 (12.5%)</td>
<td>5 (17.9%)</td>
<td>4 (11.1%)</td>
<td>2 (5.6%)</td>
</tr>
<tr>
<td>- Ventricular rhythm disorder</td>
<td>4 (12.5%)</td>
<td>3 (10.7%)</td>
<td>2 (4.5%)</td>
<td>3 (8.3%)</td>
</tr>
<tr>
<td>- CVA / Stroke</td>
<td>1 (3.1%)</td>
<td>0 (0.0%)</td>
<td>2 (4.5%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>- Myocardial infarction</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (2.3%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>- Heart transplant</td>
<td>1 (3.1%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>- Other cardiovascular event</td>
<td>4 (12.5%)</td>
<td>4 (14.3%)</td>
<td>9 (20.5%)</td>
<td>8 (22.2%)</td>
</tr>
</tbody>
</table>

### P1135
Impact of left ventricular scar and synchronization parameters on reverse left ventricular remodeling

W. Walid Ahmed1; W. Samy1; O. Tayeh1; N. Beshay2; A. Hassan1
1 Cairo University Hospitals, Critical care department, Cairo, Egypt; 2 Cairo University Hospitals, Radiology department, Cairo, Egypt

BACKGROUND: Left ventricular dyssynchrony and scar could predict response to cardiac resynchronization therapy (CRT)

PURPOSE: Explore role of LV dyssynchrony and scar impacts on reverse LV remodeling.

Methods: Thirty patients received CRT. Assessment of left ventricular (LV) dyssynchrony by Gated SPECT LV phase analysis. Cardiac magnetic resonance with late gadolinium enhancement technique to examine LV scar burden.

Results: Thirty patients received CRT (mean age 58.7 ± 9.0, 24 males). Reverse LV remodeling (decrease ≥ 15% from baseline LV end-systole) was documented in 19 patients. Temporal changes in LV dyssynchrony parameters were correlated to LV reverse remodeling. Non-responders showed higher scar burden by CMR (41.2 ± 7.8 vs 30.3 ± 11.1, P = 0.008). Left ventricular phase analysis parameters were correlated to summed rest score and CMR scar burden. Multivariate regression showed CMR scar burden (P < .001), delta change in histogram BW (P = 0.006) and delta change in histogram SD (P = 0.005) were independent predictors of reverse LV remodeling. Predicting CRT non-response showed a cutoff ≥35.5% of global LV scar burden had a sensitivity of 81.8% and specificity of 68.4%.

Conclusion: Reverse LV remodeling was associated with temporal improvements in LV dyssynchrony parameters. LV scar had an unfavorable impact, improving dysynchronous contractions resulted into better reverse LV remodeling.

### ROC analysis for CRT non response status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>AUC</th>
<th>P</th>
<th>Cut-off</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global scar burden CMR</td>
<td>78.0%</td>
<td>.012</td>
<td>36.5%</td>
<td>81.8%</td>
<td>68.4%</td>
</tr>
<tr>
<td>Delta change in histogram BW</td>
<td>90.0%</td>
<td>&lt; .001</td>
<td>-28.8%</td>
<td>100.0%</td>
<td>73.7%</td>
</tr>
<tr>
<td>Delta change in histogram SD</td>
<td>91.6%</td>
<td>&lt; .001</td>
<td>-27.1%</td>
<td>100.0%</td>
<td>73.7%</td>
</tr>
</tbody>
</table>

AUC area under curve
### P1136

**Changes and predictive value of filtered qrs duration for mortality in non ischemic heart failure patients with cardiac resynchronization therapy**

YM Minami1; AS uzuki1; TS higata1; K Ejima1; M Shoda1; N Hagiwara1

1Tokyo Women’s Medical University, Department of cardiology, Tokyo, Japan

**Introduction:** Cardiac resynchronization therapy (CRT) improves quality of life, and reduces the risks of hospitalization for heart failure (HF) or death in selected heart failure patients. The aim of this study is to evaluate the association between changes of filtered QRS duration (fQRS) recorded by signal averaged electrocardiograph (SAECG) after Cardiac resynchronization therapy (CRT) and mortality.

**Methods:** This study included 103 consecutive non-ischemic HF patients who implanted CRT between 2004 to 2015. Patients were divided into narrowing fQRS and widening fQRS groups according to the changes of fQRS before and after CRT. The impact of narrowing fQRS on all-cause mortality was investigated.

**Results:** During a median follow-up time of 33 [18-50] months, 27 (26%) patients died from any cause. 50 (49%) patients with widening fQRS after CRT had more frequently ischemic heart disease and had shorter fQRS before CRT than patients with narrowing fQRS after CRT. There is a significantly higher rate of patients with reverse remodeling in patients with narrowing fQRS after CRT than patients with widening fQRS. Cox proportional hazards analysis found that widening fQRS was a significantly associated with reduced mortality (HR: 2.98, 95% CI 1.21-7.35, P < 0.05).

**Conclusion:** After CRT, HF patients with narrowing fQRS showed significantly higher responder rate than patients with widening fQRS. Narrowing fQRS is an independently associated with reduced mortality in HF patients receiving CRT.

### P1137

**Cardiac resynchronization therapy optimization by pressure recording analytical method: feasibility, efficacy and correlation with electrocardiographic and echocardiographic methods**

D Castagno1; M Bisi1; PG Golini1; C Budano1; A Bissolino1; M Arsenino1; F Ferraris1; C Giustetto1; FG aitata1

1Division of Cardiology, Department of Medical Sciences, University of Turin, Turin, Italy

**BACKGROUND:** Nonresponse to cardiac resynchronization therapy (CRT) affects up to 40% of system recipients. Suboptimal device programming has been identified as one of the main determinant factors of poor CRT response.

**PURPOSE:** To investigate the efficacy of AV and VV optimization performed using haemodynamic parameters obtained with the pressure recording analytical method (PRAM), a new, minimally invasive technique allowing beat-by-beat stroke volume (SV) and cardiac output (CO) monitoring from the pressure signals recorded in femoral or radial arteries.

**Methods:** After implant, consecutive CRT recipients (patients with symptomatic heart failure despite optimal medical therapy, in sinus rhythm and with complete left bundle branch block) underwent PRAM-based device optimization aiming at the highest SV and CO. Correlation between PRAM-based, standard ECG (QRS axis, QRS duration and presence of R wave in lead VI) and echocardiographic (mitral and aortic velocity time integral [VTI], Ritter’s method, myocardial performance index [MPI]) CRT optimization was also investigated.

**Results:** Twenty-five patients (mean age=67±11 years, female=8, mean LVEF=29±6%, ischaemic aetiology=6) had CRT implanted. Simultaneous biventricular pacing with standard programming (AV 110/130 ms, VV 0 ms) determined a significant improvement in cardiac performance which was further enhanced after PRAM-based AV and VV delays optimization (Table). Mitral and aortic VTI showed the best correlation with PRAM-based optimization which was only poorly correlated with MPI and Ritter’s method (Figure).

**Conclusions:** PRAM-based optimization is effective in maximizing CRT hemodynamic response and may be useful in reducing nonresponse.

### Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline Standard AV/VV</th>
<th>PRAM-based AV optimization</th>
<th>PRAM-based VV optimization</th>
<th>P-value for trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke volume (ml)</td>
<td>63.4</td>
<td>66.6</td>
<td>71.4</td>
<td>75.5</td>
</tr>
<tr>
<td>Cardiac output (l/min)</td>
<td>4.0</td>
<td>4.3</td>
<td>4.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Cardiac index (l/min/m²)</td>
<td>2.3</td>
<td>2.5</td>
<td>2.8</td>
<td>2.7</td>
</tr>
<tr>
<td>dP/dt (mmHg/ms)</td>
<td>0.87</td>
<td>0.93</td>
<td>0.95</td>
<td>0.96</td>
</tr>
<tr>
<td>EA VTI (cm)</td>
<td>21.8</td>
<td>23.5</td>
<td>24</td>
<td>24.1</td>
</tr>
<tr>
<td>LVOT VTI (cm)</td>
<td>17.9</td>
<td>18.0</td>
<td>18.7</td>
<td>20.2</td>
</tr>
</tbody>
</table>

VTI = velocity time integral; LVOT = left ventricular outflow tract

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level of hemoglobin <11 g/dL (81% vs. 31%, p = 0.01), and estimated glomerular filtration rate (eGFR) <45 ml/min/1.73m2 (79% vs. 40%, p = 0.01). Multivariate Cox proportional hazards model showed that prior ventricular tachycardia/fibrillation (hazard ratio, 3.04; 95% confidence interval [CI], 1.37 to 6.74; p = 0.01), and eGFR <45 (hazard ratio, 4.11; 95% CI, 1.58 to 7.72; p < 0.01) were independent predictors of CCE.

Conclusion: ADHF patients with CRT indication tended to have poorer prognosis than those with non-CRT indication. Prior ventricular tachycardia/fibrillation and decreased renal function were predictors of poor prognosis of ADHF patients indicated for CRT.

Table 1. Baseline Characteristics

<table>
<thead>
<tr>
<th>Table 1. Baseline Characteristics</th>
<th>SINUS RHYTHM</th>
<th>BASAL AF</th>
<th>AF AT FOLLOW-UP</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>69±14</td>
<td>71±9</td>
<td>70±9</td>
<td>0.269</td>
</tr>
<tr>
<td>Sex male, n(%)</td>
<td>103(74.6)</td>
<td>105(85.4)</td>
<td>45(67.2)</td>
<td>0.011</td>
</tr>
<tr>
<td>Ischemic cardiomyopathy, n(%)</td>
<td>52(37.7)</td>
<td>41(33.3)</td>
<td>26(38.8)</td>
<td>0.682</td>
</tr>
<tr>
<td>NYHA class, n(%)</td>
<td>45(32.6)</td>
<td>25(20.3)</td>
<td>9(13.4)</td>
<td>0.023</td>
</tr>
<tr>
<td>CRT-D, n(%)</td>
<td>85(61.6)</td>
<td>65(52.8)</td>
<td>36(53.7)</td>
<td>0.948</td>
</tr>
<tr>
<td>DM, n(%)</td>
<td>37(26.8)</td>
<td>24(19.5)</td>
<td>16(23.9)</td>
<td>0.380</td>
</tr>
<tr>
<td>Sinus vein, n(%)</td>
<td>21(15.7)</td>
<td>36(29.3)</td>
<td>12(18.2)</td>
<td>0.085</td>
</tr>
<tr>
<td>Anterior Lateral</td>
<td>73(54.5)</td>
<td>59(48.0)</td>
<td>36(57.6)</td>
<td>0.154</td>
</tr>
<tr>
<td>Posterior</td>
<td>40(29.9)</td>
<td>28(22.8)</td>
<td>20(30.8)</td>
<td>0.43</td>
</tr>
<tr>
<td>Glomerular filtration rate</td>
<td>62±26</td>
<td>58±23</td>
<td>62±21</td>
<td>0.336</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>13±2</td>
<td>13±2</td>
<td>13±1</td>
<td>0.086</td>
</tr>
<tr>
<td>LVEF(%)</td>
<td>27±8</td>
<td>28±7</td>
<td>26±6</td>
<td>0.121</td>
</tr>
<tr>
<td>LVEF(mℓ)</td>
<td>168±61</td>
<td>156±59</td>
<td>177±57</td>
<td>0.081</td>
</tr>
</tbody>
</table>

P1139
Atrial fibrillation at follow-up does not worsen the prognosis of cardiac resynchronization therapy
B Belen Alvarez1; FJ Garcia Seara1; D Iglesias Alvarez1; RA Abellas Sequeiros1; L Gonzalez Melchor1; M Rodriguez Manero1; A Martinez Monciones2; A Varela Roman1; JL Martinez Sande1; JJ Gonzalez Juanteley1
1University Clinical Hospital of Santiago de Compostela, Department of Cardiology, Santiago de Compostela, Spain

OBJECTIVES: The aim of this study was to evaluate the impact of atrial fibrillation (AF) in the follow-up in patients with heart failure receiving cardiac resynchronization therapy (CRT).

BACKGROUND: CRT has been demonstrated good outcomes in sinus rhythm (SR). However, the prognosis of patients who develop AF at follow-up is unknown. Although it is believed that they have a worse prognosis than those with non-CRT indication. Prior ventricular tachycardia/fibrillation and decreased renal function were predictors of poor prognosis of ADHF patients indicated for CRT.

RESULTS: 138 (37.7%) patients were on SR, 123 (37.5%) were on basal AF and 67 (20.4%) were on AF at follow-up. Baseline characteristics were shown in Table 1. Basal AF was associated with an increased risk of HF/mortality in unadjusted analysis (HR 1.80, CI 95% 1.28-2.54, p=0.001) and adjusted analysis (HR 1.70, CI 95% 1.21-2.65, p=0.004) compared with SR. AF at follow-up was not associated with an increased risk of HF/mortality in unadjusted analysis [HR 1.39, CI 95% 0.94-2.08, p=0.103] and adjusted analysis compared with SR (HR 1.45, CI 95% 0.93-2.25, p=0.103).

Conclusions: Patients with basal AF was associated with worse outcomes in HF/mortality events compared with SR. However, AF at follow-up was associated with similar risk of HF/mortality than SR.
can considerably improve the clinical symptoms and possibly reduce the risk of rehospitalization. We report on our initial experience in patients with an implanted pulmonary artery pressure sensor (PAP), who developed severe MR requiring correction. Due to severe comorbidity, the heart team proposed an interventional approach using mitral clip-implantation. Here, we report on the possibility to directly measure the efficacy of the interventional mitral clip-procedure using ambulatory hemodynamic-telemonitoring.

Methods: Patients fitted with a PAP-sensor and severe, symptomatic MR received a mitral clip-implantation. Results: 4 patients (mean age of 66 ± 6 years) with advanced systolic heart failure (NYHA III, LVEF 21 ± 3%, cardiac index 1.8 ± 0.3) previously fitted with an implanted PAP-sensor received mitral clip-implantation for severe MR (VC莫斯 7 ± 1 mm). In comparison to the PAP values 4 weeks before the mitral clip-procedure, PAP was profoundly and significantly reduced in all 4 patients both after 30 days (delta PAPsys -16 ± 4, delta PAPmean -11 ± 5, delta PAPdias -7 ± 3 mmHg, p < 0.02) as well as after 90 days (delta PAPsys -14 ± 4, delta PAPmean -13 ± 4, delta PAPdias -9 ± 2 mmHg, p < 0.02). Reductions in PAP were accompanied by a significant clinical and echocardiographic improvement. No patient died and there was no hospitalization for cardiac decompensation.

Conclusion: In patients with advanced heart failure, the success of the interventional mitral clip-procedure can be confirmed by hemodynamic-telemonitoring demonstrating a profound and significant reduction of pulmonary artery pressure using an implanted PAP-sensor. Thus, daily non-invasive hemodynamic-telemonitoring allows for the first time a continuous investigation of the efficacy of interventional therapies in patients with chronic heart failure.

P1145
Axillary implantation of Impella CP allows early rehabilitation of patients in cardiogenic shock bridged to heart transplantation.

D Couto-Mallon1; F Esteve-Cid2; C Velasco-Garcia3; JM Herrera-Norena1; C Iglesias-Gil2; M Soledo-Buceta2; L Soane-Duque2; V Alfer-Fernandez2; S Fijon-Polanco2; M Balca-Caballero1; G Barge-Caballero1; MJ Paniagua-Martin1; MG Crespo-Leiro1; JJ Cuenca-Castillo3; 4

Background: In cardiogenic shock (CS), the use of mechanical circulatory support devices as an alternative to conventional treatment is mandatory. Axillary implantation of Impella CP allows early rehabilitation of patients while on support.

Methods: Retrospective single-centre descriptive study of CS patients bridged to HT on support with Impella® CP through axillary artery between March and December of 2016. We collect data about survival, time of mechanical ventilation after HT, days in ICU, days to hospital discharge and major complications including bleeding or infection.

Results: 4 patients were bridged to HT with a transaxillary Impella® CP. Data of patients are in the table below. All Impella CP devices were surgically implanted using a Dacron graft. Patients 1, 2 and 3 had received an intraaortic balloon pump before Impella® CP. All patients were extubated immediately after Impella® CP implantation and started an early rehabilitation program consistent in kinesitherapy, respiratory physiotherapy and active movements. Median time on device support was 15.3 days (IQR 11.25 to 15.5). In one patient the device had to be repositioned due to displacement. Median time of ICU stay after HT was 7.5 days (IQR 5.9 to 7.75) and median time to hospital discharge after HT was 29.5 days (IQR 26 to 33.5). All patients were discharged alive. Major complications after HT were bleeding in one patient with cardiac tamponade and an ischemic stroke in other patient with significant bilateral carotid stenosis. Patient recovered without neurologic sequelae.

Conclusion: Axillary implantation of Impella® CP seems to be a valid strategy for bridging patients in INTERMACS 1 and 2 for HT allowing early initiation of rehabilitation therapy while on support.

P1146
Morphological and functional features of left ventricular remodeling after ventricular assist devices support

V. Valeria Krachak1; A. Smalenski2; L. Shostakova2; O. Yudina2; D. Krachak2; 1

Background: Data indicating benefit of mechanical circulatory support in CS, but the choice of VADs for CS remains challenging. The Intra-aortic balloon pump had been frequently used in the treatment of CS, but limited data were available on the morphological and functional features of left ventricular remodeling after VAD support.

Methods: Morphological and functional parameters were studied in 18 VAD patients in cardiogenic shock, who received mechanical circulatory support. To evaluate morphological and functional features of the left ventricle, we used echocardiography and CMR imaging.

Results: Baseline echo parameters before VAD implantation were: LV EF - 17.5 ± 18.75%, LV EDV - 281 ± 523 (223: 402.5) ml, LV ESV - 230.5 ± 353 ml, during mechanical support LV EF changed to 34 ± 18.49% (p < 0.02) and LV EDV - to 165 (104.5: 231.5) ml (p < 0.02). Changes in diameter of cardiomyocytes were -18.6 ± 4.33 mm (p < 0.001). Changes in diameter of cardiomyocytes were -5.13 (<11.09: 1.41) mm. There was a negative correlation between the duration of VAD use and the diameter of cardiomyocytes.

Conclusion: Prolonged VAD support was associated with LV myocardial remodeling such as increased LVEF, reduced LV EDV and ESV, as well as decreases in myocardial hypertrophy degree were evaluated.

P1147
Axillary implantation of Impella CP device (Abiomed, Inc) is a novel implantation method for patients in cardiogenic shock (CS), which facilitates a better placement of the device and allows mobilization of patients while on support.

D Couto-Mallon1; F Estève-Cid2; C Velasco-Garcia3; JM Herrera-Norena1; C Iglesias-Gil2; M Soledo-Buceta2; L Soane-Duque2; V Alfer-Fernandez2; S Fijon-Polanco2; M Balca-Caballero1; G Barge-Caballero1; MJ Paniagua-Martin1; MG Crespo-Leiro1; JJ Cuenca-Castillo2

Background: Axillary implantation of Impella CP device is still challenging. The Intra-aortic balloon pump had been frequently used in the treatment of CS, but limited data were available on the morphological and functional features of left ventricular remodeling after VAD support.

Methods: Morphological and functional parameters were studied in 18 VAD patients in cardiogenic shock, who received mechanical circulatory support. To evaluate morphological and functional features of the left ventricle, we used echocardiography and CMR imaging.

Results: Baseline echo parameters before VAD implantation were: LV EF - 17.5 ± 18.75%, LV EDV - 281 ± 523 (223: 402.5) ml, LV ESV - 230.5 ± 353 ml, during mechanical support LV EF changed to 34 ± 18.49% (p < 0.02) and LV EDV - to 165 (104.5: 231.5) ml (p < 0.02). Changes in diameter of cardiomyocytes were -18.6 ± 4.33 mm (p < 0.001). Changes in diameter of cardiomyocytes were -5.13 (<11.09: 1.41) mm. There was a negative correlation between the duration of VAD use and the diameter of cardiomyocytes.

Conclusion: Axillary implantation of Impella® CP device (Abiomed, Inc) is a novel implantation method for patients in cardiogenic shock (CS), which facilitates a better placement of the device and allows mobilization of patients while on support.

P1148
Intubation after HT (hours) Days to discharge after HT Complications

Patient Gender Age Heart condition INTERMACS profile at implantation Time of support (days) Intubation after HT (hours) ICU stay after HT (days) Days to discharge after HT

1 Male 65 Idiopathic dilated cardiomypathy 2 20 11 6 30 Cardiac tamponade

2 Male 58 Ischemic cardiomypathy 1 6 72 9 44 Ischemic stroke

3 Male 60 Idiopathic dilated cardiomypathy 2 13 96 12 29 None

4 Male 66 Eosinophic myocarditis 2 14 12 4 17 None

ICU: Intensive care unit; HT: Heart transplant.
used in CS, but was previously found to provide no mortality benefit. Many shock centres now prefer active LV support as provided by the Impella microaxial pump. A recent underpowered prospective trial, however, demonstrated no mortality benefit for Impella over balloon-pump in CS, but all patients in the Impella cohort (vs. 83% in the balloon-pump group) had been resuscitated before implantation.

**Methods:** and Results: We investigated consecutive patients (58±13 years) with cardiogenic shock presenting at our institution, who received an ImpellaCP for isolated LV support (n = 62). 61% had been resuscitated before Impella insertion. In a hierarchical analysis we assessed all patients supported on ImpellaCP for CS irrespective of the necessity for resuscitation before implantation, as well as patient subgroups stratified by resuscitation before LV support. Overall survival was 48% at hospital discharge, 43% after 6 months and 38% after 12 months. 30-day mortality increased after out-of-hospital cardiac arrest (resuscitated: 65%; non-resuscitated: 21%), with concomitant RV failure (RV ±: 100%; RV -: 33%), and when Impella implantation was performed after PCI in case of ischemic CS (pre-PCI: 40%; post-PCI: 61%). Patients in our local registry, who fitted the inclusion/exclusion criteria of the SHOCK II trial had a markedly lower mortality (24% at 30 days) compared to the published trials.

**Conclusion:** Active hemodynamic support with ImpellaCP in singular LV failure results in lower than previously reported mortality rates. RV failure or pre-implantation cardiac arrest critically influences observed mortality and should be taken into account when performing clinical trials aiming to address mortality in CS patients.

**P1147**

A proposed algorithm to assist first responders in resuscitation of patients with left ventricular assist devices (LVADs)

**K Chu** 1; **SA Schaffer** 1

1 St. Boniface General Hospital, University of Manitoba, Winnipeg, Canada

**Background:** The prevalence of patients with left ventricular assist devices (LVAD) is increasing. If a LVAD patient collapses, emergency personnel must decide if immediate cardiopulmonary resuscitation (CPR) is safe, necessary, and effective.

Even within implanting centers, expertise on LVAD emergencies is limited to the advanced heart failure and cardiovascular surgical units.

**Purpose:** To propose an addition to the Advanced Cardiac Life Support algorithm specifically for LVAD patients and determine its application in case scenarios.

**Methods:** We reviewed and summarized the literature to devise an addition to the current Advanced Cardiac Life Support algorithm specific to LVAD patients. We then applied it to three cases.

**Results:** Continuous flow LVAD patients inherently do not have a pulse. Its absence cannot be used as a marker of hypoperfusion and need for CPR. As long as the LVAD is operating, there should be blood flow into the LVAD and out of the heart.

Uncertainty in how to manage this population may lead to delayed resuscitative measures reducing probability of favorable outcomes. In our proposed algorithm, priority is to determine if an unconscious patient has adequate perfusion and to restore it quickly prior to neurological injury if necessary. Uncounsciousness may be related to low cardiac output from LVAD malfunction, but non-LVAD related causes remain on the differential. LVAD malfunction is associated with audible alarms and visible messages on patient controllers. If the patient controller indicates normal functioning (lights on, no alarms), absolute LVAD failure and low output is unlikely. If unconsciousness is due to low cardiac output resulting from LVAD malfunction or primary cardiac pathology (e.g. right ventricular arrhythmias, low LV pre-load), immediate efforts to restore perfusion is essential. CPR has a theoretical risk of cannula dislodgement and should be deferred if alternative therapies are immediately available. Published case series have not demonstrated this. The controller should be quickly identified and examined. Check all connections from patient to driveline to controller to batteries/power base. Given the complexity and risk of controller exchange and rainty of failure, routine exchange without confirmation of malfunction is discouraged. If connections are intact, LVAD lights are off or alarming and no LVAD hum is auscultated, start immediate compressions. If a dysrhythmia is suspected and defibrillator is quickly accessible, this can be delayed. We applied our algorithm to cases involving an unconscious, spontaneously breathing patient in an outpatient hospital lab, a cardiac arrest called to the emergency room, and paramedics arriving to a patient with the LVAD alarming.

**Conclusion:** CPR in LVAD patients is safe and sometimes necessary. Our proposed algorithm assists first responders to provide timely and life-saving medical care to this special group of patients.

**P1148**

Acute kidney injury early after CF-LVAD implantation is associated with high mortality rates: a multicenter study.

**Rahat Muslem** 1; **K Callekar** 1; **S Akter** 1; **A Constantinescu** 1; **GJ Whitman** 2; **RJ Teeford** 2; **DA Hesseltine** 1; **AJJ Bogers** 3; **SD Russell** 4; **D C Mariette** 1

1 Erasmus Medical Center, Cardiology, Rotterdam, Netherlands; 2 Johns Hopkins University of Baltimore, Cardiothoracic Surgery, Baltimore, United States of America; 3 Johns Hopkins University of Baltimore, Cardiology, Baltimore, United States of America; 4 Erasmus Medical Center, Nephrology, Rotterdam, Netherlands

**Purpose:** Data on the consequence of acute kidney injury (AKI) after continuous-flow left ventricle assist devices (LVADs) are scarce and inconsistent. In the current study, the incidence and predictors of AKI and its impact on mortality and renal function in the first year after LVAD implantation was evaluated.

**Methods:** A retrospective multicenter cohort study was conducted, including all patients (age ≥18) undergoing LVAD implantation (91% HeartMate II, 8% HVAD). The definition proposed by the Kidney Disease Improving Global Outcome criteria (KDIGO) was used to define AKI. AKI stages. One-year mortality rates in patients without AKI, AKI stages I, II and III were 18.7%, 26.4%, 23%, 51%, respectively (log-rank p<0.01) at 1 year.

**Conclusion:** AKI is highly frequent after LVAD implantation. More severe AKI stages are associated with higher mortality rates and impaired renal function at one year after LVAD implantation.

*Figure 1 Kaplan-Meier curve for survival*
P1149
Outcomes of patients with or without implantable cardioverter defibrillators on continuous-flow left ventricular assist device support

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1Duke-NUS Graduate Medical School Singapore, Singapore, Singapore; 2National Heart Centre Singapore, Singapore, Singapore

Background/Introduction: The role of implantable Cardioverter Defibrillators (ICDs) in patients implanted with continuous-flow Left Ventricular Assist Devices (LVADs) remains controversial. Pre-LVAD ventricular arrhythmia (VA) was shown to be a major predictor of post-LVAD VA, suggesting that patients with pre-LVAD VA could benefit from ICD implantation. There is, thus far, little evidence for the routine implantation of ICDs for patients undergoing LVAD surgery.

Purpose: We aimed to study whether ICD implantation in patients with or without pre-LVAD VA affected the outcomes of patients on LVAD support.

Methods: We performed a retrospective analysis of 72 consecutive patients receiving LVADs between May 2009 and April 2016 in a single tertiary hospital in Singapore. Data analysed included demographic variables, ICD reports, and other clinical attributes. Group A was defined as patients who received ICD implantation pre-LVAD surgery, while group B did not have ICDs implanted going into LVAD surgery. Outcomes assessed included all-cause mortality, all-cause hospitalisation and clinically significant VA (defined as any post-LVAD VA resulting in hospitalisation, cardioversion, ICD reprogramming, or ICD therapy occurring >30 days post-LVAD implantation).

Results: Our cohort comprised of majority (81%) male, 49% with ischaemic cardiomyopathy, 43% INTERMACS profile 1 or 2 at LVAD implantation. Group A (n=36) was older (53±12 vs. 47±13, p=0.04), had higher incidence of pre-LVAD VA (47% vs. 22%, p=0.05), and larger pre-LVAD end-diastolic left ventricular internal diameter (LVId) (7.1±1.0 vs. 6.5±1.3, p=0.02). There was no significant difference between the two groups in terms of all-cause mortality and hospitalisation (Group A vs. Group B: 22% vs. 8%, P=0.2 and 86% vs. 86%, P=1.0, respectively). However, there was a higher rate of clinically significant post-LVAD VA in Group A than Group B (44% vs. 11%, p<0.05). Compared to patients without pre-LVAD VA, a higher proportion of patients who had pre-LVAD VA tended to experience clinically significant VA post-LVAD in Group A (71% vs. 21%, p=0.006) but not Group B (13% vs. 116, P=1.0). However, pre-LVAD VA did not result in a difference in mortality in either group (Pre-LVAD VA vs. none: Group A 18% vs. 26%, P=0.7; Group B 5% vs. 116%, P=1.0). The presence of ICD did not confer a mortality benefit in patients with pre-LVAD VA (Group A 18% vs. Group B 0%, p=0.5).

Conclusion: ICD implantation pre-LVAD surgery did not confer a mortality benefit regardless of presence of pre-LVAD VA. Our findings do not support the practice of routine ICD implantation prior to LVAD surgery.

P1151
Cangrelor use in the treatment of left ventricular assist device pump thrombosis

CM Christopher Bianco1; BP Dhakal1; M Zacharias1; SG Al-Kindi1; R Barcelona1; L Meece1; CE Lam1; MR Robinson1; R Benatti1; M Ginwalla1; BP Sareyssoglu1; BP Medalion1; SG Park1; G Oliveira1; LK Goh1; C PL Lim2; DS Lim2; K Ker2; TET Tan2; CSivath2; JL Soon2; LT Teo2
1National Heart Centre Singapore, Singapore, Singapore; 2Intensive Care Unit, Cardiology Institute, UPMC, APHP, Paris, France; 3Hospital Pitie-Salpetriere, Department of Cardiology and Cardiovascular Surgery, Cardiology Institute, UPMC, APHP, Paris, France; 4Hospital Pitie-Salpetriere, Intensive Care Unit, Cardiology Institute, UPMC, APHP, Paris, France; 5Hospital Pitie-Salpetriere, Department of Biostatistics and Medical Information, UPMC, APHP, Paris, France

Background: Left ventricular assist device (LVAD) pump thrombosis (PT) treated with conventional pharmacologic therapy is associated with a 6 month mortality rate of nearly 50%. Pump exchange or transplantation is the definitive therapy, however many patients are suboptimal candidates and an attempt at medical therapy is appealing. Several strategies involving escalating anticoagulants, antplatelets, or thrombolytics have been utilized; however none has emerged superior. Our group has shown the P2Y12 inhibitor ticagrelor, in conjunction with heparin and aspirin, was beneficial in resolving PT and avoiding pump exchange. However, a relatively long half-life limits its use in expectant medical management with the potential for urgent pump exchange. Cangrelor, a potent, reversible P2Y12 inhibitor that allows rapid restoration of normal platelet function within 1 hour of cessation may facilitate a more effective, safer strategy.

Purpose: LVAD PT is common, however suboptimally treated with conventional medications. A novel treatment strategy utilizing cangrelor may prove effective and safe in cases of suspected PT.

Methods: We performed a case review of patients with suspected PT (evident by sustained power elevations >10W or >20 rpm baseline with peak elevated LDH >3x ULN) who were treated with cangrelor at a large academic center between
Successful pharmacologic treatment was defined as freedom from death, pump exchange, or transplantation during index hospitalization.

**Results:** Cangrelor was utilized in 4 patients with 5 episodes of suspected PT. All 4 patients had Heartmate II devices implanted as destination therapy between January-2012 and December-2016. LVAD used as bridge-to-transplantation showed a trend toward better post-transplant outcomes. One patient originally treated successfully with cangrelor developed another episode of suspected PT 14 months later, he was treated with cangrelor again, but eventually required pump exchange. There were no major bleeding events during cangrelor infusion. 1 patient who underwent pump exchange had to return to OR for continued post-op mediastinal bleeding. Two patients, both safely and successfully treated, experienced minor post-op bleeding events, one by history of renal impairment and the other with recurrent GIB. A mean of 3.6 antplatelet or anticoagulant agents were maintained prior to cangrelor initiation. Mean duration of cangrelor infusion was 6 days. Mean decrease of serum LDH from cangrelor initiation to hospital discharge or pump exchange was 45%.

**Conclusions:** Cangrelor use for treatment of suspected PT is associated with a reasonable success rate and excellent safety profile in this small series. To our knowledge, this is the first reported case series of cangrelor use in PT. Further study of cangrelor use in the management of PT is warranted.

**P1152**

Heart transplantation: to bridge or not to bridge

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1University Hospital of Padova, Cardiac Surgery Unit, Padua, Italy

Background/Introduction: It is unclear if the use of left-ventricular-assist-device (LVAD) as bridge-to-transplantation can improve post-transplant outcomes. We aimed to compare results of heart transplantation with or without previous bridging with an implantable continuous-flow LVAD.

**Methods:** All consecutive patients who underwent heart transplantation at our institution between January-2012 and December-2016 were included. LVAD used were Jarvik2000 and HeartWare. Patients were divided in VAD and No-VAD groups according to previous implantation of an LVAD or not.

**Results:** Included are 128 patients: 44 VAD and 84 No-VAD. Emergent transplantation (p = 0.03), previous staying in ICU (p = 0.01) and para-corporeal mechanical support (<0.01) were more frequent in No-VAD. VAD vs No-VAD had similar 30-day-mortality (7% vs 5%, p = 0.69), whereas ICU-stay (>6 days) 4 days vs 12 ± 16, p = 0.09) and hospital-stay (37 ± 16 vs 45 ± 28, p = 0.03) were longer in No-VAD. Postoperative complications were comparable among groups, except for pleural/pericardial-effusion (p = 0.01) and tracheostomy (p < 0.01), more frequent in No-VAD. After a mean follow-up of 25 ± 19 months mortality was higher in VAD group (9% vs 5%, p = 0.14) though not significantly. Rate of cellular-mediated-rejection (p = 0.17) and antibody-mediate-rejection (p = 0.97) were similar.

**Conclusions:** LVAD as bridge-to-transplantation showed a trend toward better post-transplant outcomes. A larger patient population is needed to confirm our results.

**P1153**

Clinical outcomes at 5-years following transcatheter aortic valve replacement in patients with aortic stenosis

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1Department of Cardiology, Malaga, Spain; 2University Hospital Virgen de la Victoria, Department of Cardiology, Malaga, Spain

The durability of transcatheter heart valves and long-term clinical outcomes are unknown. The aim of this study was to evaluate clinical and hemodynamic outcomes 5 years after Transcatheter Aortic Valve Replacement (TAVR).

**Methods:** Between April 2008 and December 2011, 224 patients underwent TAVR for the treatment of severe symptomatic aortic stenosis with the auto-expandable prosthesis.

**Results:** The mean age and EuroSCORE were 79.2 ± 6.4 years and 19.8 ± 13% respectively. Mean aortic valve gradient decreased from 50 ± 15 mm Hg to 8.6 ± 3.8 mm Hg after TAVI, to 11 ± 9 mm Hg at 4 years and 22 ± 12 mm Hg at 5 years (p for post-TAVI trend 0.03). Mean aortic valve area increased from 0.6 ± 0.16 cm² to 1.59 ± 0.3 cm² after TAVI to 1.48 ± 0.2 cm² at 4 years and 0.97 ± 0.3 cm² (p for post-TAVI trend 0.01). Mean left ventricular ejection fraction increased from 61.1 ± 15% to 65.5 ± 11% after TAVI, to 58.2 ± 17% at 4 years and 60.7 ± 8% at 5 years (p for post-TAVI trend 0.001). Late mortality after a mean of 52.29 ± 28 months was 58.3% and in only 37 patients was cardiovascular mortality. Survival rates at 1 to 6 years were 86.1%, 77.8%, 70.4%, 64.8%, 53% and 44.3% respectively. At 5 years, 3 patients had severe prosthetic valve dysfunction (severe stenosis and moderate transvalvular regurgitation). Median survival time after TAVI was 3.91 years (95% confidence interval [CI]: 3.6 to 4.21), and the risk of death was significantly increased in patients with frailty (adjusted hazard ratio [HR]: 3.25; 95% CI: 1.76 to 6.01), p = 0.001, Charlson index [HR= 1.24 (95% CI 1.11-1.37), p = 0.001], Acute kidney injury after TAVR [HR= 1.942 (95% CI 1.10-3.42) p = 0.022] and left ventricular ejection fraction [HR=.352 (95% CI 0.166-0.745)p = 0.006].

**Conclusions:** Our study demonstrated favorable long-term outcomes after TAVR. Signs of prosthetic valve failure were observed in 1.33% of patients.
Methods: 68 subjects were included in the study; 28 young (< 35 yrs) healthy volunteers and 40 elderly hypertensive pts (≥ 60 yrs). BP were measured by a trained health care provider using a mercury sphygmomanometer and the Korotkoff sound technique. Central SBP, DBP were evaluated in supine position with SphygmoCor device. BP measurement was also performed using new tacho-occiulometric cuff-based device EDVT-Hemodin. This device analyzes recorded tachocissocillogram and evaluates diastolic, mean, (true systolic) and end-systolic pressure.
Results: 65% of subjects were male and mean BMI was 24.9 ± 4.1 kg/m². Mean SBP measured using Korotkoff method was 129.7 ± 9.88 mm Hg, DBP - 70.17 ± 9.14 mm Hg. Mean central SBP measured with SphygmoCor 109.9 ± 10.2 mm Hg, mean central DBP - 72.25 ± 6.3 mm Hg. Mean SBP and DBP measured with EDVT-Hemodin were 111.7 ± 11.83 and 51.37 ± 10.56 mm Hg respectively. We found correlations using Spearman’s rank between mean central SBP measured with SphygmoCor and SBP measured with EDVT-Hemodin (r = 0.41, p < 0.05). The method to assess DBP was found to be between SBP measured by SphygmoCor and EDVT-Hemodin (bias = -1.87 mm Hg; [-5.43; 1.76]). There were no associations between assessment BP using BBP and EDVT-Hemodin and auscultation method. Positive correlation in both groups between measurement of central SBP with SphygmoCor (103.67 ± 6.31 mm Hg and 115.94 ± 9.19 mm Hg respectively) and SBP evaluated with EDVT-Hemodin (108.05 ± 11.56 mm Hg and 115.00 ± 11.05 mm Hg respectively) - for the first group bias was - 4.38 [-9.89;1.13] mm Hg; for the second - bias was 5.94 [-4.56; 6.45] mm Hg. Conclusion: SBP and DBP by VCO were significantly higher compared to the Korotkoff method.

P1155
Cardiac device implantation rate in heart failure patients: A study based on a tertiary cardiology service in Ireland.
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Background: HFrEF is defined as left ventricular ejection fraction (LVEF) of ≤ 40%. Goals of therapy in HFrEF are to reduce mortality and morbidity as well as to improve functional status and reduce hospital admissions secondary to decompensation.
Purpose: This study aimed to evaluate if patients referred to our Heart Failure Clinic (HFC) were appropriately considered for an implantable device after optimal medical therapy (OMT) as per ESC 2013 guidelines.
Methods: Patient referrals from January 2015 to December 2016 were assessed through an online portal – Cellma. Out of 179 patients referred, 90 patients (50.0%) were included in this study. SCS-60%, SCS-CRAN and SCS-CAU did not influence HRV, BRS or hemodynamics (table). Similarly, SCS-60%, SCS-CRAN and SCS-CAU did not change HRV, BRS or hemodynamics compared to SCS-OFF. Conclusion: SCS delivered acutely at ≥ 90% of maximally tolerated output does not appear to improve autonomic balance or baroreflex sensitivity in patients with chronic HF.

P1156
Acute effects of spinal cord stimulation on cardiac autonomic control and function in patients with heart failure
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Background/Introduction: Heart failure with reduced ejection fraction (HFrEF) is characterized by sympathetic over-activity and baroreceptor desensitization. Spinal cord stimulation (SCS) can reduce sympathetic nerve activity in animal models of HF but data in patients with HF is limited.
Purpose: We aimed at testing the hypothesis that SCS acutely improves heart rate variability (HRV) and baroreceptor sensitivity (BRS) in patients with chronic HF.
Methods: HF patients with a SCS device implanted (Th1-Th4 spinal cord level) were included in this study. SCS was delivered (stimulation amplitude: 90% of maximally tolerated, all eight electrodes active) for 15 minutes. ECG and beat-to-beat non-invasive hemodynamics (finger plethysmography) were recorded continuously during SCS-90% and compared to a 5 min baseline period immediately before SCS (SCS-OFF). This was repeated using different SCS stimulation settings: Output 60% of maximally tolerated (SCS-60%), cranial electrode configuration (SCS-CRAN) and caudal electrode configuration (SCS-CAU).
Results: Fifteen patients (73% males, mean age 65 ± 8 years, mean left ventricular EF 43 ± 14%) were included to this study. SCS-90% did not influence HRV, BRS or hemodynamics (table). Similarly, SCS-60%, SCS-CRAN and SCS-CAU did not change HRV, BRS or hemodynamics compared to SCS-OFF.

Table
P1158
Caval flow regulator catheter balloon in acute heart failure: echocardiographic data.
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Background: We reported the hemodynamic changes of the first 6 CHF case in humans, using Percutaneous Transluminal Caval flow Restriction (PTCR). This innovative method reduced preload in CHF. We are reporting the echocardiographic data results of the 6 consecutive patients with CHF, treated with intermittent reduction of flow with Caval restriction with Balloon.

Materials and Methods: 6 patients with CHF who met protocol criteria were evaluated. 4 were ischemic, and 2 non ischemic. We performed baseline echocardiogram, coronary angiogram and right heart catheterization. Caval flow restriction was started, catheter balloon was introduced in the femoral vein and echo guided, placed before hepatic vein drainage. The balloon was inflated to cover Inferior Vena Cava (IVC) remaining area completely 100% occlusion, and 70% (sub-occlusion) during expiration resulting in intermittent flow restriction. The balloon was kept inflated for 30 minutes, right catheterization and echocardiogram were repeated during inflated balloon.

Results: Table 1.

Conclusions: We are reporting our echocardiographic data in 6 patients with CHF treated with intermittent reduction of preload with Caval restriction with Balloon. Hemodynamic and echocardiographic changes obtained in these patients, suggest, that this innovative approach can play a role in the treatment of CHF patients.

P1159
Safety of aspirin therapy in patients for elective coronary artery bypass grafting
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Objective: To evaluate safety of coronary artery surgeries with preoperative aspirin management.

Materials and Methods: 168 patients, treated with aspirin in the preoperative period, were included in the current study (Group I). The comparison group (Group II) included 218 patients, who did not receive aspirin preoperatively. Intr- and post-operative blood loss, the rate of redo procedures, caused by bleedings, the rate of blood transfusions as well as blood product volumes were evaluated. The data were analyzed six using the SPSS 13.0 software package for Windows.

Results: The intraoperative blood loss was similar in both groups (495.2 ± 66.8 ml in Group I vs. 490.5 ± 68.6 ml in Group II, p = 0.67), whereas postoperative blood loss within 6 h and 12 h was significantly higher in Group I (within 6 h of surgery - 163.3 ± 92.9 ml, p = 0.001; within 12 h of surgery – 245.3 ± 150.3 ml, p = 0.001) compared to Group II (within 6 h – 116.4 ± 55.2 ml, p = 0.001; within 12 h – 161.0 ± 127.9 ml, p = 0.0001). However, there were no significant differences in the total blood loss within 24 h (314.7 ± 250.8 ml in Group I vs. 250.8 ± 127.4 ml in Group II, p = 0.08; mean difference 63.9 ml, CI 95% from 0.7 to 125.3 ml, p = 0.13). The rates of blood transfusions were significantly higher in Group I (81.9%) compared to Group II (65.2%, p = 0.02), thus, resulting in increased rate of red cell concentrate transfusions (29.8% vs. 7.5% respectively, p = 0.001) and platelet concentrates transfusions (78.0% vs. 7.5%, respectively, p = 0.001). However, the rates of fresh frozen plasma transfusion were similar in both groups (29.8% vs. 7.5%, respectively, p = 0.03); it should be noted that the average volume of blood product transfusions for each patient did not significantly differ in both groups. Moreover, the rates of redo procedures, caused by bleedings, were similar in both groups (3.6% in Group I vs. 1.9% in Group II, p = 0.35).

Conclusions: Patients, receiving aspirin before elective CABG, reported a significant increase in postoperative blood loss within 6 h and 12 h as well as increased need in blood product transfusions. Nevertheless, the total blood loss within 24 h as well as the redo rates, caused by bleedings, did not differ significantly.

P1160
Challenges of pregnancy after aortic coarctation repair
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Introduction: Major advances in cardiology and cardiac surgery determined an increment of women with corrected heart conditions that are reaching childbearing age. The incidence of foetal and maternal complications during this period is widely variable among female with congenital heart diseases.

Material and methods: A retrospective analysis of pregnant women with the diagnosis of repaired aortic coarctation (CoA), being followed-up in a Grown-up Congenital Heart Disease (GUCH) Centre. Epidemiological and clinical data were collected and inserted in a registry database.

Results: From 46 female patients (pts) [mean current age 39 ± 10 years-old], 25 have been pregnant (54%). Among these patients, 16 pts (64%) presented a comitant congenital heart defect, being bicuspid aortic valve the most commonly observed (n = 6 pts, 24%), followed by associated ventricular septal defect (VSD) (n = 5, 20%) and ductus arteriosus (n = 5, 20%). Surgical repair of CoA was the inter- vention of choice for most women (n = 20, 80%). Hypertension was diagnosed in 11 pts (44%). There were a total of 28 pregnancies (2 ongoing). All patients were submitted to foetal echocardiography and in 3 cases foetal cardiac defects were diagnosed in uterus (11%). A complex cardiomyopathy associated with major malformations was identified in 2 pregnancies, leading to medically supervised abortions. During childbearing or the perinaturn period, there were no cases of eclampsia or pre-eclampsia, vascular complications or death. There were no contradictions to vaginal delivery because of the congenital heart disease. However, caesarean sections were performed in 48% of the cases. The live-birth rate was 81% (3 spontane- ous abortions). At birth, mean gestational age was 38 ± 2 weeks and mean weight was 2991 ± 380g.

Conclusion: Our study supports that successful pregnancy is possible for most women with CoA, as long as adequate care during pregnancy, delivery, and post-partum period is provided. This underscores the importance of pregnancy follow-up with a specialized multidisciplinary team in a GUCH centre.
Elevated postoperative right atrial pressure predicts post-heart transplant 1-year mortality

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Background: Mean right atrial pressure (mRAP) is a practical hemodynamic parameter to reflect preload and right ventricular function. Clinical significance of postoperative mRAP in heart transplant has not been well studied.

Objectives: 1) To study the association between postoperative mRAP and post-heart transplant outcomes. 2) To study the trend and natural behaviour of mRAP after heart transplant.

Methods and Results: Fifty-one consecutive de novo adult heart transplant patients (42 ± 13 years, female 35%, cold ischaemic time 236 ± 67 minutes, donor age 27 ± 9 years) at our institution from January 2008 - September 2016 were analyzed. Mean RAP was measured by pulmonary artery catheter after heart transplant. Of 51 patients, 98% (50 patients) had elevated postoperative mRAP ≥ 15 mmHg. Mean RAP continuously increased postoperatively with the highest measured mRAP at 56 (2-396) hours (or 2.3 days) post-heart transplant. The median of highest measured mRAP was 26 (12-39) mmHg. Highest measured mRAP post-heart transplant was not significantly associated with recipient age, cold ischaemic time, preoperative mean pulmonary pressure, preoperative pulmonary vascular resistance, or donor age. The highest measured mRAP was a predictor of 1-year mortality of the area under the ROC curve of 0.65 and the optimal mRAP cut-off of 24.5 mmHg. Patients with highest measured mRAP ≥ 24.5 mmHg had higher 1-year mortality than patients with highest measured mRAP < 24.5 mmHg (35% vs 5%, p = 0.02) (Figure 1). Highest measured mRAP ≥ 24.5 mmHg was associated with 1-year mortality (Hazard ratio was 7.8 [95%CI 1.01 - 60.5, p = 0.049]). There was no significant difference in intensive care unit length of stay (LOS) (14 ± 10 days vs. 11 ± 5 days, p = 0.3), post-heart transplant hospital LOS (45 ± 30 days vs. 36 ± 18 days, p = 0.2) or acute cellular rejection (ACR) grade ≥ 2R at 1 year post-heart transplant (16% vs 29%, p = 0.4) between patients with highest measured mRAP ≥ 24.5 mmHg and ≤ 24.5 mmHg respectively.

Conclusions: (1) Elevated mean right atrial pressure, mRAP ≥ 15 mmHg, in post-operative de novo heart transplant was common (88%). Mean RAP continuously increased postoperatively with the highest measured mRAP at 2.3 days post-heart transplant. (2) Among post-heart transplant outcomes, highest measured postoperative mRAP ≥ 24.5 mmHg was common (98%). Mean RAP continuously increased postoperatively with the highest measured mRAP at 56 (2-396) hours (or 2.3 days) post-heart transplant. The median of highest measured mRAP was 26 (12-39) mmHg. Highest measured mRAP post-heart transplant was not significantly associated with recipient age, cold ischaemic time, preoperative mean pulmonary pressure, preoperative pulmonary vascular resistance, or donor age. The highest measured mRAP was a predictor of 1-year mortality of the area under the ROC curve of 0.65 and the optimal mRAP cut-off of 24.5 mmHg. Patients with highest measured mRAP ≥ 24.5 mmHg had higher 1-year mortality than patients with highest measured mRAP < 24.5 mmHg (35% vs 5%, p = 0.02) (Figure 1). Highest measured mRAP ≥ 24.5 mmHg was associated with 1-year mortality (Hazard ratio was 7.8 [95%CI 1.01 - 60.5, p = 0.049]). There was no significant difference in intensive care unit length of stay (LOS) (14 ± 10 days vs. 11 ± 5 days, p = 0.3), post-heart transplant hospital LOS (45 ± 30 days vs. 36 ± 18 days, p = 0.2) or acute cellular rejection (ACR) grade ≥ 2R at 1 year post-heart transplant (16% vs 29%, p = 0.4) between patients with highest measured mRAP ≥ 24.5 mmHg and ≤ 24.5 mmHg respectively.

Conclusions: (1) Elevated mean right atrial pressure, mRAP ≥ 15 mmHg, in post-operative de novo heart transplant was common (88%). Mean RAP continuously increased postoperatively with the highest measured mRAP at 2.3 days post-heart transplant. (2) Among post-heart transplant outcomes, highest measured postoperative mRAP ≥ 24.5 mmHg was associated with 1-year mortality. Whether therapies aiming at mRAP reduction improve post-heart transplant survival needs to be further studied.
Background. Hospitalization is an opportunity to optimize heart failure (HF) therapy and to improve the quality of further patient care, and in particular to reduce the readmission rate.

The aim of the study was to analyze the effects of the beta-blockers (BBs) and ivabradine combination versus BBs alone in patients with sinus rhythm hospitalized due to worsening HF.

Methods: The international Optimize Heart Failure Care program was designed to improve the outcomes of HF hospitalization through patient education and engagement, and post-discharge planning. This analysis included data collected over 12 months from 414 patients (mean age 61.8 ± 0.9 years, 74.6% male) with sinus rhythm hospitalized due to worsening HF.

Results: In total, 37.2% of hospitalized patients with HF received the combination of BBs and ivabradine (Group 1), and 62.8% were on BBs therapy alone (Group 2). There were no differences in terms of age, sex, NYHA functional class, LVEF between the two groups of patients, however, the baseline HR in Group 1 was significantly higher than in the patients who did not receive ivabradine (88.9 ± 1.3 bpm vs. 78.6 ± 0.9 bpm, p < 0.05). After 12 months of follow-up, 76.1% of patients in Group 1 received at least half of the target dose of BBs (compared with 65.5% in Group 2, p < 0.05). HR control was more effective in Group 1 than in Group 2 (17.3% vs. 11.8%, p < 0.05). Moreover, after 12 months of follow-up the rate of repeat hospitalizations due to worsening HF was significantly lower in the patients receiving the combination of BBs and ivabradine compared with BBs therapy alone (8.1% vs. 30.4%, p < 0.01).

Conclusions: The co-administration of beta-blockers and ivabradine in hospitalized patients with heart failure produces a meaningful reduction of the rate of readmission during heart rate increase.

Conclusion: Beta-adrenergic blockers are considered a cornerstone in the management of heart failure in adults. Beta-blockers reduce the heart rate and contractility consequently lowering the workload of the heart and improving its performance. This effect is estimated to be parallel in children and beta-blockers are used clinically despite lack of proven evidence to support such guidelines. Nevertheless, due to the variances in aetiology, pharmacokinetics and comorbidities between adults and children with congestive heart failure, it is fundamental to determine the safety and effectiveness of beta-blockers in children in a systematic review.

P1165 Are beta-blockers effective in children with congestive heart failure? - A Cochrane review

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On behalf of: Cochrane Heart

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Introduction: Beta-adrenergic blockers are considered a cornerstone in the management of heart failure in adults. Beta-blockers reduce the heart rate and contractility consequently lowering the workload of the heart and improving its performance. This effect is estimated to be parallel in children and beta-blockers are used clinically despite lack of proven evidence to support such guidelines. Nevertheless, due to the variances in aetiology, pharmacokinetics and comorbidities between adults and children with congestive heart failure, it is fundamental to determine the safety and effectiveness of beta-blockers in children in a systematic review.

Purpose: A Cochrane systematic review of all randomised controlled trials (RCT) to assess the effect of beta-blockers in children with congestive heart failure.

Methods: The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, and LILACS were search up to November 2015 for relevant RCTs. Two review authors independently screened the search results, extracted and assessed data from the included trials.

Results: The systematic review includes seven RCTs with a total of 420 participants. Four small studies with 20 to 30 children each, and two larger studies of 80 children each, showed an improvement of congestive heart failure with beta-blocker therapy. A larger study with 161 participants showed no evidence of benefit over placebo in a composite measure of heart failure outcomes. The included studies showed no significant difference in mortality or heart transplantation rates between the beta-blocker and control groups. No significant adverse events were reported with beta-blockers, apart from one episode of complete heart block. A meta-analysis of left ventricular ejection fraction (LVEF) and fractional shortening (LVFS) data showed a very small improvement with beta-blockers. However, the primary outcomes could not be pooled in meta-analyses. There were vast differences in the age, age range, and health of the participants (aetiology and severity of heart failure; heterogeneity of diagnoses and co-morbidities); there was a range of treatments across studies (choice of beta-blocker, dosing, duration of treatment); and a lack of standardised methods and outcome measures.

Conclusion: The available data suggests a trend that beta-blockers might be beneficial in the treatment of paediatric congestive heart failure. However, there is no sufficient evidence to recommend or discourage the use of beta-blockers in children with congestive heart failure or to propose a dosage scheme.
The impact of 12 month beta-blocker therapy on left and right ventricular volumes and ejection fraction and functional status of heart failure patients with midrange ejection fraction

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Objectives: Recently heart failure patients with "grey area" left ventricular ejection fraction (LVEF) in the range of 40-49% were classified as having HF with mid-range EF (HFmrEF). The beneficial effects of beta-blockers on cardiac remodelling and prognosis are well established in HF with reduced but not preserved EF. The aim of the study was to evaluate the impact of beta-blockers (BB) on left (LV) and right ventricular (RV) systolic function and the distance of 6 minute walk test (6mWT) in patients with HFmrEF.

Methods: we performed the retrospective analysis of 38 patients (32 male, 6 female, mean age 58.9±10.0 years) with HFmrEF NYHA class I-III mainly of ischemic origin who were followed up 12 months after the initiation of metoprolol succinate, bisoprolol or carvedilol. Beta-blockers were increased to optimal therapy unchanged for 3 months or more and up-titrated to target or maximal tolerated doses. Standard clinical evaluation, echocardiography (EchocG), radionuclide ventriculography (RVG) and 6mWT were performed 3, 6 and 12 months after the start of BB therapy.

Results: After 12 months of BB therapy marked improvement of LVEF measured both by echocG (from 43.5±2.2% to 48.4±6.1%; p=0.003) and RVG (from 41.6±1.4% to 56.4±7.4%; p=0.004) and end-systolic volume by echocG (from 100.4±40.7% to 80.9±33.8%; p=0.01) was observed. The parameters of RV hadn’t changed significantly. 6mWT distance increased from 428.8±57.2 to 541.4±79.0m (+=112.9m; p=0.001). Significant improvement of LV parameters and exercise tolerance was found after 3 months of BB therapy and further improved to 12 months.

Conclusions: in patients with heart failure with mid-range EF 12-month beta-blocker therapy is associated with beneficial effect on LV systolic function and exercise capacity similar to that observed in HF with reduced EF.
HORMONES - NEUROHUMORAL REGULATION

P1169
Gender differences in neurohumoral activation in heart failure
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Background: Heart failure (HF) is a clinical syndrome that affects both men and women. The differences in neurohumoral activation between men and women are incompletely understood.

Purpose: The aim of this study was to evaluate gender differences in plasma levels of several humoral markers and perform comparative analysis between men and women.

Methods: We examined 80 patients with compensated heart failure II to IV class by NYHA classification (mean age 67 ± 10 years; 33% women) who underwent routine echocardiography and measurement of plasma procalcitonin type 1 N-terminal propeptide (PINP), endotoxin 1 (ET-1), natriuretic peptide (NAP), troponin I (TnI), BNP, NT-proBNP, progastrin-releasing peptide (PGRP), and vasopressin were measured in plasma. Plasma samples were randomly split into several aliquots and stored at −20°C until analysis. The etiology of heart failure was evaluated using clinical and diagnostic data. The primary endpoint was the one-month evolution in functional class, analytical parameters and drug tolerance.

Results: The median plasma level of PINP in 73 patients (42% females; n=31; males n=102; NYHA II-IV; mean age: 67 years; etiology: ischemic n=49, dilated cardiomyopathy n=41; mean EF: 23 %) was 20.7 ± 9.8 pg/mL. Plasma levels of PINP were significantly higher in men compared with women (male: 24.7 ± 8.5 pg/mL vs female: 15.3 ± 7.2 pg/mL, p < 0.05). Additionally, the plasma levels of NT-proBNP were significantly higher in men compared with women (male: 114.1 ± 37.4 pg/mL vs female: 54 ± 12.5 pg/mL, p < 0.05). No significant differences were found in plasma levels of ET-1 (p = 0.047) and TnI (p = 0.010) between men and women. No significant sex-related differences were found in plasma levels of PINP and TnI, but NT-proBNP was significantly higher in women compared with men.

Conclusions: Plasma levels of PINP and NT-proBNP were significantly higher in female heart failure patients than in male heart failure patients. Plasma levels of ET-1 and TnI were significantly higher in men and women compared with men.

P1170
Assessment of intact fibroblast growth factor 23 in patients with heart failure with reduced ejection fraction
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Background: Biomarkers can contribute to the prognostication of patients with heart failure (HF) and to implementation of more tailored based approach. Fibroblast growth factor 23 (FGF-23) is the most potent phosphaturic hormone and also regulates bone and mineral metabolism. FGF-23 is a strong and independent factor of cardiovascular events and death in HF patients. However, most of the studies were based on the measurement of C-terminal FGF23 and only few have also determined intact FGF-23 in HF.

Purpose: We determined the circulating levels of intact FGF-23 in patients with HF with reduced ejection fraction (HFrEF) as well as its relation with cardiac biomarkers and functional capacity or quality of life. Small sample size and improvement in TT levels but not in TT levels might limit study results.

Methods: We conducted a prospective observational study of patients with chronic HF patients II to IV class by NYHA classification (mean age 67 ± 10 years; 33% women) who underwent echocardiography and NT-proBNP determinations, functional capacity (6 minutes walk test, 6MWTest) and quality of life (Minnesota Living with Heart Failure test, MLHF) (clinical-trials.gov ISCTN10181320).

Results: 29 ambulatory male patients (age 65 ± 8.8%, ischemic etiology:30 ± 6%VHF, NYHA II-III) were prospectively recruited. Testosterone deficiency was confirmed in all subjects with a mean TT (2.4 ± 0.5 nmol/L) and TT levels might limit study results.

Conclusion: Testosterone therapy in CHF patients with hormone deficiency was neither associated with adverse side effects nor improvement of cardiac function, functional capacity or quality of life. Small sample size and improvement in TT levels but not in TT levels might limit study results.

P1171
Testosterone replacement in patients with advanced heart failure and hormone deficiency
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Background: Chronic heart failure (CHF) is characterized by progressive arboitic impairment with a decline in testosterone levels, which has been associated with a poor prognosis. We aim to determine whether testosterone therapy improves clinical outcomes in these patients.

Methods: We designed a multicenter randomized double-blind trial including patients with CHF, systolic dysfunction (LVEF < 40%) and both total testosterone (TT) and free testosterone (FT) < 50% of the lower limit of normality and who were assigned to receive 1000 mg of testosterone undecanoate or placebo injected intramuscularly at inclusion,3,6 and 9 months. We evaluated the occurrence of adverse side effects, the improvement in cardiac function (assessed by echocardiography and NT-proBNP determinations), functional capacity (8 minutes walk test, 6MWTest) and quality of life (Minnesota Living with Heart Failure test, MLHF) (clinical-trials.gov ISCTN10181320).

Results: 29 ambulatory male patients (age 65 ± 8.8%, ischemic etiology:30 ± 6%VHF, NYHA II-III) were prospectively recruited. Testosterone deficiency was confirmed in all subjects with a mean TT (2.4 ± 0.5 nmol/L) and TT levels might limit study results.

Conclusion: Testosterone therapy in CHF patients with hormone deficiency was neither associated with adverse side effects nor improvement of cardiac function, functional capacity or quality of life. Small sample size and improvement in TT levels but not in TT levels might limit study results.

P1172
Initial experience using LCZ696 in real life: tolerability and clinical evolution in a short term.
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Introduction: The prevalence of chronic heart failure (HF) has been increased, due to the improvement in the management and treatment of most of heart diseases and the longer life expectancy of the population, becoming an important public health problem. The optimal treatment recommended for patients with HF and ventricular dysfunction, with ACE inhibitors, ARBIs, beta-blockers and mineralocorticoid inhibitors, has been shown to reduce the morbidity and mortality of these patients, but it is still necessary to design further treatments that improve prognosis. Recently, clinical practice guidelines of HF have approved using LCZ696 in patients with HF with reduced ejection fraction (HFrEF) and functional class (FC) ≥ 2.

Material and methods: We conducted a prospective observational study of patients with HFrEF assessed in our outpatient clinic, who started treatment with LCZ696 between October-November 2016. We analyzed their baseline characteristics and the one-month evolution in functional class, analytical parameters and drug tolerance.

Results: We analyzed 22 patients, with a mean age of 65.4 ± 10.4 years, being 81.8% male. Fifty percent were hypertensive, 22.7% diabetic and 31.8% dyslipidemic. Chronic kidney disease was present in 31.8%, with a mean FG of 81/min (Cockcroft-Gault). The cause of heart failure was dilated cardiomyopathy in 72.7% and in ischemic heart disease in 27.3% of them. The mean telediastolic diameter of left ventricle was 62.4 ± 7.2mm, with an average LV ejection fraction of 34.7 ± 9.9%. Abnormal liver function was present in 31.8% with mean ALT 45.1 ± 16.1 and cardiac resynchronization therapy at the same proportion. At the beginning, the
majority were in FC II (59.1%) and the rest in FC III. Mean baseline systolic blood pressure was 126.2 ± 20.7 mmHg and diastolic 76.5 ± 13.7 mmHg and mean heart rate was 66.6 ± 12.6 bpm. Pretreatment was optimal in all cases (maximum tolerated doses of ACEI, ARB II, BB, mineralcorticoid). ARNI was started (after stopping ACE inhibitors in 59.1% and the rest ARII, if at low doses in 54.9%, at medium doses in 31.8% and the rest at high doses. After one month of follow-up, the goal was improvement in FC, 18.2% of patients were FC I and 63.6% FC II. Concerning analytical parameters, we observed a reduction of NT-ProBNP (from 557.3 to 353.8 μg/L) and uric acid (from 7.6 to 6.66 mg/dL). We found a non-significant decrease in blood pressure (119 ± 17.8/71.0 ± 12.6 mmHg), which allowed us to optimize the treatment with LCZ696, being at medium dose 50%, at high dose 36.4% and the rest at low doses. Only one patient stopped taking medication due to economic issues.

Conclusions: The treatment with LCZ696 in a group of patients in real-life was well tolerated in all cases, without a significant decrease in blood pressure, being able to optimize the dose of LCZ696. It was related to improvement in the functional class and in analytical parameters, even with a short follow-up.

**METABOLISM - DIABETES MELLITUS - OBESITY**

**P1173**

Neck circumference as a predictor of arterial hypertension

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**Background:** Neck circumference (NC) is a simple, reliable non-invasive and low cost anthropometric method. It has been related to overweight, obesity and metabolic risk factors since it is an etopic fat deposit responsible for large release of systemic free fatty acids. It has been found relation of the NC with the systemic arterial hypertension. However, it is unknown if the NC is related with blood pressure (BP) increase Objectives: To determine if there is an increase in BP due to an increase in NC.

**Methods:** A cross-sectional study, >18 years old apparently healthy subjects were included. Subjects with diabetes and hypertension were excluded. Weight, height, body mass index, NC and BP were evaluated.

**Results:** Fifty-four patients were recruited, age 49.3 ± 13.3 years, 55.5% were women and 44.4% men. Men had higher weight (83.58 ± 10.6 vs 74.2 ± 14.1, p < 0.01), height (1.73 ± 0.4 vs 1.55 ± 0.5, p < 0.001), NC (40.7 ± 2.2 vs 35.4 ± 2.3, p < 0.001), systolic blood pressure (SBP) (132 ± 14 vs 115.5 ± 19.1, p = 0.011) and diastolic blood pressure (DBP) (80.1 ± 7.9 vs 72.2 ± 11.6, p = 0.008), than women. According to the linear regression it was observed that for each centimeter in NC increases 2.5 mmHg the SBP and 1.6 mmHg the DBP.

**Conclusions:** For each centimeter in NC increases 2.5 mmHg the SBP and 1.6 mmHg the DBP.

**P1174**

Lipid control across very high cardiovascular risk profiles

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**Introduction:** Cardiovascular disease (CVD) is a leading cause of morbidity and mortality worldwide. In the last decades, a significant proportion of the reduction in CVD burden is attributed to cardiovascular (CV) prevention, including a more effective control of CV risk factors, namely dyslipidaemias. With the publication of the “2011 ESC Guidelines for the management of dyslipidaemias” (2011 ESC-G), there were introduced specific LDL targets for each level of CV risk. For patients (pts) at very high CV risk (HVCVR), a goal of LDL <70mg/dL was defined. The objective of this study was to analyze lipid control in this population, between different groups of pts.

**Methods:** The study population corresponded to pts at VHCR, as defined by the 2011 ESC-G. We performed a retrospective evaluation of pts in this category admitted in our department in 3 different time periods: pts admitted in the year prior to the guideline publication (2011: A), in the next year (2012: B) and 5 years after (November/2015/November/2016: C). Data from clinical variables and from lipid control were collected and those 3 groups were compared.

**Results:** A total of 1143 pts were included in the analysis (315 from A, 342 from B and 486 from C), of whom 821 (71.8%) were male, with a mean age of 67.5 ± 11.7 years. There were no significant differences in gender proportion or mean age between groups. Of the total population, 44% of pts had a prior Acute Coronary Syndrome (ACS), 13% had a prior Stroke, 15% had Peripheral Artery Disease (PAD), 54% were diabetic and 18% had moderate/severe Chronic Kidney Disease (CKD). Only 24.7% (n = 282) had achieved the goal LDL value <70mg/dL, with no significant differences between the 3 time periods (p > 0.25). In pts with a prior ACS, over time, there was a progressive increase of the achievement of target LDL between the 3 groups: 24% (A) vs 34% (B) vs 39% (C), p = 0.02. However, there were no significant differences between the 3 time periods in pts: with a prior Stroke - 30% (A) vs 36% (B) vs 40% (C), p = 0.54; with PAD - 26% (A) vs 43% (B) vs 32% (C), p = 0.21; diabetics - 23% (A) vs 25% (B) vs 31% (C), p = 0.13; with CKD - 34% (A) vs 30% (B) vs 25% (C), p = 0.88.

**Conclusions:** Despite what would be expected, 5 years after the publication of the 2011 ESC-G, adequate lipid control is still far from desirable. Only pts with a prior ACS had a significant difference in the achievement of target LDL values over time and were more likely to have adequate lipid control. Particular attention to lipid control should be paid to other pts at VHCR as well.

**P1175**

Clinical features of obese and heart failure with reduction ejection fraction (HFrEF) in Mexican patients: a cohort

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**Purpose:** Mexican population has a high obesity rate in childhood as adults. The main purpose of this work is to describe Clinical Characteristics of the impact of Obesity in patients with Heart Failure with Reduction Fraction (HFrEF) in the confirmation of a comparative cohort.

**Material and Method:** We analyzed consecutively a group of patients from the Instituto Nacional de Cardiología Heart Failure Clinic. All over 18 years old, both genders with clinical, laboratory and Imaging Diagnosis according 2016 European and AHA-ACC clinical Guidelines. In our Investigation Obesity was defined as BMI greater than 25 Kg/m2. According Age, LVEF and NYHA Class were matched in two groups for a suitable comparison. We describe clinical history, PTCA or CABG records, laboratory findings, echocardiographic diameters, hospitalization feature. The principal point at follow-up was hospitalization for Heart failure impairment. For statistical difference we declare p-value equal or less than 0.05.

**Results:** A total of 257 patients were evaluated, according our matching criteria two groups were formed: Obese: 191 (74.31%) and Non-obese: 66 (25.68%). Both groups were homogeneous in: Age 56.79 ± 4.87 vs 56.79 ± 4.23, LVEF: 29.50 ± 1.2 vs 28.19 ± 1.1 y NYHA-I: 91.62% vs 92.42% (p = ns for all). Gender male were also similar (68.87% both). Expected statistical significance differences in BMI were seen: 29.83 ± 3.95 vs 22.53 ± 2.10 (p = 0.005). Metabolic Syndrome Clinical Components were evidently more seen in obese group: Diabetes History (19.89% vs. 9.09%, p < 0.05) and Dyslipidemia (17.80% vs. 11.41%, p = 0.02). Blood pressure differences were seen: Systolic 141.2 ± 18.0 vs 128.2 ± 14.0 (p = 0.005), Diastolic 77.7 ± 10.5 vs 72.8 ± 9.4 (p = 0.001). Metabolic Syndrome Echocardiographic Components were seen: LVESD: 49.96 ± 5.4 vs 46.8 ± 3.9 (p = 0.001) and LVESVI: 2.34 ± 0.56 vs 1.97 ± 0.35 (p = 0.001). The principal difference at follow-up was for hospitalization for Heart failure impairment. For statistical difference we declare p-value equal or less than 0.05.

**Conclusions:** The present Cohort is the first report on patients with HFrEF in the Obese Mexican population. High rates of hospitalization in Emergency Room due Heart Failure exacerbation in the obese group were observed, possibly associated with Metabolic Syndrome components.

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Prevalence and factors predictive of preclinical diastolic dysfunction (stage B heart failure) in a predominantly Hispanic cohort with type 2 diabetes

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Background: People with type 2 diabetes mellitus (DM2) are predisposed to developing cardiac structural changes, diastolic dysfunction (DD), and heart failure (HF). Prior research has shown that preclinical DD (Stage B HF) is common among people with DM2. However, the characteristics and risk factors of DD development in people with DM2 remain incompletely defined.

Objective: To define the clinical and echocardiographic characteristics of a cohort of adult patients with DM2, and to identify risk factors for development of DD.

Methods: A retrospective analysis of consecutive adult patients with DM2 in California, USA. Patients without signs or symptoms of heart failure (HF) underwent 2D and Doppler echocardiography screening, and grouped into two cohorts: normal diastolic function and DD. Obesity was defined as a BMI ≤30 kg/m2 and overweight BMI between 25-30 kg/m2. Chronic kidney disease (CKD) was defined as estimated glomerular filtration rate (eGFR, by CKD-EPI equation) ≤60 mL/min/1.73 m2 (i.e., Stages 3A-5). DD was defined as those with medial E/e’ ≤15 or left atrial volume index ≥34 mL/m2. Multivariate logistic analysis was performed to identify factors associated with the presence of DD.

Results: Among 387 study patients, the mean age was 54.4 ± 12.9 years and 299 (77%) were Hispanic. 37.5% had DD and 62.5% had normal diastolic function. There was no difference in proportion of Hispanics with DD and normal diastolic function (78 vs 76%, p = 0.4). Mean hemoglobin A1c was 8.1% for the DD group and 8.6% for the normal diastolic function group (p = 0.02). When compared to those with normal diastolic function, the DD group had more females (66 vs 53%, p = 0.015), was older in age (mean 59 vs 51 years, p < 0.01), and had longer duration of diagnosed DM2 (12 vs 10 years, p = 0.01). Furthermore, those with DD had more cardiovascular comorbidities, including coronary artery disease (14 vs 4%, p < 0.01) and hypertension (88 vs 68%, p < 0.01). There was also greater proportion of CKD (25 vs 6%, p < 0.01) and obese or overweight (75 vs 65% and 25 vs 23%, respectively; p = 0.04) among the group with DD. LVMI in the DD group was also greater (118 vs 96 g/m2, p < 0.01).

Using multivariate logistic analysis, several significant predictors of DD in adults with DM2 were identified: older age (adjusted OR [AOR] 1.18 [1.11, 1.14], female gender (AOR 1.72 [1.06, 2.81]), obesity (AOR 3.1 [2.5, 3.8]) and obesity (AOR 3.86 [1.42, 10.48]) and the presence of at least Stage 3A CKD (AOR 4.9 [2.38, 10.1]).

Conclusions: Preclinical (stage B HF) DD was common (37.5%) in our predominantly Hispanic cohort with DM2. Those with DD were more likely to be female, older in age, obese or overweight, and have at least moderate (Stage 3A) CKD. These findings suggest that populations with similar ethnic and racial demographics, asymptomatic, obese or overweight, middle-aged to elderly women with at least Stage 3A CKD should be screened for preclinical DD (stage B HF).

P1177

Prescription of anti-diabetic-glucose-lowering agents and clinical outcomes in asian patients with heart failure and type 2 diabetes mellitus

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Background: Diabetes mellitus (DM) is a common comorbidity among patients with heart failure (HF). Anti-diabetic agents are important for glycaemic control, but some may worsen HF, whereas newer agents have recently been reported to improve cardiovascular outcomes. The prescription patterns of anti-diabetic agents in Asia are unknown.

Purpose: To determine the prescription patterns of anti-diabetic agents, and their association with mortality and HF hospitalisation, among Asian patients with HF and DM.

Methods: We studied prescription of anti-diabetic and HF medications among 5276 patients with HF and reduced ejection fraction (< 45%) from Northeast Asia (South Korea, Japan, Taiwan, Hong Kong and China), South Asia (India), and Southeast Asia (Thailand, Malaysia, Philippines, Indonesia, Singapore) in the prospective ASIAN-HF study. Patients were followed for the composite outcome of 1-year all-cause mortality or 1st HF hospitalisation.

Results: DM was present in 2177 (41%) patients (61 ± 11 years old, 21% women), of whom 1493 (89%) were prescribed anti-diabetic agents (761 [51%] monotherapy, 549 [37%] dual therapy). The most common anti-diabetic agents prescribed were metformin (54%), sulfonylureas (53%) and insulin (24%). Prescription varied by geography: metformin and sulfonylureas were more commonly prescribed in South and Southeast Asia (55-68%, compared to 33-34% in East Asia); whereas dpp4 inhibitors (76% vs 68% in Southeast Asia) and alpha-glucosidase inhibitors (25% vs 5% in Southeast Asia) were more commonly prescribed in East Asia. Patients with anti-diabetic therapy (vs without) were younger (60 ± 11 vs 62 ± 11 years) and more likely to have hypertension (69% vs 64%) and to receive angiotensin-converting-enzyme inhibitors or angiotensin receptor blockers (76% vs 68%) (all p < 0.01), similarly likely to have chronic kidney disease and arterial fibration. One-year composite outcome occurred in 481 (22%) of 1983 patients with 1-year follow-up. Adjusting for age, sex, body size, blood pressure, EF, NYHA, ischemic aetiology, hypertension and arterial fibration, metformin therapy was associated with reduced risk of the primary endpoint (vs no metformin, adjusted HR = 0.80, 95%CI 0.66-0.97) while there was no significant association with the usage of sulfonylureas (aHR=0.88, 95%CI 0.72-1.07), insulin (aHR=1.16, 95%CI 0.91-1.48) or DPP-4 inhibitors (aHR=0.77, 95%CI 0.56-1.06).

Conclusions: Wide geographical variation in prescribing patterns of anti-diabetic agents was observed among patients with HF across Asia. The lower hazard of a 1-year composite outcome with metformin support the ESC HF guidelines recommendation to consider metformin as first-line therapy unless contraindicated in these patients.

P1178

Polysaturated fatty acids supplementation impairs HDL function in heart failure

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Aims: The aim of this study was to assess the effects of oral treatment with polysaturated fatty acids (PUFA) on the anti-oxidative capacity of HDL in patients with heart failure (HF) of non-ischemic origin.

Methods: Patients with advanced chronic HF who were on stable optimized therapy for ≥ 3 months were randomized in a 1:1:1 fashion to receive 1 g/day of Ω3 PUFA, or placebo, respectively for 12 weeks. HDL anti-oxidant capacity was measured using a 2’-7’-DCF-based cell free fluorescent assay that determined the ability of apo-B depleted serum to inactivate or deplete previously oxidized LDL. HDL inflammatory index (HII) was calculated by subtracting the intensity signal of DCF alone from that of DCF incubated with apo-B depleted patient sera and log-transformed before analysis. A higher HII indicates a poorer anti-oxidative function.

Results: Forty-three patients with a median age of 60 years and a median HDL level of 41 mg/dl were included (Table 1). There was no difference in HII at baseline. After twelve weeks of treatment, we found a significant dose-dependent effect of PUFA treatment on the median change of HII (p = 0.03, Figure 1).

Discussion: Treatment with PUFA impairs HDL anti-oxidative function in a dose-dependent manner. This might provide one explanation for the rather small clinical benefit of this treatment.
Background and aims: It is known that telomere length (TL) shortening is a biomarker of cellular aging and associated with vascular changes. Glycemic variability (GV) in type 2 diabetes mellitus (T2DM) patients may be involved in vascular aging, but pathogenic mechanisms of this effect are not well established. The aim of our study was to investigate the association between GV, vascular aging and TL in T2DM patients.

Materials and Methods: The study group included 50 T2DM patients without symptoms of heart failure (mean age 58.4 ± 7.9 years, median diabetes duration 1.0 year and a HbA1c of 7.27 ± 0.69 %). NT-proBNP was < 100 ng/ml, ejection fraction was > 50%. All subjects were measured for TL by quantitative PCR; arterial stiffness evaluated by carotid-femoral pulse wave velocity (PWV); carotid intima-media thickness (IMT), plaque presence determined by ultrasonography in carotid arteries. The mean amplitude of glycemic excursion (MAGE), the standard deviation of blood glucose values (SD) and the continuous overlapping net glycemic action (CONGA) were calculated from continuous glucose monitoring system data for assessing GV. Statistical analyses were performed using SAS 9.1 (SAS Institute, Cary, NC, USA).

Results: The majority of patients with T2DM had subclinical atherosclerosis (78.1%) and shortened telomeres (> the median of TL 9.75) (71.4%). Correlation analysis showed significant association between IMT and TL (r = -0.39, p = 0.006), IMT and GV parameters: MAGE (r = -0.42, p = 0.007), SD (r = -0.41, p = 0.009), CONGA (r = -0.27, p = 0.093) and for MAGE this relationship remained significant in multiple linear regression analysis (p = 0.040, multiple R2 = 0.290). Multiple linear regression analysis also revealed significant independent association between plaque presence and CONGA (p = 0.088, p = 0.040, multiple R2 = 0.457). It was not revealed relationship between vascular stiffness (PWV) and GV. TL was correlated only with CONGA (r = 0.31, p = 0.054), but very long telomeres (> the TL 10.00) were associated with all GV parameters: MAGE (r = 0.39, p = 0.015), SD (r = 0.43, p = 0.007), CONGA (r = 0.42, p = 0.008).

Conclusion: Glycemic variability is associated with subclinical atherosclerosis and TL shortening in T2DM patients. Thus, we can suppose that the glycemic variability plays a principal role in TL shortening and vascular aging in T2DM patients without heart failure.

P1179
Lipid transfer to HDL in patients with heart failure was diminished and is correlated with IL-6 levels
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Table 1 - Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>Placebo=16</th>
<th>1g n3-PUFA n=14</th>
<th>4g n3-PUFA n=13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>56 (46 - 63)</td>
<td>59 (52 - 65)</td>
<td>65 (57 - 68)</td>
</tr>
<tr>
<td>Female</td>
<td>25%</td>
<td>21%</td>
<td>/</td>
</tr>
<tr>
<td>NYHA I/II</td>
<td>93%</td>
<td>85%</td>
<td>92%</td>
</tr>
<tr>
<td>NYHA III/IV</td>
<td>70%</td>
<td>64%</td>
<td>48%</td>
</tr>
<tr>
<td>Alcohol Other</td>
<td>25 (18 - 30)</td>
<td>27 (22 - 30)</td>
<td>28 (19 - 30)</td>
</tr>
<tr>
<td>BMI</td>
<td>27 (24 - 32)</td>
<td>26 (25 - 28)</td>
<td>26 (26 - 30)</td>
</tr>
<tr>
<td>eGFR</td>
<td>70 (59 - 88)</td>
<td>61 (40 - 82)</td>
<td>77 (52 - 103)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>130 (95 - 168)</td>
<td>151 (96 - 190)</td>
<td>102 (72 - 161)</td>
</tr>
<tr>
<td>HDL</td>
<td>42 (32 - 57)</td>
<td>43 (32 - 51)</td>
<td>37 (32 - 58)</td>
</tr>
<tr>
<td>CRP</td>
<td>0.46 (0.13 - 15)</td>
<td>0.49 (0.19 - 0.83)</td>
<td>0.60 (0.29 - 16)</td>
</tr>
</tbody>
</table>

Numbers are percentages within group or median (interquartile range). PUFA - polyunsaturated fatty acids, NYHA - new york heart association class; UEF - left ventricular ejection fraction; BMI = body mass index, eGFR = estimated glomerular filtration rate; LDL - low density lipoprotein, HDL - high density lipoprotein, CRP = C-reactive protein.

Figure 1

P1180
Arterial structure is associated with telomere length and glycemic variability in diabetic patients without heart failure
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Background: It is now consensual that the various protective functions of HDL should be explored beyond HDL-cholesterol.

Methods: Forty-eight HF patients were studied, 25 with functional class NYHA I/II and 23 with NYHA III/IV, as well as 50 non-HF patients matched for gender and age. All HF had ejection fraction ≤40%. Levels of IL-6, BNP, CETP, LCAT, oxidized LDL (oxLDL) and paraoxonase 1 (PON-1) activity were determined. Transfers of radioactive unesterified and esterified cholesterol, triglycerides and phospholipids from a donor artificial emulsion to HDL was determined by in vitro assay.

Results: Total, LDL and HDL cholesterol and triglycerides did not differ among the 3 groups, but apo A-I and apo B was lower in both HF groups compared to non-HF (p = 0.01, p < 0.001). Transfer of esterified and unesterified cholesterol, triglycerides and phospholipids (in %) was lower in HF-III/IV than in non-HF (HF-III/IV: 5.44 ± 1.76, 6.29 ± 2.05, 19.05 ± 2.5, 6.29 ± 2.05, non-HF: 6.24 ± 0.85, 7.33 ± 1.48, 20.21 ± 1.43, 7.40 ± 1.47, respectively, p < 0.05), but transfers were not different between HF-I/II and non-HF. Levels of oxLDL was lower in HF-III/IV than in non-HF (p < 0.0001). CETP mass was lower in HF-III/IV than in HF-I/II (p = 0.0006). LCAT activity was lower in patients with HF than non-HF subjects (p = 0.0384). Transfer of lipids to HDL, apo A-I, apo B, oxLDL and LCAT are inverse correlated with IL-6 and BNP levels. Conclusion: Alterations in the markers related with the plasma lipid metabolism seemed to be more pronounced in the most severe forms of HF. These alterations were correlated with IL-6 and BNP. Important biomarkers of HF, which could suggest that they could play a role in the evolution of the disease.
HEART FAILURE IMAGING

P1181
Role of MR imaging in the diagnosis and the management of hypertrophic cardiomyopathy
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Background: Hypertrophic cardiomyopathy (HCM) is the most common inherited cardiomyopathy and the most common cause of sudden cardiac death among young people. Clinical manifestations and electrocardiographic findings of HCM are nonspecific and diverse. Traditionally, echocardiography has been the easiest and most reliable technique for establishing a diagnosis of HCM. However, cardiac magnetic resonance (MR) today enables a more accurate and reliable assessment of maximal wall thickness, increasing the diagnostic yield by identifying subtle forms of myocardial hypertrophy. Furthermore, MR may be helpful in risk stratification by identifying massive LV hypertrophy or extensive areas of myocardial fibrosis heralding disease, which further impacts prognosis and patient management.

Purpose: The aim of this study is to present the MR imaging findings in HCM and to discuss the role of MR imaging in diagnosis, and risk profiling of HCM.

Methods: We reviewed all cardiac MRI studies carried out between May 2015 and January 2017 with a suspicion of HCM due to the results in echocardiography. A 1.5 tesla MRI is used to perform exams (Ingenia, Philips Healthcare). Cardiac MRI studies were performed using the following protocol: Cine imaging with bright blood prepared steady state free precession (SSFP) in the short axis, 2, 3 and 4 chamber plane, Black blood T2 in short axis, PSIR in short axis, 2 and 4 chamber plane ad IR-RT in short axis, 2 and 4 chamber plane ad IR-RT in short axis, 2 and 4 chamber plane.

Results: The final study group consisted of 16 patients with a median age of 55 years (extremes 33 and 74 years). We found no sex prevalence with female to male ratio 55 years (extremes 33 and 74 years). We found no sex prevalence with female to male ratio 1. Most common symptoms were atypical thoracic pain, dyspnea and arrhythmia. One patient had a family history (his brother) of sudden death in young age (50 years). Asymmetrical sigmoid HCM with septal hypertrophy was the most common phenotype (69%). Septal reverse curve HCM (6%), concentric hypertrophy (19%), mid ventricular hypertrophy (19%), apical hypertrophy (12%) and focal hypertrophy (6%) were less frequent. The mean of the maximal thickness of LV wall was 19.6mm (± 5.6). Right ventricular was involved in 2 cases (12%). LV sub aortic outflow obstruction with systolic anterior motion of the mitral valve (SAM) and a high velocity jet (signal void) were found in 9 cases (56%). Involvement of the mitral valve apparatus with increased length of the mitral valve leaflets were seen in 3 cases (16%). One patient presented a “bumped out” HCM with impaired systolic function (ejection fraction 28%). All the others patients had preserved systolic function. Delayed myocardial enhancement with gadolinium was found in 10 cases (62%).

Conclusion: MRI should be considered in patients with HCM at their baseline assessment.

P1182
Association of right ventricular dysfunction in left ventricular dysfunction with chronic obstructive pulmonary disease patients
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Introduction: Right ventricular dysfunction is associated with Chronic Obstructive Pulmonary Disease (COPD) for their effects on cardiac functions, affecting the pulmonary vasculature besides these patients has a major risk to develop pulmonary hypertension.

Objective: To evaluate the association of left ventricular dysfunction in patients with right ventricular dysfunction

Materials and Methods: A cross sectional observational study was conducted on 20 patients older than 18 years old, with confirmed COPD diagnosis, included through history taking, clinical examination, echocardiogram and gated radioisotopic ventriculography or gated myocardial perfusion imaging with Single Photon Emission Tomography/Computed Tomography (SPECT/CT). Statistical analysis was done by linear regression adjusted for pulmonary hypertension.

Results: Right ventricular dysfunction was present in 6 patients, mean age 62.3 ± 17.28 years, There were not significative difference in comorbities. Right ventricular dysfunction subjects had higher left ventricular and diastolic volume (y = 38 milliliters 95 % IC 11.41 to 64.94, p = 0.009) than among the patients without right ventricular dysfunction.

Conclusion: This study shows that the patients with right ventricular failure have a higher left ventricular and diastolic volume than patients without right ventricular failure, then the risk of both, left and right ventricular failure is higher with COPD patients and could be investigated.

P1183
Takotsubo syndrome: cardiac magnetic resonance versus new HFA diagnostic criteria to confirm the diagnosis
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Introduction: Takotsubo Syndrome (STK) is an acute reversible heart failure syndrome distinct from acute coronary syndrome (ACS), although the initial presentation has similar features. Many patients (P) are discharge from the hospital with uncertain diagnosis until, recovery of ventricular function in the follow-up, confirm the diagnosis. Given the new evidence, new diagnostic criteria have been proposed by the European Society of Cardiology Heart Failure Association (HFA).

Purpose/Methods: The objective was to compare the degree of accuracy of new HFA diagnostic criteria versus findings in Cardiac Magnetic Resonance (CMR) to confirm the diagnosis in P with suspected diagnosis of STK. We collect all P with suspected diagnosis of STK admitted to our hospital from January 2009 to April 2016.

Results: We included 70 P with suspected diagnosis of STK. The average age was 69 years, 86% women and 54% presented some stressful trigger (emotional most frequent). The 71% was HFA, 19% diabetics, 38% had dyslipidemia, 6,3% presented a history of ischemic heart disease. Killip class III or IV were observed in 21,4% of P, but only 13% needed administration of, vasoactive amines. 24% of these patients identified as STEMI underwent urgent PCI, 91% of them had normal coronary arteries. ECG showed ST segment elevation in 65% and 92% evolved to T wave inversion. 90% of P presented apical dyskinesia, 8% mid-ventricular and the remaining 2% presented basal dyskinesia. At discharge, 96% were prescribed beta blockers, ACE inhibitors/ARBs, statins or ASA. Regarding follow-up, STK diagnosis was confirmed by HFA criteria in 92% of P. However, it would be confirmed in 84% using the CMR (12% AMI and 4% myocarditis). Three P died (4.28%) of non-cardiac causes during follow-up, and other four had a CV event (ACS, an episode of IC and two STK recurrences).

Conclusions: In our series, STK diagnosis was confirmed by HFA criteria in more than 80% of P. Notwithstanding, CMR findings would reclassify up to 15% of P in other diagnoses. CMR would be of significant utility for the correct diagnosis of these P, because even with the new HFA criteria, some P with other pathologies would be included as STK. CMR should be considered as a new diagnostic criterion in future classifications.

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P1184 The analysis of parameters of echocardiography of patients with
cardiomyopathy after cardia pacemaker therapy
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Background: There are areas of controversy exist regarding the imaging assessment
of patients (pts) with CRT. The analysis of echocardiographic data about posi-
tive CRT responders is still collecting nowadays.

Purpose: The aim of this work is to find out the change of parameters of echocar-
diography of pts that have cardiomyopathy before and after one year CRT.

Methods: All pts were divided into two groups: group 1-pts with dilated car-
diomyopathy(DCM) (24 men and 13 women; aged 54.5 ± 9.4) and group 2-pts with
ischemic cardiomyopathy (22 men and 2 women; aged 56.4 ± 8.2) and chronic heart
failure (CHF) were included in the study. In the first group, pts with CHF NYHA func-
tional class III were 78%, in the second group 86.3%. The diagnosis is based on
clinical researches, that also include coronaryography. We compared the values of the
EF, LVEDV index, LVEF (%) and LVESV index, left ventricular end-systolic volume index;
LVEF, left ventricular ejection fraction; S’, tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived
tissue Doppler–derived fractional area change of RV, S’, RV basal diam-
ter, the level of SPAP, TAPSE before and after CRT.

Results: We received in a year after CRT it was discovered, that positive
dynamic of echocardiographic measures can be observed with DCM pts in com-
parison with pts with ischemic cardiomyopathy. The pts who have DCM turn out to be
more perspective responders for CRT. The extensive research on the topic, and
development of new imaging techniques, are likely to contribute to more accurate
assessment of these pts, thus improving management.

Conclusions: This research was supported by the Colombian
government through COLCIENCIAS, project code 656665740365, CT 648-2014.

P1185 Ventricular function according to severity stages of chagas disease:
an echocardiographic viewpoint of the natural history
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Funding Acknowledgements: This research was supported by the Colombian

government through COLCIENCIAS, project code 656665740365, CT 648-2014.

Background: There are few studies that assess myocardial deterioration in Cha-
gas patients with different severity stages, especially through techniques such as
Global Longitudinal Strain (GLS). Evaluating and understanding the natural history
of the disease and the progression of cardiac alterations by means of echocardio-
graphic vision may help early identification of asymptomatic individuals with incipi-
ent myocardial changes.

Purpose: Evaluate the echocardiographic characteristics and the myocardial defor-
mity in patients with different severity stages of Chagas disease.

Methods: A cross-sectional study. Continuous variables are expressed as mean ±
standard deviation or median (first and third quartile), Chi-square or Fisher test were
applicable for categorical variables. An analysis of variance (ANOVA) or Kruskal-Wallis
test and Scheffe test were used to identify differences between groups.

Results: A total 121 patients. Left ventricle volume and mass increase was evident
throughout the groups, including patients with preserved systolic function with EKG
changes typical of Chagas disease (stage B); although these changes were statis-
tically significant when compared to stage D, they were non-significant for stages
A and C. Statistically significant SLG alteration was found for all Chagas cardiac
disease stages (p < 0.000). Late right ventricular function deterioration was another
interesting finding, as evidenced by abnormal TAPSE, only in the most advanced stage
C and D (p < 0.000) (Table 1).

Conclusions: SLG was the only echocardiographic measure able to differentiate
early stages (A vs B) of the disease, suggesting it is an indicator of incipient myocardial
defamation in this population. However, these findings will require confirmation
through a study of larger and randomized sample.
Table P1186

<table>
<thead>
<tr>
<th>Echocardiogram</th>
<th>A (n=21)</th>
<th>B (n=26)</th>
<th>C (n=28)</th>
<th>D (n=45)</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td>LVED (mm)</td>
<td>74±5 (75-85)</td>
<td>75±5 (75-85)</td>
<td>75±5 (75-85)</td>
<td>75±5 (75-85)</td>
<td>0.0001</td>
</tr>
<tr>
<td>LV mass (g/m²)</td>
<td>26±9 (22-32)</td>
<td>30±9 (22-32)</td>
<td>30±9 (22-32)</td>
<td>30±9 (22-32)</td>
<td>0.0001</td>
</tr>
<tr>
<td>LV GLS (%)</td>
<td>53±2 (53-70)</td>
<td>53±2 (53-70)</td>
<td>53±2 (53-70)</td>
<td>53±2 (53-70)</td>
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</tr>
<tr>
<td>LV EDV (ml)</td>
<td>101±8 (82-139)</td>
<td>101±8 (82-139)</td>
<td>101±8 (82-139)</td>
<td>101±8 (82-139)</td>
<td>0.0001</td>
</tr>
<tr>
<td>6MWT (m)</td>
<td>327±95 (242.2-461)</td>
<td>352±95 (296-457)</td>
<td>370±95 (313-464)</td>
<td>397±95 (352-464)</td>
<td>0.0001</td>
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</tbody>
</table>

P1187

Value of 3D echocardiography in assessment of super-response to cardiac resynchronisation therapy in patients with chronic heart failure

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Background: Cardiac resynchronisation therapy (CRT) is an effective treatment for patients with chronic heart failure (CHF). Selection of patients with the prognosis of favorable response to CRT is one of the important issues.

Purpose: To reveal clinical and functional features in patients with CHF and super-response to CRT.

Methods: The study included 69 subjects (88% men, mean age 52.9±9.0 years): 33 patients with ischemic and 26 patients with nonischemic cardiomyopathy. The main criteria of patients selection: NYHA II-IV functional class; left ventricular (LV) ejection fraction (LVEF) <35%; signs of mechanical dyssynchrony assessed by 3D echocardiography; duration of QRS complex. 39 subjects had sinus rhythm and 20 patients - permanent atrial fibrillation. Combined CRT/ICD devices were implanted in 40 patients. 3D echocardiography with assessment of systolic dyssynchrony index (SDI) was performed at baseline and 6 months after CRT. Patients were divided into groups: I (n=18) - increase in LV end-systolic volume (ESV)>30% (super-responders); II group (n=41) - increase in LV ESV <30%.

Results: At baseline no significant differences in clinical and functional characteristics were observed between the groups. 6 months after implantation both groups demonstrated reduction in NYHA functional classes (I group from 2.69 to 2.00, p=0.001; in group II from 2.70 to 2.18, p=0.007). In patient with super-response significant increase in 6-minute walk test was observed (from 327±95 to 407±46 m; p=0.013), in group II increase in mean distance was not significant (from 232±95 to 246±46 m; p=0.126). Significant increase in LVEF and decrease in end-diastolic volume and ESV were found in both groups during CRT. At baseline SDI was significantly higher in patients with super-response (9.8±3.5% vs 7.4±4.4%; p=0.03).

Conclusion: In the group of patients with super-response to CRT clinical improvement and exercise tolerance were detected along with LV reverse remodeling. More significant LV mechanical dyssynchrony including 3D echocardiography in patients with CHF was associated with super-response to CRT.

P1188

Left atrial minimum volume is more strongly associated with left ventricular filling pressures than the left atrial maximum volume

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Aim: Left atrial (LA) maximum volume (LAV max) is an indicator of left ventricular filling pressure. However, systolic function is a determinant of LAV max, whereas the LA minimum volume (LAV min) is directly exposed to left ventricular pressure. Our aim was to demonstrate that LAV min is better correlated to filling pressure than LAV max.

Methods: This prospective study enrolled 49 patients (mean age: 62.7 years, range 44-89, 85% male) with ischemic cardiomyopathy (mean left ventricular ejection fraction = 47.57%). All patients underwent transthoracic echocardiography and N-terminal pro-B-type natriuretic peptide (NT-proBNP) measurement within 24 hours. All LA volumes measurements were indexed by body surface area, LAV min: LA end-diastolic volume at the first frame after mitral valve closure, LAV max: LA end-systolic volume right before mitral valve opening.

Results: In linear regressions, LAV min was better associated with E/E‘ (r=0.572, p<0.001) than LV max (r=0.434, p=0.003); LAV min was also more correlated with NT-proBNP (r=0.636, p=0.001) than LAV max (r=0.418, p=0.003). The area under the receiver-operating curve (AUC) to detect E/E‘<15 was 0.848 (p=0.001) for LAV min and 0.721 (p=0.02) for LAV max. The optimal LAV min cut-off to predict E/E‘<15 was 20 mm/m² (sensitivity of 85% and specificity of 73%). To detect an NT-proBNP level of 450 ng/L, LAV min yielded a significantly larger AUC 0.75 (p=0.004) than LAV max (AUC=0.608, p=0.21).

Conclusion: Our findings support that LAV min may be more closely related to left ventricular filling pressures than LAV max in patients with ischemic cardiomyopathy.

P1189

Early reverse remodeling and improvement of echo parameters after introduction of sacubitril/valsartan in 80 stable and well treated HFrEF patients

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Background: Sacubitril/valsartan is recommended to optimize pharmacological therapy of HFrEF patients, who remain symptomatic despite optimal treatment. If the benefits on prognosis have already been demonstrated in the PARADIGM trial, the effects on cardiac function, chambers dimensions and load conditions are unknown.

Objectives: We report the results of our monocentric cohort of 129 consecutive systolic HF patients, treated with Entresto between October 2015 and July 2016, studied with serial echocardiographic examinations acquired before and after 3 months of treatment. All echo were blind analysed in an external ESC accredited core lab echo.

Results: 129 patients were included with Entresto, 5% patients were excluded because of confounding factors (supposed alcoholic or rhythmic cardiomyopathy, concomitant CRT or valvular surgery), 11% discontinued treatment for adverse events, 3.8% were transplanted, 0.5% died of cardiovascular cause and 8% had missing data during the follow up period. 80 patients had finally echocardiographic examination before and after 3 months of treatment. All echo were blind analysed in an external ESC accredited core lab echo.

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Background and purpose: Aortic Coarctation (CoA) is a narrowing of the aorta, most commonly located distal to the origin of the left subclavian artery. Despite successful correction of this vascular defect, left ventricular hypertrophy (LVH) may persist. The primary goal of this study was to determine the predictors of LVH in this group of patients (pts).

Material and methods: This study was based on a retrospective analysis of 117 pts (±18 years old) with the diagnosis of repaired CoA, followed-up in a Grown-up Congenital Heart Disease Centre. Epidemiological, clinical and echocardiographic data were collected and inserted in a registry base.

Results: From a total of 117 adult pts, 39.3% were female and the current mean age was 34.9 ± 9.2 years old. Surgical repair was performed in 105 pts (89.7%): resection with subclavian artery flap aortoplasty (96); head-to-head anastomosis (21) and woven Dacron patch (18). Remaining 12 pts (10.3%) were submitted to percutaneous intervention. Mean age at CoA correction was 9.7 years old. All pts were in sinus rhythm and age distribution was similar between groups. LVH was present in 33 pts (28.2%). LVH voltage criteria on ECG correlated significantly with the presence of LVH on transthoracic echocardiogram (ECHO) (OR 7.75, CI 3.04–19.71, p < 0.001). Regarding ECHO data, LVH was observed in 29 (24.2%) of the pts, and only two pts had mild to moderate left ventricular systolic dysfunction. Associated ventricular septal defect (VSD) (OR 3.6, CI 1.35–9.82, p = 0.013) was a predictor of LVH on ECHO. Likewise, there was a group of pts presenting superior left atrial diameter (LAD) (37.7 ± 4.9 vs. 34.5 ± 5.4 mm, p = 0.008) and a E/e’ (9.6 ± 2.5 vs. 8.1 ± 1.9, p = 0.058). Pts with LVH have been more often submitted to re-intervention (OR 2.53, CI 1.03–6.20, p = 0.003). Other variables as sex, age of repair and type of intervention were not determinants of LVH on ECHO. LVH pts had a currently well-controlled blood pressure with a mean systolic blood pressure of 126.7 ± 11.6 mmHg with an average of 1 ± 0.7 anti-hypertensive agents. Beta-blocker was the most frequent used drug (70.0%), followed by blockers of the renin-angiotensin system (40.4%).

Conclusion: Our study reinforced that ECG voltage criteria strongly correlated with LVH on ECHO. Moreover, LVH on ECHO was associated with VSD, higher LAD and re-intervention. Also, despite optimal blood pressure control, patients with repaired CoA may present LVH long after correction, suggesting the need for lower blood pressure targets for these pts.

P1193
Ejection fraction can be accurately determined using a cloud based platform on mobile devices
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Despite its shortcomings, left ventricular ejection fraction (EF) remains the most widely used measure of systolic function. Echocardiography remains the most widely used modality for measuring EF given its widespread availability, portability, reliability and low cost. Given the digital nature of echocardiographic data, echocardiograms can potentially be viewed and analyzed using mobile devices. We therefore performed this preliminary study to compare echocardiographic EF derived on a widely available mobile device. METHOD We randomly selected 20 transthoracic echocardiograms (TTE) with regional wall motion abnormalities from which identifying information was removed. All studies were acquired using GE Vivid 7 system then converted from native to mp4 format with a compression ratio of 69:1 using a commercially available web/cloud based service for analysis, archiving and retrieval. They were then interpreted in random order by an echocardiographer with level 3 training on a standard computer display (STRD) with a minimum LCD display size and resolution of 20” x 24” and 1600 x 1200 pixels, and an iPad 2 (MBL) with a screen size and resolution of 5.82” x 7.75” and 1024 x 768 pixels. EF was determined using a previously derived method of that scored segmental wall motion in the 4 and 2 chamber views. RESULTS The 20 subjects (15 male, mean age 71.2 ± 3.74 years), 3 had suboptimal studies requiring contrast administration for LV visualisation. There was no significant difference in the mean EF by STRD vs. MBL (47.9 ± 13.44, range 28.06–66, vs. 45.89 ± 14.25, 24.83–66, p = 0.53). There was good agreement between both methods by regression analysis (R=0.55, p = 0.01), and as demonstrated using a Bland-Altman plot (average difference between methods = 2.0, 95% CI ± 14.07). CONCLUSION TTE EF can be reliably evaluated on a mobile device with results compared to EF derived by STRD. This will potentially lead to faster and timelier availability of this important piece of information. Additional studies on a larger number of mobile platforms should also be carried out.

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The value of NT-proBNP in the diagnosis of cardiac disease in patients with alcoholic liver cirrhosis

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Background: The value of NT-proBNP in the diagnosis of cardiac disease in patients with alcoholic liver cirrhosis (ALC) is not well established. The objective of this study was to evaluate the diagnostic value of NT-proBNP in alcoholic LC patients.

Methods: Our study included 80 alcoholic LC patients (mean age 53 ± 12 years) without any history of cardiovascular and respiratory disease. The number of patients with Child-Pugh classes A, B, and C was 12 (14.8%), 22 (27.2%), 46 (59.2%), respectively. All patients had a liver biopsy. NT-proBNP plasma was elevated (>125 pg/ml) in 46 (50%) patients, while there was a direct association between the level of NT-proBNP and severity of LC, estimated by MELD (R = 0.39, p < 0.05) and Child-Pugh (R = 0.35, p < 0.05) scores. The mean NT-proBNP in all patients amounted to 621.5 pg/ml (min 33 pg/ml, max 3849 pg/ml). No correlations between the level of NT-proBNP and parameters reflecting the presence of cardiac changes (size and area of the left and right atrial cavities, end-diastolic size, end-systolic size, thickness of interventricular septum and posterior wall of the left ventricle, LVMi, SV, EF, diastolic dysfunction, global longitudinal LV strain, OTI interval duration) were observed. A positive correlation were observed between the CO values and the level of NT-proBNP (R = 0.29, p < 0.05).

Conclusion: The level of NT-proBNP increased in majority of the patients with ALC and directly correlated with the severity of liver disease. The level of NT-proBNP is directly associated with CO and not with other echocardiographic parameters, which suggests that this marker could reflect the overload of sympathoadrenal system, and not heart failure, in this patient population.

P1197
The diagnostic and economic implications of using a plasma n-terminal brain natriuretic peptide threshold of 300 or 400ng/litre as the threshold for ruling out the diagnosis of heart failure in a non-selected British population

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Background: The 2014 National Institute of Clinical Excellence (NICE) guidelines on the management of acute heart failure recommend a plasma NT-proBNP threshold of 300nmol/l to assist in ruling out the diagnosis of heart failure (HF), updating previous guidelines recommending using a threshold of 400pg/ml.

Purpose: This study sought to determine the diagnostic and economic implications of using these thresholds in a large unselected UK population.

Methods: In our institution, all consecutive patients with suspected heart failure underwent NT-proBNP testing from September 2014 to September 2015. The reason for all the patient’s admission was recorded using hospital notes and imaging
Results: 697 were diagnosed with symptomatic HF following echocardiography and consultant review. From reviewing all the reasons for diagnosis, lowering the threshold from 300 to 400pg/ml would have involved screening an additional 81 patients and theoretically identified 6 patients with symptomatic HF. At 300pg/ml the sensitivity was 0.987 with a positive predictive value (PPV) of 0.396 and an accuracy of 0.467. Using a threshold of 400pg/ml sensitivity was 0.973, PPV 0.407 and accuracy of 0.492. The economic implications of lowering the threshold would have involved additional costs of £158,116.07 (Suppl. S1) per patient screened or £868.61 per HF patient identified. The six patients identified with a NTproBNP between 300–399pg/ml were already known to the HF service.

Conclusion: This study reported the updated NICE guidelines to lower the plasma NT-proBNP threshold of 300/399ng/litre to rule out the diagnosis of heart failure had a significant impact on the heart failure team and costs, but would potentially improve heart failure detection (additional 6 patients identified).

Costing for different NTproBNP threshold

<table>
<thead>
<tr>
<th>Model screening patients with NTproBNP&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Number of Patients</th>
<th>Total Costs (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300–399pg/ml</td>
<td>61</td>
<td>1991.04</td>
</tr>
<tr>
<td>Cost of blood tests (£32.64/each)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HF Team screening review (Nurse review (£25-57/each))</td>
<td>61</td>
<td>1614.67</td>
</tr>
<tr>
<td>Number of additional echocardiograms (£55.70/echo)</td>
<td>57</td>
<td>3744.90</td>
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<tr>
<td>Additional length of stay (£40/day x 2 days)</td>
<td>55</td>
<td>44,000</td>
</tr>
<tr>
<td>Change in stay for 6 patients correctly</td>
<td>6</td>
<td>2400</td>
</tr>
<tr>
<td>Identified as having HF (increase by 1 day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of patients with HF readmitted within a month (and so no payment made according to BPT (£0-179))</td>
<td>0.71</td>
<td>4365.46</td>
</tr>
<tr>
<td>OVERALL DIFFERENCE</td>
<td></td>
<td>58,116.07</td>
</tr>
</tbody>
</table>

Cost implications of lowering the NTproBNP threshold to 300pg/ml

P1198

Natriuretic peptides for detection of heart failure in patients with atrial fibrillation from the community

S Van Doorn<sup>1</sup>, J Gethings<sup>1</sup>, AW Hoes<sup>1</sup>, F H Frans Hendrik Rutter<sup>1</sup>

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Heart failure (HF) may develop in patients with atrial fibrillation (AF), and the other way around. Both share shortness of breath and reduced exercise tolerance as key symptoms, and elevated natriuretic peptide levels. We aimed to assess the diagnostic value of amino-terminal pro B-type natriuretic peptide (NTproBNP) for uncovering heart failure in patients with atrial fibrillation.

Methods: Individual patient data from four opportunistic HF screening studies in older high-risk persons from the open population (>65 years and type 2 diabetes, >65 years and chronic obstructive pulmonary disease, >65 years and shortness of breath, and >65 years and multimorbidity). All participants underwent an extensive clinical assessment, blood testing, electrocardiography, and echocardiography. Presence or absence of HF was established by an expert panel following the criteria of the European Society of Cardiology on HF. We used a two-stage mixed effects regression meta-analysis to calculate discrimination; efficiency; the proportion of missed cases and sensitivity, specificity and predicted values.

Results: In 1,341 individuals with median age 72.3 (IQR 67.4–77.7) years and 49.7% males, 194 (10.1%) cases had atrial fibrillation. Heart failure was uncovered in 82 (42.5%) patients with AF. Median NTproBNP levels of AF patients with and without uncovered HF were 744 pg/mL and 211 pg/mL, respectively. Forty-three (21.9%) AF patients had NTproBNP value below 125 pg/mL. At this cutpoint, the sensitivity was 93%, specificity 36%, and the positive value and negative predictive value 52% and 87%, respectively.

Conclusion: In older high-risk AF patients from the community the prevalence of unrecognized HF is very high (42.5%), and straightforward echocardiography should be considered.

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P1200 Semaphorin 4D levels in heart failure patients: do we have a novel biomarker of heart failure besides BNP?

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Background: Semaphorin 4D (Sema4D) is a transmembrane glycoprotein expressed on platelets and T-cells, mainly involved in inflammation processes, aortal guidance during embryonal development, angiogenesis and malignant cells proliferation. Heart failure (HF) is caused by diverse pathophysiological processes including inflammation and neuro-hormonal activation, thus potentially influence Sema4D levels.

Purpose: The study had several aims: 1. Comparing Sema4D serum levels in HF patients with control group, with post-hoc analysis of potential confounders like kidney function, medical comorbidities and ejection fraction. 2. Analysis of the correlation between NT-pro-BNP and Sema4D, in order to examine the possible role of Sema4D as a biomarker for HF. 3. Evaluation of Sema4D serum levels in HF patients- during the acute phase and following remission.

Methods: 60 patients hospitalized with complaints clinically suspected to be HF were enrolled for the HF group, 45 patients were diagnosed with HF by echocardiography. Echocardiographic findings and positive NT-pro-BNP with normal Sema4D were included in the study. Controls were age matched healthy individuals declaring no chronic diseases or medications. First NT-pro-BNP and Sema4D samples were taken on admission to hospital, and a repeated measurement was done on patients’ discharge. Both NT-pro-BNP and Sema4D serum levels were done using commercial kits according to the manufacturer instructions.

Results: In the HF group, mean age was 72.2 ± 3.9 years old, 72.7% were women, and mean NT-pro-BNP levels was 3.550 (± 0.56) ng/ml, compare with mean age of 76.5 (± 12.5) years old, 42.2% women and mean NT-pro-BNP levels of 1.8 (± 0.26) ng/ml in controls. In both NT-pro-BNP and Sema4D (p = 0.05 and p = 0.014, respectively), reduced ejection fraction was found to predict both higher levels of NT-pro-BNP and Sema4D. The correlation between NT-pro-BNP and Sema4D levels was done on patients’ discharge. Both NT-pro-BNP and Sema4D serum levels were done using commercial kits according to the manufacturer instructions.

Discussion: The role of Sema4D as a biomarker of HF is essential, but ejection fraction compare with HF patients with preserved ejection fraction. Clinical disease. Unlike NT-pro-BNP, Sema4D is not elevated in HF patients with reduced ejection fraction significantly (3.41 ± 0.87 ng/ml vs. 762.18 ± 0.87 ng/ml). To 6 days, the concentration of copeptin in the first group were significantly different between HFpEF and HFrEF (p = 0.001, r = 0.45). When comparing mean Sema4D levels on admission and discharge, a significant reduction was found (3534.94 ± 1650.55 and 2455.67 ± 1424.04, p = 0.03); NT-pro-BNP levels did not change significantly (3.41 ± 0.75 and 3.38 ± 0.6, p = 0.79).

Conclusions: Sema4D serum levels in HF patients are significantly higher than in controls, with the highest levels being in patients with chronic kidney disease. Unlike NT-pro-BNP, Sema4D is not elevated in HF patients with reduced ejection fraction compare with HF patients with preserved ejection fraction. Clinical improvement caused rapid reduction in Sema4D levels, which may be related to the inflammatory process in HF. Further research of Sema4D and HF is essential, but those preliminary findings might indicate a possible role for Sema4D as a biomarker of acute heart failure.

P1201 Copeptin and inflammatory markers in patients with different variants of acute coronary syndrome.

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Purpose: of the study was to access the dynamics of the concentration of copeptin, biomarkers of inflammation and their relationship patients with MI and unstable angina.

Materials and methods: the study included 49 divided into 2 groups: with aim -26 people - the first group, the average age of 64.2 ± 1.6 unstable angina- 23 the second group, at the age of 62.1 ± 2.2 years. All patients were assessed on the first and sixth day of hospitalization. The study included 49 divided into 2 groups: with aim -26 people - the first group, the average age of 64.2 ± 1.6 unstable angina- 23 the second group, at the age of 62.1 ± 2.2 years. All patients were assessed on the first and sixth day of hospitalization. Both patients with HF with reduced ejection fraction (HFREF) and those with HF with preserved ejection fraction (HFpEF) were eligible. Patients who were diagnosed with acute MI, patients with primary valvular disease, and those with missing data regarding admission or discharge hsCRP were excluded. Relative variation of hsCRP (ΔhsCRP) during hospitalization was calculated using the formula: ΔhsCRP = discharge hsCRP admission hsCRP). Patients were followed up to 3 years and the endpoint under analysis was all cause-death. A multivariate Cox-regression model (variables in the model: age, gender, discharge BNP and hsCRP, NYHA class and infection occurrence) was used to assess the prognostic impact of ΔhsCRP (both as continuous and as a categorical variable: cut-off 40% decrease median value) and a stratified analysis according to left ventricular function (HFREF and HFpEF) was performed.

Results: We studied 439 patients, mean age 75 years, 50.1% male and 69.2% had HF-REF. Median admission hsCRP was 20.00mg/L, and median discharge hsCRP was 12.4mg/L. ΔhsCRP decreased during hospitalization in 294 (67.6%); median (QR) ΔhsCRP was 38 (–22 to 73) %. During the 3-year follow-up 247 patients (56.3%) died, 73 (54.1%) in HFpEF patients and 174 (67.2%) in those with HF-REF. The multivariate-adjusted HR of 3-year mortality in HFpEF patients with hsCRP decrease ≤40% during hospitalization was 0.56 (95% CI: 0.32-0.99). A decrease ≤40% in ΔhsCRP was not mortality-associated in HFpEF patients - HR=0.90, 95% CI: 0.64-1.26. There was interaction between ΔhsCRP and left ventricular dysfunction; p for interaction was 0.02. Similar results were obtained when ΔhsCRP was analyzed as a continuous variable.

Conclusions: A decrease≤40% in ΔhsCRP in acute HF associated with a 44% decrease in the 3-year death risk in HFpEF patients. No association between ΔhsCRP and prognosis existed in HFpEF patients. The prognostic impact of ΔhsCRP was significantly different between HFpEF and HF-REF patients. Our results suggest that inflammation plays a different role according to left ventricular function.

P1202 Is there a c-reactive protein value beyond which one should consider infection as the cause of acute heart failure?

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Background: Inflammation has been associated with heart failure (HF) progression and worse prognosis. The prognostic role of high sensitivity C-reactive protein (hsCRP) in the acute HF setting is less well established and the impact of its variation widely unknown. We aimed to study the prognostic impact of ΔhsCRP variation and it if differed in patients according to left ventricular function.

Methods: We analyzed patients prospectively included in an acute HF registry. All patients were drawn a venous blood sample at admission and discharge and an echocardiogram was performed during hospitalization. Both patients with HF with reduced ejection fraction (HFREF) and those with HF with preserved ejection fraction (HFpEF) were eligible. Patients with primary valvular disease, and those with missing data regarding admission or discharge hsCRP were excluded. Relative variation of ΔhsCRP (ΔhsCRP) during hospitalization was calculated using the formula: ΔhsCRP = discharge hsCRP admission hsCRP). Patients were followed up to 3 years and the endpoint under analysis was all cause-death. A multivariate Cox-regression model (variables in the model: age, gender, discharge BNP and hsCRP, NYHA class and infection occurrence) was used to assess the prognostic impact of ΔhsCRP (both as continuous and as a categorical variable: cut-off 40% decrease median value) and a stratified analysis according to left ventricular function (HFREF and HFpEF) was performed.

Results: We studied 439 patients, mean age 75 years, 50.1% male and 69.2% had HF-REF. Median admission hsCRP was 20.00mg/L, and median discharge hsCRP was 12.4mg/L. ΔhsCRP decreased during hospitalization in 294 (67.6%); median (QR) ΔhsCRP was 38 (–22 to 73) %. During the 3-year follow-up 247 patients (56.3%) died, 73 (54.1%) in HFpEF patients and 174 (67.2%) in those with HF-REF. The multivariate-adjusted HR of 3-year mortality in HFpEF patients with ΔhsCRP decrease ≤40% during hospitalization was 0.56 (95% CI: 0.32-0.99). A decrease ≤40% in ΔhsCRP was not mortality-associated in HFpEF patients - HR=0.90, 95% CI: 0.64-1.26. There was interaction between ΔhsCRP and left ventricular dysfunction; p for interaction was 0.02. Similar results were obtained when ΔhsCRP was analyzed as a continuous variable.

Conclusions: A decrease≤40% in ΔhsCRP in acute HF associated with a 44% decrease in the 3-year death risk in HFpEF patients. No association between ΔhsCRP and prognosis existed in HFpEF patients. The prognostic impact of ΔhsCRP was significantly different between HFpEF and HF-REF patients. Our results suggest that inflammation plays a different role according to left ventricular function.
BACKGROUND: Heart Failure (HF) is a condition that courses with low-grade inflammation. High sensitivity C-reactive protein (hsCRP) is an established inflammatory marker widely used in clinical practice. A cut-off value of hsCRP beyond which an infection should be sought has never been studied in HF. We aimed to determine the best CRP cut-off for infection prediction in acute HF.

Methods: We analyzed patients prospectively included in an acute HF registry. All patients were drawn a venous blood sample upon admission, hsCRP was measured. An infectious condition was considered according to the discharge diagnosis list as judged by the attending physician. A ROC curve was used to determine the best hsCRP cut-off for infection prediction. Variables associated with infection in acute HF were assessed using logistic regression analysis.

RESULTS: We studied 615 acute HF patients. Mean age 78 years, 45.2% male, 60.3% had systolic dysfunction. Median admission hsCRP was 20.3 (9.5-55.5) mg/L and in 41.6% an infection was the cause of decompensation. The area under the ROC curve for admission hsCRP in the prediction of infection was 0.57 (0.76-0.83). The best hsCRP cut-off for infection prediction was 25 mg/L, with a sensitivity of 77.2%, a specificity of 77.2%, a positive predictive value of 69.4% and a negative predictive value of 79.9%. Age and elevated hsCRP (continuous and categorical) were the only variables independently associated with concomitant infection (Table).

Conclusions: We suggest 25 mg/L as a cut-off beyond which an infection should be sought as the cause of acute HF decompensation. Almost 80% of the patients with CRP ≥ 25 mg/L are not infected and 69.4% of those with higher CRP have a concomitant infection.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR (95% CI)</th>
<th>p-value</th>
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<tr>
<td>Age, per year</td>
<td>1.02 (1.00-1.04)</td>
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<tr>
<td>hsCRP, mg/L</td>
<td>8.96 (5.91-13.56)</td>
<td>&lt; 0.001</td>
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<td>Male sex</td>
<td>0.69 (0.44-1.08)</td>
<td>0.11</td>
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<tr>
<td>Diabetes mellitus</td>
<td>0.89 (0.72-1.09)</td>
<td>0.25</td>
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<tr>
<td>Coronary heart disease</td>
<td>0.69 (0.45-1.06)</td>
<td>0.09</td>
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<tr>
<td>Admission systolic blood pressure, mmHg</td>
<td>1.00 (0.99-1.00)</td>
<td>0.24</td>
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<tr>
<td>Haemoglobin, g/dL</td>
<td>0.94 (0.85-1.04)</td>
<td>0.26</td>
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<tr>
<td>BNP, pg/mL</td>
<td>1.00 (1.00-1.02)</td>
<td>0.35</td>
</tr>
<tr>
<td>Creatinine per mg/dL</td>
<td>0.89 (0.68-1.17)</td>
<td>0.40</td>
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<tr>
<td>Left ventricular systolic dysfunction</td>
<td>0.78 (0.50-1.13)</td>
<td>0.30</td>
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Predictors of an infectious condition underlying decompensated heart failure: multivariate model

P1204

Galectin-3 levels at presentation and left ventricular ejection fraction (LVEF) prediction in patients with STEMI/NSTEMI acute myocardial infarction. An observational study.

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Background and Aim: The role of circulating Galectin-3 (Gal-3), a fibrosis marker, as a predictor of Left Ventricular Ejection Fraction (LVEF) in patients with acute myocardial infarction (AMI) is poorly investigated. The aim is to investigate serum Gal-3 levels in patients presenting at the Emergency Department with AMI (STEMI and NSTEMI) and the relationship with LVEF.

Patients and Methods: We enrolled 152 patients diagnosed with AMI and with either preserved (HFPEF n=89) or reduced (HFPREF n=73) ejection fraction, of whom 44 and 55 with STEMI and NSTEMI, respectively. Serum Gal-3 levels were assessed by Architect i1000SR (ABBOTT Laboratories) at the baseline and after 5 days from presentation. A logistic multivariate curve regression model (MCRM) was developed for investigating Gal-3 and type of infarct contribution on Gal-3 dynamics after 5 days of hospitalization. Five years risk prediction in patients with heart failure: clinical data and biomarkers interaction.

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Aim: Five years risk prediction in patients with heart failure: clinical data and biomarkers interaction.

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Chronic heart failure (CHF) and acute heart failure (AHF) are associated with high short- and long-term morbidity and mortality. However, there are few data in our country about long term follow up of this condition.
Conclusions: Simple clinical variables could help to the early identification of poor outcome. A
associated with HOSP-S were COPD ($p < 0.001$), anemia ($p = 0.002$), atrial fibrillation ($p = 0.002$), hospitalization for AF during last year ($p = 0.001$), previous functional class (FC) 3-4 ($p < 0.001$), age ($< 0.001$), creatinin ($< 0.001$), sodium ($p = 0.002$), CA125 > 14 U/ml ($p = 0.02$) and HsTnT > 23 ng/l ($p = 0.005$); Independent predictors for mortality were COPD ($p = 0.03$); HR=1.6; 95%CI=1.05-2.5), FC 3-4 ($p < 0.001$; 2.3; 1.5-3.4), age ($p = 0.001$; 1.01; 1.01-1.04), creatinin ($p = 0.01$; 3.6; 1.1-1.7), sodium ($p < 0.001$; 0.94; 0.91-0.97) and HsTnT > 23 ng/l ($p = 0.19$; 1.09; 1.09-2.63). The variables associated with HOSP-S were COPD ($p = 0.02$), anemia ($p = 0.01$), atrial fibrillation ($< 0.001$), hospitalization for AF during last year ($p = 0.001$), age ($p = 0.02$), creatinin ($< 0.001$), sodium ($p = 0.04$), BNP = 180 pg/ml ($p = 0.03$) and HsTnT > 23 ng/l ($p = 0.001$). Independent predictors for HOSP-S were FC 3-4 ($p = 0.001$; HR=2.2; 95%CI=1.5-3.0), atrial fibrillation ($p = 0.01$; 1.7; 1.2-2.4), age ($p = 0.02$; 1.02; 1.01-1.03), creatinin ($p = 0.002$; 1.2; 1.1-1.3), sodium ($p = 0.06$; 0.96; 0.92-0.98) and BNP > 180 pg/ml ($p = 0.003$; 1.7; 1.2-2.4).

Conclusions: The five years follow up of patients with heart failure evidenced that only one out two survive, and one out three survive without hospitalization for AF. Simple clinical variables could help to the early identification of poor outcome. A biomarker of myocardial damage appeared as mortality predictor whereas one of cardiac stress was associated with combined events

P1207
Abnormal potassium level predicts short-term readmissions in patients with acute dyspnea
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On behalf of: GREAT network
Funding Acknowledgements: The work was supported by Research Council of Lithuania, grant Nr. MP-049/2015 and approved by Lithuanian Bioethics Committee, Nr. L-15-01.

Introduction: Potassium imbalance is included in some clinical risk scores to predict short-term outcomes in a wide population of patients with acute dyspnea admitted to the emergency department. Aim: To evaluate whether hypokalemia and hypochloremia had a significant value in predicting short-term rehospitalizations and mortality of patients with acute dyspnea admitted to the emergency department.

Methods: Prospective observational cohort study enrolled consecutive patients admitted to the emergency department with acute dyspnea due to decompensated HF, exacerbation of chronic obstructive pulmonary disease (COPD), pneumonia, pulmonary embolism and other reasons. Electrolyte concentration on admission and rate of mortality and rehospitalizations at 1 and 3 months follow up were collected. Data of 307 study patients (mean age 68.4 ± 12.7 years) were included in the analysis. The study group consisted of 143 women (46.6%) and 164 men (53.4%). Data were analyzed using SPSS v23 statistical package using Cox proportional-hazards regression analysis. A p-value < 0.05 was considered statistically significant.

Results: On admission 8.8% of patients had hyponatremia (sodium concentration < 134 mmol/l) and 16.6% were hypochloremic (chloride concentration < 98 mmol/l). Patients with hyponatremia had greater chance to be rehospitalized due to all causes [hazard ratio (HR)=2.6; 95% confidence interval (CI): 1.48 to 4.55; p = 0.001] and due to cardiovascular causes during 3 months period (HR=3.31; 95% CI: 1.45 to 7.58; p = 0.05). There was no statistically significant association between hyponatremia and patients’ mortality in three months period. Admission serum chloride level during hospitalization for acute dyspnea was independently associated with 3-month mortality (HR=3.36; 95% CI: 1.62 to 6.99; p = 0.001), but not with rehospitalizations. AHF was the main cause of admission to the hospital in hyponatremic and hypochloremic groups (respectively 81.48% and 78.43%), other causes were pulmonary embolism, COPD, hydrothorax, pneumonia, bronchitis, sepsis, pulmonary carcinoma and B cell lymphoma. In hyponatremia group patients with AHF were rehospitalized more often than non-AHF patients ($p = 0.045$). However, there was no statistically significant difference in deaths of AHF and non-AHF patients with hyponatremia. No statistically significant correlation between blood electrolytes concentration and diabetes mellitus or renal disease was found.

Conclusion: Sodium and chloride concentrations are significant predictors of outcomes in acute dyspnea patients admitted to the emergency department. Hypochloremia is more hazardous to patients’ outcomes compared to hyponatremia.
P1209

Predictive value of a novel 4- miRNAs diagnostic panel after acute myocardial infarction: independent validation from the MITOCARE study
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1Firis SAS, Molecular Diagnostics, Huningue, France; 2Ullevaal University Hospital, Department of Cardiology B, Oslo, Norway; 3Stavanger University Hospital, Department of Cardiology, Stavanger, Norway; 4Lund University, Department of Cardiology, Lund, Sweden; 5Aalborg University Hospital, Department of Cardiology, Aalborg, Denmark; 6CNP-Sante, Cardiac Vascular Research Unit, Luxembourg, Luxembourg

On behalf of: Cardiovdiac network

Funding Acknowledgements: Eurostars MIPROG E1 9686

Following acute myocardial infarction (AMI), a significant proportion of patients develops heart failure (HF) due to left ventricular remodelling (LVR). The early identification of patients developing LVR is essential for evidence-based intervention and pharmacological therapy. Novel biomarkers might pave the way for improved prediction approaches. Since the discovery of their stability in the bloodstream, microRNAs (miRNAs) short oligonucleotides which down-regulate gene expression, have been extensively studied for their potential to diagnose AMI. We previously identified a panel of 4 circulating miRNAs (miR-16-5p/27a-3p/101-3p/150-5p) able to significantly improve the prediction of post-AMI LVR by a multivariable clinical model including N-terminal pro-brain natriuretic peptide (NT-pro-BNP). In the present study, we aimed to confirm the predictive value of the 4-miRNA panel in an independent cohort obtained from the MITOCARE study, a prospective randomized clinical trial conducted from 2011 to 2013. We enrolled 90 patients with STEMI treated by primary PCI. The HTG EdgeSeq targeting sequencing platform was used to assess the levels of miRNAs in plasma samples collected 3 days after AMI. Cardiac function was assessed by echocardiography at discharge and after 1 month. Left ventricular ejection fraction (LVEF) at 1 month was used to classify patients into 3 categories: LVEF <40% (n = 14), LVEF between 41 and 50 (n = 34) and LVEF>50 (n= 41). Random forest model was used for predictive modelling and individual AUC, and confidence intervals (CI) were calculated for each miRNA. miR-16-5p/27a-3p/101-3p/150-5p individual AUC were 0.81, 0.75, 0.84 and 0.81, respectively. The combination of the set of 4 miRNAs showed an average AUC of 0.83 (CI 0.85-0.85). Combining the 4 miRNAs with NT-pro-BNP resulted in an AUC of 0.87 (CI 0.75 and 0.99). In conclusion, we here confirm the independent predictive value of the 4-miRNA panel in the independent cohort obtained from the MITOCARE study, whereas the results validate the development of molecular diagnostic kits based on miRNAs to aid in outcome prediction after AMI.

ROC Curve

P1210

Identification of novel biomarkers for prediction of clinical outcome in acute myocardial infarction patients by Otikon platform.
S Sandra Schordon1; TN u h r e n b e r g2; P Ruile2; ES c h o r d a n1;AM o s t e f a i1; H Firat1;YD e v a u x6

1Department of Cardiology, Stavanger, Norway; 2Department of Cardiology B, Oslo, Norway; 14), LVEF between 41 and 50 (n= 41). Random forest model was used for predictive modelling and individual AUC, and confidence intervals (CI) were calculated for each miRNA. miR-16-5p/27a-3p/101-3p/150-5p individual AUC were 0.81, 0.75, 0.84 and 0.81, respectively. The combination of the set of 4 miRNAs showed an average AUC of 0.83 (CI 0.85-0.85). Combining the 4 miRNAs with NT-pro-BNP resulted in an AUC of 0.87 (CI 0.75 and 0.99). In conclusion, we here confirm the independent predictive value of the 4-miRNA panel in the independent cohort obtained from the MITOCARE study, whereas the results validate the development of molecular diagnostic kits based on miRNAs to aid in outcome prediction after AMI.

ROC Curve

P1211

Echocardiographic and neurohumoral correlations of plasma galectin-3 in adult patients with congenital heart disease.
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Introduction: Galectin-3 is a -galactoside–binding lectin and is best known for its role as a mediator of tumor growth and metastasis. In addition galectin-3 plays a role in inflammatory and immune-mediated disorders as well as in fibrogenesis, mechanisms involved in the progression of heart failure and cardiac remodeling. It has an important and significant prognostic value in identifying patients with heart failure at elevated risk for subsequent morbidity and mortality. However, no efficient data exist regarding the relationship of plasma galectin-3 levels and cardiovascular abnormalities in congenital heart disease. Aim of the study was to look at echocardiographic and neurohumoral correlations of plasma galectin-3 in adult patients with congenital heart disease.

Methods: We studied 57 clinically stable patients (31 men, mean age 37.1 ± 16.9) with congenital heart disease. Forty-nine had systemic left ventricle, 5 systemic right ventricle and 3 single ventricle physiology. All patients underwent echocardiographic study and NtProBNP and galectin-3 plasma levels were measured. For parameters with normal distribution Pearson correlation analysis was performed while for parameters without normal distribution Spearman correlation analysis was performed.

Results: Mean galectin-3 value was 16.93 ± 6.39 ng/ml. Mean NtProBNP value was 265.25 pg/ml (range 18.7 pg/ml-3788 pg/ml). Plasma galectin-3 levels correlated with LogNtProBNP (r=0.469, p = 0.001) and left atrial diameter (r=0.316 p = 0.025). Galectin-3 plasma levels didn't correlate with age, systemic ventricle ejection fraction, subpulmonary ventricle pressure, and subpulmonary ventricle function indices (annulus systolic excursion and systolic tissue Doppler velocity).

Conclusion: Galectin-3 plasma levels correlated with plasma NtProBNP as well as left atrial diameter indicating that systemic ventricle fibrosis and/or left atrium may be included in the causes of increased systemic ventricle end-diastolic pressure in adult patients with congenital heart disease.

P1212

Prognostic value of Galectin-3 as predictor of acute kidney injury in acute heart failure hospitalization.
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1Hospital Clinico Universitario Virgen de la Arrixaca, Cardiolog, Murcia, Spain

Background: Elevated levels of Galectin-3 (GAL-3) have been associated with worse prognosis in acute heart failure (AHF). These may be influenced by the presence of Infarction (AMI) by reducing the size of the infarct and mortality due to cardiac ischemia. Despite advances in care, prognosis in term of Heart Failure (HF) remains poor. Once HF has developed, 30 to 40% of patients die within one year and 60 to 70% within 5 years of diagnosis. The earlier patients who are prone to develop HF are identified, the more efficiently a prophylactic treatment can be adapted.

Aim: The aim of this project is to identify new biomarkers for the prediction of HF and translate this into a diagnostic test for risk stratification, prognosis and monitoring of treatment response for AMI patients after PCI treatment.

Material and Methods: Blood samples and patient data were collected in the frame of the CardioSAVE study, a prospective 12-months longitudinal study, for risk stratification of AMI patients undergoing PCI, with a one year follow-up conducted at our Heart Center. Patients were selected according their LVEF <40% or >50% at 6 months (M6) assessed by echocardiography. Plasma samples collected on day 3 (D3) after MI were analyzed for 92 biomarkers (BM) on the Proseek Multiplex CVD II (human cardiovascular and inflammatory markers) platform from Olink on the Biomark HD Platform. This innovative technology is based on a dual recognition of antibody-pairs and oligonucleotides called proximity extension assay.

Results: Six AMI patients with LVEF <40% and 6 AMI patients with LVEF>50% at 6 months were analyzed. A differential expression was observed for 20 BM between both groups. Five BM exhibit an increase of the expression at D3 in the group with reduced ejection fraction at M6, whereas 15 BM decreased their expression at D3 in the group with reduced ejection fraction at M6.

Conclusion: The selected biomarker panel profile will be further investigated and developed on a diagnostic prototype. The reliability and accuracy of the novel diagnostic kit will be tested in a clinical setting to achieve Proof of Concept. Upon complete validation, this tool may serve as a personalized medicine device focusing on HF allowing the identification and risk stratification of AMI patients in low- and high risk groups after undergoing PCI.
renal failure. However, it is unknown if Gal-3 can identify a worse renal prognosis.

**Purpose:** To assess whether Gal-3 concentrations in AHF admissions identify patients at higher risk of acute kidney injury (AKI).

**Methods:** We studied 111 patients admitted for AHF (61% men, 33% ≥65 years, EF 45±15%). Gal-3 determinations were made on admission with a commercial assay (Biomérieux). Serum creatinine (Cr) value and glomerular filtration rate (GFR) during admission and baseline values before admission were collected. Two validated criteria were used to define AKI: RIFLE (increase ≥15% of Cr or decrease of GFR ≥25% respect to baseline values or death ≤0.5 mL/kg/h for 6 hours) and AKIN (increase ≥0.3mg/dl or ≥150% Cr within 48 hours of hospitalization or decrease ≤0.5 mL/kg/h for 6 hours).

**Results:** Gal-3 levels at admission were 20.7±11.9 mg/mL. During hospitalization, 24 (21.6%) patients presented AKI according to the AKIN criteria; 43 (38.7%) according to RIFLE criteria; and 46 (41.4%) according to AKIN and/or RIFLE. Based on the AKIN/RIFLE criteria, Gal-3 levels were higher in patients who developed AKI (18.79 vs 23.32, p=0.049). The ROC analysis showed an area under the curve of 0.66 (95% CI 0.55-0.76, p<0.01). The best prediction point was 17.2 mg/mL. Considering this value, patients with higher levels had an increased risk of AKI (OR 2.83, 95% CI 1.28-6.23, p<0.01). In the multivariate analysis taking into account age, sex, normal LVEF (>55%) and preserved renal function (eGFR≥60 mL/min/1.73m²), the predictive value of Gal-3>17.2 mg/mL lost the statistical significance (OR 2.23, 95% CI 0.93-5.33, p=0.07).

**Conclusions:** In patients admitted for AHF, Gal-3 on admission identified an increased risk of deterioration of renal function during hospitalization. After adjustment for known renal dysfunction factors, Gal-3 levels maintained a non-significant trend, suggesting the need for new studies with larger populations.

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**P1214**

**Biomarkers of fibrosis, inflammation, renal dysfunction and its correlations in patients with HfEF and HfNEf**

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There is extensive research on biomarkers in heart failure (HF) patients. However, only a few studies have reported an association between different biomarkers in HF with preserved and mid-range ejection fraction.

**Objective:** To evaluate concentrations of biomarkers of fibrosis, renal dysfunction, inflammation, and their correlation in patients with chronic heart failure (CHF) with prior myocardial infarction (MI) and ejection fraction (EF) <40%. Design and Methods: The study included 103 patients with CHF with preserved (HfEF, EF>50%) and mid-range ejection fraction (HfNEf: EF: 40-49%). Criteria of inclusion were prior MI and previous PCI in history, NTproBNP level>135 pg/mL. As a comparison group, we included 51 patients with prior MI and PCI, without signs of HF and with level of NT-pro BNP <125 pg/mL. All patients underwent a comprehensive clinical assessment, echocardiography. There was valued the level of galactamine-3, ST2, hs-CRP and cystatin-C by immunoassay analysis. The estimated glomerular filtration rate (e-GFR) was calculated using Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation. All statistical analysis was performed with Statistica 6.0. Continuous variables were described by median (1st-3rd quartile). Comparisons of continuous variables were performed using Mann-Whitney, U-test. Spearman's rank correlation coefficient was calculated to measure dependence between two variables.

**Results:** In the study group (1st), the level of NT-proBNP was 445.23 (245.9-896.93) pg/mL, in a comparison group (2nd) 67.16 (40.17-86.61) pg/mL. The plasma level of ST2 in the 1st and 2nd groups were 40.70 (33.45-49.27) ng/mL and 39.21 (32.64-46.38) accordingly, we did not observe significant difference between groups (p=0.05). We found significant correlations between the level of biomarkers for fibrosis and myocardial stress only in patients with CHF: ST2-NT-proBNP (r²=0.36, p<0.01), galactamine-3-NT-proBNP (r²=0.38, p<0.01), renal dysfunction was observed in both groups. The plasma concentration of cystatin-C in the 1st group was 987.67 (548.8-1161.19) ng/mL, e-GFR = 58.5 mL/min/1.73m² (44.0-79.7), there was no significant difference from 2nd group. The correlation analysis showed the following significant correlations: strong negative correlation in a pair of galactamine-3-eGFR (r² = -0.49, p<0.01) and positive between galactamine-3 and cystatin C (r² = 0.62, p<0.01) in patients with CHF. Moreover, galactamine-3 correlated with plasma level of hs-CRP (r² = 0.56, p<0.01), in the comparison group significant correlations were not observed.

**Conclusions:** The levels of biomarkers for fibrosis, inflammation and renal dysfunction in patients with prior MI and PCI were comparable in groups with HF with EF<40% and without HF. The plasma concentration of ST2, galactamine-3 correlated with the concentration of NT-proBNP in HF patients, Galactamine-3 also correlated with renal dysfunction and inflammation in HfEF/HfNEf patients with prior MI.
Contamination with STEMI deserves to be further studied.

Available blood markers to predict the severity of hemodynamic impairment at pre-hospitalization may be interesting. Higher levels of procalcitonin were associated with significantly lower PNR and PLR values. The potential of these readily available blood markers to predict the severity of hemodynamic impairment at presentation with STEMI deserves to be further studied.

Conclusions: In patients with STEMI, the presence of CS on admission was associated with significantly lower PNR and PLR values. The potential of these readily available blood markers to predict the severity of hemodynamic impairment at presentation with STEMI deserves to be further studied.

Purpose: In patients with STEMI, the presence of CS on admission was associated with significantly lower PNR and PLR values. The potential of these readily available blood markers to predict the severity of hemodynamic impairment at presentation with STEMI deserves to be further studied.

Background/Introduction: Chronic heart failure is one of the most common consequence of myocardial infarction, and is characterized by a reduction of the heart ability to face peripheral blood distribution. Chronic heart failure (HF) and myocardial infarction (MI) are often associated to the augmentation of inflammation markers. S100B is an alarmin secreted by damaged cardiomyocytes. Serum S100B levels are increased in the pathogenesis of heart disease and involved their pathogenetic mechanisms. S100B is a tissue-specific protein (chondrocytes, adipocytes, skeletal myofibers, cardiomyocytes, dendritic cells, etc.); it was largely demonstrated to be increased in myocardial infarction (IMA) are often associated to the augmentation of inflammation markers. S100B is an alarmin secreted by damaged cardiomyocytes. Serum S100B levels were increased in the pathogenesis of heart disease and involved their pathogenetic mechanisms. S100B is a tissue-specific protein (chondrocytes, adipocytes, skeletal myofibers, cardiomyocytes, dendritic cells, etc.); it was largely demonstrated to be released after a damage and the consequent remodelling involving cardiac tissue.

Purpose: We examined the correlation between S100B protein serum levels and the incidence of acute heart failure and IMA in symptomatic patients.

Methods: We conducted a prospective study on 90 patients aged between 50 and 72 years accepted to our Unit referring cardiac associated symptoms (thorax pain, dyspnea, arrhythmic symptoms). They were divided in three groups: healthy subjects (group A), chronic heart failure patients (group B) and IMA patients (group C). CRP, NT-proBNP, and routine exam were performed in every patient. Moreover it was made a S100B dosage was made.

Results: Results demonstrated different levels among healthy subjects. However in chronic heart failure patients the alarmen levels were higher but not significantly augmented. Instead AMI patients had mean values of S100B doubled than the other two groups and significantly augmented.

Conclusions: According to our data S100B as the potential to be, in a near future, be considered as an acute myocardial infarction marker in addition to the ones existing. However more studies are needed to identify possible byas elements in S100B serum dosage. This together with other elements are guiding us to a better understand of micro-structural changes in damaged heart in order to consider new therapeutic targets.

<table>
<thead>
<tr>
<th>Tab. Groups</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>NT-proBNP</td>
<td>45 ± 23</td>
<td>800 ± 150</td>
<td>230 ± 67</td>
</tr>
<tr>
<td>Crp</td>
<td>2 ± 7</td>
<td>5 ± 6</td>
<td>7 ± 7</td>
</tr>
<tr>
<td>S100b</td>
<td>3.6 ± 2.2</td>
<td>4.3 ± 2.5</td>
<td>7.7 ± 4.7</td>
</tr>
</tbody>
</table>

Serum levels of markers of inflammation in the different groups at the moment of access in cardiology unit

S100b and heart

P1217

The apelin relations with cardiac remodeling in the hypertension patients with type 2 diabetes

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Purpose. The peptide apelin has antihypertensive and antidiabetic properties, but its role in the processes of cardiac remodeling in patients with hypertension and type 2 diabetes (T2D) isn’t understood. The aim of the study was to investigate apelin levels in patients with hypertension and T2D and to determine its relations to heart structural parameters and types of cardiac remodeling.

Methods: We examined 63 hypertension patients grades 2-3 with concomitant T2D (53 men and 30 women), aged 43 to 70 years. The investigation complex included physical examination, standard transthoracic echocardiography and determination of apelin serum levels by ELISA. Types of cardiac remodeling we determined according to ESH/ESC 2013. Control group consisted of 16 volunteers.

Results: The apelin levels in patients with hypertension and T2D were significantly lower than in volunteers (0,882(0,788;0,924) ng/ml versus 1,097(0,944;1,171) ng/ml, p < 0,001). Negative correlation relations of apelin with septal wall thickness (r = −0,50, p < 0,001), posterior wall thickness (r = −0,46, p < 0,001), left ventricle (LV) mass (r = −0,39, p < 0,01), LV mass index (r = −0,42, p < 0,001) and left atrium size (r = −0,45, p < 0,001) were observed. Among patients with hypertension and T2D concentric remodeling of LV was observed in 10 patients (16%), concentric LV hypertrophy was observed in 29 patients (49%) and eccentric LV hypertrophy was observed in 34 patients (54%). In patients with concentric remodeling of LV apelin levels were slightly lower than in hypotensive patients (0.892; 0.984 ng/ml, with concentric LV hypertrophy 0.859(0,722;0,899) ng/ml, with eccentric LV hypertrophy 0.884(0,856;0,928) ng/ml (p < 0,05, p < 0,001 versus control respectively). Patients with concentric LV hypertrophy had significantly lower apelin levels than patients with concentric remodeling of LV, p < 0,05.

Conclusion: In hypertension patients with T2D compared with healthy individuals the significant reduction of apelin blood levels has been found. Reduced blood levels of apelin are accompanied by the development of cardiac remodeling primarily concentric LV hypertrophy. Negative correlation of apelin with major heart structural parameters that characterize the LV remodeling and size of left atrium have been observed. The data allow us to consider apelin as an important prognostic marker of progression of hypertension with T2D, the development of pathological remodeling of the left ventricle and left atrium of the heart.

P1218

Can serum prolactin level determine the severity of acute decompensated heart failure?

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Background: Recent investigations have shown increased serum prolactin (PRL) level in chronic heart failure. However, data regarding PRL level and its prognostic implications in patients with acute decompensated systolic heart failure are lacking.

Purpose: The aim of this study was to evaluate the association between serum PRL level and functional, biochemical and echocardiographic indices of severity of heart failure in patients admitted with acute decompensated systolic heart failure.
Methods: All patients with advanced systolic heart failure (left ventricular ejection fraction [LVEF] < 30%) who were admitted for a recent acute decompensation were enrolled. The serum PRL level was measured on admission.

Results: A total of 86 patients (73% male, aged 48 ± 19 years with median LVEF of 15% [IQR, 10-20]) were included. The median PRL level was 20.31 ng/mL (IQR, 14.77-33.53). The male and female patients had statistically similar PRL levels [18.80 (IQR, 14.96-28.10) vs 20.80 (IQR, 16.94-43.40); p = 0.21]. The PRL levels were also statistically comparable among patients with NYHA function classes of II, III and IV (p = 0.07). No significant correlations were found between PRL level and LVEF (r = 0.03, p = 0.75). NT-proBNP (r = 0.07, p = 0.03), high-sensitivity C-reactive protein (r = 0.06, p = 0.51), troponin I (r = 0.09, p = 0.04), and natriuretic peptide A (r = 0.04, p = 0.69) were also statistically comparable among patients with NYHA function classes of II, III and IV (p = 0.07). No significant correlations were found between PRL level and uric acid (r = 0.10, p = 0.39) and duration of hospitalization (r = 0.01, p = 0.89).

Conclusion: The serum PRL level does not seem to be an indicator of severity of acute decompensated systolic heart failure.

NURSING

P1219

Theoretical and practical training of students from vocational public high school to care for cardiac arrest: a prospective study in a developing country

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Cardiovascular diseases are the leading cause of death in the world, sudden cardiac arrest is a major contributor to this index. Training reduces the ignorance and fear, increasing safety to recognize that the victim is not breathing properly, so as to trigger the help and start CPR as soon as possible.

Objective: To apply a theoretical-practical training of vocational public high school, to work correctly, quickly and safely before a cardiac arrest, resuscitation maneuvers running efficiently, in order to save lives.

Methods: This study was designed as a prospective investigation in more than 1800 students of vocational public high school, between 2012 and 2015. The program of theoretical and practical training lasts 2 hours. Each student attends a lecture with video on the subject for 30 minutes after 30 minutes of classroom practice. Then, using practical training mannequins, which are assessed through a performance checklist. A questionnaire was distributed before the start of training to see if the student had prior knowledge about a rescue in the event of cardiac arrest.

Results: A half of this students did not have any knowledge about the subject. This evaluation showed that after 2 hours of training and analyzed the performance checklists: 84% knew how to perform the procedures call for help effectively, 27% were able to recognize the absence of breathing, 31% positioned themselves and began of chest compressions recommended form.

Conclusions: Students from that school are represented by 90% of adolescents when trained are able to act in the scene of a cardiac arrest, multiply the knowledge to family and community and save lives. However, according to the international recommendations of retraining as an ideal that does not exceed two years.

P1220

Oral health assessment and referral guidelines: an evidence-based practice change

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Background: The World Health Organization (WHO) and the Institute of Medicine (IOM) have identified oral health as a growing epidemic of systemic disease burden on individuals and a cost burden on the health care system. Significant correlations exist between improved oral hygiene and the reduction of morbidity and mortality from cardiovascular disease. The poor dental health status of outpatient clinic patients continues to be an unaddressed clinical concern encountered by healthcare providers. Individual barriers to obtaining dental health care include cost and the inability to access preventative dental services.

Purpose: Identify the incidence of oral health disease in an outpatient clinic setting, utilize an evidence-based practice (EBP) solution, and implement an effective intervention to address this concern.

Methods: A convenience sample of 36 adult English speaking outpatient clinic patients at an urban hospital in Maryland were included in the 6 week pilot study. The mean age of the participants was 53.5, 41.66% Males (n = 15), and 58.33% Females of which 66.6% were African American, 33.3% were Caucasians (n = 12). The Brief Oral Health Status Examination (BOHSE) tool was utilized as a valid and reliable oral screening tool to identify poor dental conditions needing urgent dental referral. A 10 item Dental Health Knowledge Questionnaire (DHKQ) was completed by participants prior to and after receiving dental education, and results were obtained via a comparative trend analysis.

Results: All participants, (100%, n = 36) identified with oral health disease, received dental health education and were referred for low cost dental intervention. Statistical analysis of the effectiveness of the EBP change was determined by a paired-samples t-test. The mean dental knowledge scores improved from a pre DHKQ score of 78.3 % to a mean post DHKQ score of 98.4%. A significant increase in participant dental knowledge, (p < 0.001) from the pre DHKQ to the post DHKQ, was demonstrated. The EBP change initiative was a reliable and valid practice intervention that significantly improved dental health knowledge, promoting nursing staff education in the use of the BOHSE tool, and implementing dental referrals for patients with oral health disease identified by the BOHSE tool.

Conclusions: Outpatient clinic patients presenting with loose teeth, dental decay, and/or periodontal disease can successfully receive dental education with dental referral for disease intervention. The Maryland Dental Health Smiles Program and other local programs offer low cost dentistry to individuals with low incomes. Dental health education is critical for patients to understand the oral health and systemic health connection. Oral health assessments with referral guidelines are needed in all cardiac clinical settings to promote personal self-care management behaviors, improve patient health outcomes, and decrease health care costs.
Background: Heart failure (HF) is one of the most important public health problems due to its associated morbidity, mortality and high health care cost, with more than two thirds of this cost attributed to medical expenditures. Several trials have evaluated the effect of disease management programs (DMPs) in HF, with diverse results. Although recent meta-analyses have shown a consistent reduction in hospital readmission, data concerning overall mortality reduction are inconclusive. Among DMPs, those based on multidisciplinary interventions have the highest evidence, while nurse-led interventions have insufficient evidence.

Objectives: The aim of this study was to develop a simple nurse-led clinic cross intervention program (health education and drug treatment optimization) for patients with heart failure and assess whether this intervention positively affects the prognosis of patients, their care costs (hospital readmissions) and perceived quality of life.

Methods and results: Between 2011 and 2013, 127 patients with reduced ejection fraction were prospectively randomly allocated (1:1) to standard care or intervention program. Primary composite endpoint was mortality and hospital readmissions from any cause. Secondary endpoints were mortality from any cause, hospital readmissions from any cause, readmissions for heart failure, time to first admission and quality of life improvements (assessed by Minnesota Living with Heart Failure Questionnaire). Mean±SD was 75±12 years and 69% were males. An intention-to-treat analysis was performed and after 2-years median follow-up no differences were found in the primary composite endpoint (58% vs. 57%; p=0.99). Likewise, there were no differences between groups in mortality from any cause or admissions from any cause (28% vs. 25%; p=0.79 and 55% vs. 49%; p=0.35 respectively). Time to first admission was similar in both groups (mean±SD: 277±235 days vs. 249±224 days; p=0.72). However, in the intervention group, admissions for heart failure were reduced (35% vs. 18%; p=0.04) and quality of life related to health was higher (MLHQF 23.46 vs. 19.8; p=0.04).

Conclusion: Nurse-led cross intervention programs significantly improve perceived quality of life and reduce hospital admission for HF with no effect in all-cause mortality.

P1224 Health and community care utilization in patients hospitalized due to heart failure
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Introduction: Patients with heart failure (HF) are often elderly and fragile, suffering from multiple illnesses leading to polypharmacy, frailty and increased need of community and health care. There is a lack of knowledge on HF patients’ community- and health care utilization prior and post hospitalization.

Purpose: To describe health and community care utilization before and after hospitalization in patients hospitalized due to HF.

Methods: The study had a cross-sectional design. Patients who had been hospitalized due to de novo or deteriorating HF were consecutively included. Data were collected by structured telephone interviews and medical chart review one week after discharge and review of health care utilization 30 days after discharge.

Results: A total of 131 patients were included in the study (mean age 82.5±6.8 years, 49% women 2.6 additional co-morbidities, length of hospital stay 5.7±4.8 days). Review of health care utilization before the index hospital admission revealed that a majority of the patients had not visited any health care facility the month preceding the hospitalization and 13% of the patients had been hospitalized. A total of 40% of the patients received assistance from community care or home health care prior hospitalization and 52% after discharge. At discharge, 10% of the patients had no documented plan for follow up, 48% were referred to the primary care and 36% to the outpatient medical clinic. Health care utilization seems to be increasing after hospitalization: review of health care utilization 30 days post discharge revealed that 55% of the patients had visited a health care facility and 35% of the patients had been hospitalized or visited the ER without being admitted.

Conclusion: This "real world" study from a non-academic hospital revealed that most patients had not visited any health care facility the month prior to the index hospital admission. The number of patients who received assistance at home increased after hospitalization and patients were most often referred for follow up in primary care. Health care utilization increased significantly after hospitalization.

P1225 The value of nurse-based patient education in the success of multidisciplinary heart failure programs in developing countries
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Background: Heart failure (HF) readmissions are associated with significant morbidity and mortality burdens. Adequate heart failure education on adherence and self-care behaviors can reduce readmission rates and nurses are at the frontline of patient education. Such education is valuable when establishing heart failure programs in developing countries, in light of the challenging socio-economic differences compared to the developed world. Purpose: This study aimed (a) to evaluate the level of heart failure knowledge that nurses have at a cardiac center; (b) to assess patients’ baseline knowledge; and (c) to evaluate the effectiveness of structured nurse-driven education on knowledge acquired by patients.

Methods: A total of 131 cardiac center-based nurses and 30 chronic HF patients participated in the nurse and patient surveys, respectively. Patients were also surveyed a second time 3 to 6 months later, while being followed at an advanced heart failure clinic. Results: The majority of the nurses (80%) had not received heart failure

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Effective interventions to improve self-care in patients with heart failure

P1226

L Klompstra1; N Sedlar2; AS Tromberg3; J Martensson4; M Lainscak5; J Farkas5

Methods: A literature search was undertaken between June 2003 (when the EHF-ScBS was first published) and November 2015 in the databases PubMed, Scopus and ScienceDirect, using search terms: "self-care" OR "self-care behaviour" OR "self-care behavior" OR "European Heart Failure Self-care Behaviour Scale" OR EHFScBS OR "EHFS(ScBS-9)" AND "chronic heart failure" OR "heart failure". Articles were excluded if they were not focused on interventions increasing self-care or were not RCT studies. 2154 articles were initially found, 14 were included in the analysis.

Results: Of the 14 studies included, 7 interventions found a significant (p < 0.05) increase in the self-care in the intervention group compared to the control group. The average number of patients included in the studies was 225 (range 82-602) and the follow-up period ranged between 3 and 12 months. Of the 7 interventions with positive effects on self-care, 2 studies were telemonitoring interventions, 3 studies were nurse-led educational intervention and 2 studies were multidisciplinary educational interventions. One telemonitoring intervention included a system monitoring symptoms, knowledge and behaviour and the second study included monitoring of weight, diuretic medication and well-being. The nurse-led and multidisciplinary educational interventions included visits and follow-up. The seven studies that were not effective to increase self-care were nurse-led/multidisciplinary educational interventions, one pharmacist educational program, one educational program for general practitioners and one telemonitoring study.

Conclusion: There are several interventions that have shown to be effective to increase self-care in patients with HF, such as telemonitoring, nurse-led or multidisciplinary educational programs. However, at the same time there is a considerable amount of interventions, including the same components as the effective interventions, which did not work to increase self-care. Future research is needed to assess the difference in factors known to influence self-care between the effective and non-effective interventions, such as experience with the illness, physical functioning, depression and anxiety, social support, daytime sleepiness, and attitudes. Research is also needed to assess the effectiveness of interventions with follow-up longer than 12 months. Because the EHFScBS can pick up the benefits of different interventions, the scale can be used for the intervention effect assessment.

Table 1

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortness of breath</td>
<td>129 (98)</td>
</tr>
<tr>
<td>Light Headedness</td>
<td>27 (21)</td>
</tr>
<tr>
<td>Leg swelling</td>
<td>115 (88)</td>
</tr>
<tr>
<td>Abdominal Swelling</td>
<td>61 (47)</td>
</tr>
<tr>
<td>Weight gain</td>
<td>112 (85)</td>
</tr>
<tr>
<td>Weakness, fatigue</td>
<td>116 (99)</td>
</tr>
<tr>
<td>Chest pain</td>
<td>71 (54)</td>
</tr>
<tr>
<td>Poor appetite</td>
<td>51 (39)</td>
</tr>
<tr>
<td>Poor sleep</td>
<td>82 (63)</td>
</tr>
<tr>
<td>Inability to lie flat</td>
<td>119 (91)</td>
</tr>
</tbody>
</table>

Knowledge of different HF symptoms by cardiac center nurses participating in the survey (total of 131).

Table 2: Response of patients on the initial and follow up surveys to questions on adherence and self-care

<table>
<thead>
<tr>
<th>Question</th>
<th>Choices</th>
<th>Initial</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many times do you consume per day?</td>
<td>2 glasses or less</td>
<td>9 (37)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 glasses</td>
<td>2 (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any amount of salt</td>
<td>3 (0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>16 (2)</td>
<td></td>
</tr>
<tr>
<td>How often do you check your weight?</td>
<td>Every day; early morning; nighttime; evening</td>
<td>10 (29)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>3 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>10 (3)</td>
<td></td>
</tr>
<tr>
<td>If your weight increases by 1 Kg or more over 2 days, what should you do?</td>
<td>Take extra water pill</td>
<td>7 (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Call the nurse if weight increases</td>
<td>4 (23)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wait until the next visit to tell the doctor</td>
<td>1 (10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>13 (5)</td>
<td></td>
</tr>
</tbody>
</table>

P1227

An end of year review of patients with left ventricular systolic dysfunction secondary to cardiotoxic cancer therapy in a cardiac tertiary centre

VJ Chambers1; H Pryse-Hawkins1; L Fallon1; RK Sharma1; SD Rosen1; AR Lyon1

Our Cardio-Oncology clinic provides cardiology management plans for patients with cardiac complications of cancer therapy and for patients with pre-existing cardiac conditions who receive cardiotoxic therapy. We present data regarding the patients diagnosed with left ventricular systolic dysfunction (LVSD) in whom the LV ejection fraction on echocardiogram is < 55%.

Aim: To consider whether care provided by a Heart Failure Clinical Nurse Specialist (HFCNS) can be applied to patients with LVSD secondary to cardiotoxic cancer therapy.

Method: The HFCNS discusses symptom recognition, self-care and medication purpose and side effects with the patient in the clinic. An opportunity is provided to answer further questions and also contact numbers for the HFCNS are provided in case of symptom occurrence or problems with medications. Subsequent HFCNS review with up titration of heart failure medication in between cardiology appointments is arranged with the patient attending an in person consultation or a telephone consultation. In addition the HFCNS liaised with the oncology CNS or the patient’s primary care physician.

Results: In 2016 169 new patients were referred and reviewed as new patients. Twenty-eight were diagnosed with LVSD. From this group of patients 22 (78%) received cardiotoxic cancer treatments for current disease. Table 1 demonstrates the cardiology agents that this group of patients received, the way in which the patients were reviewed by the HFCNS and the cardiac medication prescribed. After their first consultation in the clinic 100% of patients continued with their oncology treatments as documented in table 1.

Conclusion: The role of the HFCNS is an established part of the heart failure team; however there is very limited literature on the role of HFCNS care for Cardio-Oncology patients. This is an evolving service and we hope that we have demonstrated that established heart failure nursing care can be applied to this group of patients with successful results as demonstrated by improved medication compliance, concordance and titration. The HFCNS, through effective collaboration with appropriate local services, may contribute to the optimal and holistic management of this care group.
**Table 1**

<table>
<thead>
<tr>
<th>Treatment/</th>
<th>Anthraclyines</th>
<th>Tyrosine-Kinase Inhibitors</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trabzumab</td>
<td>50%</td>
<td>27%</td>
<td>9%</td>
</tr>
<tr>
<td>Pertzumab</td>
<td>14%</td>
<td>9%</td>
<td></td>
</tr>
</tbody>
</table>

**P1228**

**B-type natriuretic peptide as a tool to increase the diagnostic accuracy of nursing in congestive heart failure patients**

MELINA Trojan1; SLS Barri1; GB Alli4; DS Bernardes3; LL Pedraza2; E Rabelo-Silva1

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**Background:** Systemic congestion is the main factor related to decompensation of patients with heart failure (HF). The main clinical manifestations resulting from congestion are dyspnea, orthopnea, tiredness, distension of jugular vein, and edema. These signs and symptoms, are part of the diagnosis of Excess Fluid Volume (EFV) often established in congested patients. In the context of clinical congestion in patients with HF, the B-type Natriuretic Peptide (BNP) is a reliable tool for the diagnosis of dyspnea, becoming also an important clinical indicator to EFV ND. This study was planned in order to improve the accuracy of this nursing diagnosis.

**Purpose:** To clinically validate the blood marker BNP as a tool to diagnose EFV in patients congested with HF.

**Methods:** Cohort study conducted in the emergence of a public university hospital, of a Southern Brazilian University Hospital. We included patients with HF diagnosis, reduced or preserved systolic function, who were hospitalized by acute decompensation. The collection was systematized through a clinical evaluation at admission and discharge, containing the signs and symptoms already clinically validated for this diagnosis in patients with HF. Blood samples were also collected for BNP measurements.

**Results:** 64 patients were included, with mean age of 69 ± 13 years, and fraction ejection of the left ventricle of 50 ± 16%. The frequency of signs and symptoms of the EFV ND on admission (11.3 ± 2.8) and discharge (7.5 ± 3.2) were statistically significant (p < 0.001). The median of the BNP values were reduced significantly (381[202-707] pg/ml in admission and 309[180-640] pg/ml in discharge, p < 0.001).

**Conclusion:** The results indicated a reduction in the congestive state observed by the decrease of frequency of the signs and symptoms of the EFV as well as in BNP values. These findings indicate that this blood marker can be used as a clinical indicator in congested patients, improving diagnostic accuracy.

**Funding Acknowledgements:** Instituto de Salud Carlos III (FIS PI 14/01208), The European Regional Development Fund, The Government of The Basque Country (Exp 2014111143)

**Background:** Depression and anxiety are highly prevalent in HF patients, conditioning prognosis, adherence and quality of life. Treatment and symptoms prevalence are not well known in “de Novo” HF patients with reduced LVEF (HFREF).

**Purpose:** To evaluate antidepressant-anxiolytic treatment and self-reported symptoms in quality of life test prevalence in “De Novo” HFREF patients and clinical and sociodemographic factors related.

**Methods:** Cross-sectional study, 174 HFREF patients of 18 hospitals (04/2015-11/2016). ETRIC study. N (%) patients with antidepressant/anxiolytic treatment, with symptoms, Emotional Dimension ≤12 in Minnesota (MLWHF), 2-3 anxiety/depression in EQ-5D test; clinical and sociodemographic factors were evaluated. CEIC approved study. Categorical variables: %, Quantitative: mean ±/-. SD. Hypothesis Contrast: 1.- C-H, 2.- Student t. Significant p < 0.05. Analysis with SAS v9.4.

**Results:** 36(20.68%) patients treated with antidepressants / anxiolytics. Variables significantly related: women, NYHA III, 6-minute walking test, EQ-5D and Minnesota total score. 59(36.87%) in MLWHF and 86(53.75%) patients in EQ-5D, with self-reported symptoms

**Conclusions:** High prevalence of treatments with antidepressant / anxiolytics in the novo HF patients. Association with: female gender, dyspnea, 6-m. walking test and quality of life. Implications in Figure
**POPULATION STUDIES - EPIDEMIOLOGY**

**P1230**
Mortality in ischemic heart failure patients with moderately reduced ejection fraction - A nationwide multicentre retrospective study.

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On behalf of: National Acute Coronary Syndrome Registry Investigators

**Introduction:** Moderately reduced ejection fraction (mEF) patients were recently defined by the European Society of Cardiology as a new subgroup of left ventricle systolic dysfunction to stimulate research on its particular characteristics and prognosis.

**Aim:** To compare, in post-acute coronary syndrome (ACS) patients, the in-hospital mortality (IHm) according to the ejection fraction (EF) and to identify, in mEF patients, IMH predictors.

**Population and methods:** The authors analyzed a cohort of a multicentre national registry between 1/10/2010 and 30/09/2016. Patients with previously known heart failure or with no echocardiography EF evaluation were excluded. 9429 patients were included and classified in (1)EF >50%, (2)EF 40-49% (n = 1922, 20%) and (3)EF <40% (n = 1390, 15%). To determine IMH predictors for group 2, multivariate logistic regression was performed, including pre-hospital, clinical and laboratory data, ACS classification, coronary anatomy when known and pharmacological treatment.

**Results:** Overall mortality was 2.8% (n = 263; 0.9% (n = 53) in group 1, 2.4% (n = 37) in group 2 and 11.4% (n = 159) in group 3. IMH predictors are described in the enclosed table. Previous medication with aspirin, in-hospital beta blockers administration and coronaryography had a positive impact in prognosis. The presented statistical model has a >80% sensitivity and specificity for event prediction in this population.

**Conclusion:** Patients with mEF after an ACS are an intermediate risk group. The identified mortality predictors define a subgroup of patients with a higher risk, that similarly reduced EF patients benefit the most of optimized therapeutic measures.

<table>
<thead>
<tr>
<th>Table - In-hospital mortality predictors</th>
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<tr>
<td>Age &gt; 73 years</td>
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<tr>
<td>Severe valve disease</td>
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<tr>
<td>Cardiac Arrest</td>
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<td>Heart rate &gt; 109 bpm</td>
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<td>Platelet count &gt; 192 000 µL</td>
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<td>Previous medication: Aspirin</td>
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<td>Previous medication: Amiodarone</td>
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<td>In-hospital medication: Beta-blockers</td>
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<td>In-hospital medication: Inotropics</td>
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<td>Coronarography</td>
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**P1231**
ExTrA HF survey. The european survey on implementation of exercise training in heart failure patients: regional differences.

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On behalf of: Committee on Exercise Physiology & Training of the Heart Failure Association and endorsed by the Cardiac Rehabilitation Section of the ESC

**Background.** In heart failure (HF), exercise training programmes (ETP) are well-recognised intervention to improve symptoms, but still poorly implemented. The Heart Failure Association promoted a survey to investigate whether and how cardiac centres in Europe are using ETP in their HF patients.

**Methods.** A 12-item web-based questionnaire was distributed using the coordinators of the HF working groups of the Countries affiliated to the ESC who distributed and promoted the survey in the key cardiac centres. Forty-one country coordinators out of 44 contacted replied to our questionnaire (91%). This accounted for 170 cardiac centres in charge of 77,214 HF patients.

**Results:** The majority of the participating centres (82%) were general cardiology units and the rest were specialised rehabilitation units or local health centres. Sixty-seven (46%) centres (in charge of 36,385 [48%] patients) did not implement ETP. This was mainly attributed to the lack of resources (25%), largely due to lack of staff or of financial coverage. The lack of national or local pathway for such programme was the reason in 13% of the cases and in 12% the perceived lack of evidence on safety or benefit were advocated. When implemented, in only 55% of the centres it was proposed to all HF patients, with restriction according to severity, or age.

In the regional sub-analysis: a larger implementation of ETP was observed in cardiac centres located in the North and Central Europe (69% and 67%) vs South and East Europe (59% and 45%) (p<0.05).

No differences were observed between University, General or Community Hospitals (59%, vs 57%, vs 60%) (p=NS)

**Conclusions:** With respect to previous surveys, there is evidence of increased supply of exercise training programmes in HF in Europe, although still too many patients are denied a highly recommended therapy, mainly due to lack of resources or logistics, mainly in the South and East European Regions.
Conclusion: in inflammation. While the rate of S. aureus etiology was higher in HF group (19 (65.5%) vs. p = 0.09). Pulmonary artery systolic pressure was higher in group 1 ([32.2 (23.0-50.5)] vs. 25.0 (19.5-36.8) mmHg, p = 0.08), although left ventricle EF values were similar ([58.0 (54.5-63.0)] % in group 1 vs. 60.5 (58.0-62.0) % in group 2, p = 0.37). IE caused by Staphylococcus spp. was diagnosed in 19 (65.5%) patients in group 1 and in 16 (66.7%) patients in group 2 (p = 0.09), while the rate of S. aureus etiology was higher in HF group [19 (65.5%) vs. 10 (41.7%), p = 0.10]. The presence of HF conferred a higher risk of thromboembolic events [21 (72.4%) vs. 11 (47.8%), p = 0.09] and mortality (6 (20.7%) vs. 1 (4.2%), p = 0.11).

Conclusion: IE in patients with a history of NVD use is often complicated by HF that is associated with a higher rate of thromboembolism and 1-year total mortality. Risk factors for HF development could include S. aureus infection and higher degree of inflammation.

P1234
Younger heart failure population with higher in-hospital mortality
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On behalf of: Journey-HF Study Group

Background: In this study, we aimed to evaluate the overall clinical characteristics, management and in-hospital outcomes of hospitalized patients with AHF in a large sample of Turkish population.

Methods: The Journey-HF TRI study is a cross-sectional, multicenter, non-invasive and observational trial that was conducted in intensive/coronary care units and cardiology wards. The patients who were hospitalized with the diagnosis of acute heart failure in intensive/coronary care units between September 2015 and 2016 were included in the study.

Results: The 1606 patients (male: 57.2% mean age, 67.8 ± 13 years old) who were diagnosed with AHF (NYHA II/III/IV, 75.2%) in 37 centers, in seven geographical regions of Turkey were enrolled in this study. Seventeen percent of patients were admitted to hospital with diagnosis of new onset AHF. Hypertension (67%) and coronary artery disease (59.6%) were the most frequent underlying diseases. Acute coronary syndrome accompanying to heart failure (14.7%), infection (29.3%), arrhythmia (25.1%), cardio-renal syndrome (23%) and non-compliance with medication (23.8%) were the precipitating factors. Biomarkers were used in 41% of patients admission for diagnosis. The mean EF was 32.7 ± 14.1%. The median length of stay (LOS) in ICU was 3 days (IQR 1-72) and was 7 days (IQR 0-72) for in hospital’s journey. The guideline recommended medications were less likely used (<73%) before admission and were similar to European and US registers at discharge. In-hospital mortality rate was 7.6%.

Conclusions: Although our study population was younger than other registers, in-hospital mortality was high. Hypertension and coronary artery disease were the most frequent underlying diseases.

P1235
Imparting information to the HF patient; lessons learned from the cardiovascular ward round
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Introduction: Inpatient ward rounds are an invaluable part of the hospital day allowing for daily assessment of each patient, evaluating treatment and basing clinical decisions on this information. Perhaps the most crucial role of the ward round is information transfer, which is particularly important in the management of chronic diseases such as heart failure, where poor lifestyle and treatment adherence directly impacts health outcomes. With the ward round being an important vehicle to transmit information to the patient, it is interesting that little objective analysis of the ward round has been undertaken.

Purpose: This study aimed to investigate patient’s perception of the cardiology ward round, in order to identify strengths and weaknesses and in particular to assess how effective the ward round is in delivering information to the patient.

Methods: Initially, open interviews with in-patients were conducted to explore areas of concern and satisfaction surrounding the round. Repeated themes were identified and used to develop a relevant questionnaire which analysed four pertinent aspects of the ward round: Information-Giving & Communication, Emotional Reaction, Professionalism and Privacy.

Results: 98 cardiology inpatients completed the questionnaire. Patients had been admitted through the ER for a variety of cardiovascular emergencies including acute decompensated heart failure, ACS and arrhythmia. Professionalism and privacy were the highest scoring categories, with an average positive response rate of 79% and 81% respectively. Emotional reaction towards the ward round scored an average positive response rate of 99%. A considerable weakness was revealed under the category information giving and communication; the average positive response rate was only 60%. This low score was attributed to the use of medical jargon, apparent time constraints and patients perceived in-opportunity to ask questions; almost half of patients found the language used by staff difficult to understand, 58% felt that the ward round was rushed and 30% of patients felt they...
P1236
Depression and all-cause mortality in patients with congestive heart failure with implanted cardiac devices
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Background: It is well known that depression is associated with high risk of cardiovascular mortality and morbidity. However the impact of depression on mortality in patients with implanted cardiac devices has not been fully evaluated. The purpose was to assess the association between depression and all-cause mortality in patients with congestive heart failure (CHF) and implanted cardiac devices.

Methods: The study enrolled 253 patients (mean age 56.8 ± 10.1 years, 85% men) with CHF and implanted cardiac devices (149 patients with implanted cardiac devices for resynchronization therapy, 104 patients - with implantable cardioverter defibrillators). Mean duration of follow-up was 49.5 ± 31.7 months. The Beck Depression Inventory (BDI) was used to measure depressive symptoms. Depression was considered absent for a score between 0 and 9, mild to moderate between 10 and 19, significant - if more 19. Cox proportional hazards regression model was used to estimate hazard ratios (HR) with 95% confidence interval (95% CI) for impact of depression on all-cause mortality. HR was calculated after adjustment for the following confounders: age, gender, smoking status, hypertension, diabetes mellitus, body mass index, hypercholesterolemia, left ventricular ejection fraction, number of hemodynamically significant lesions of the coronary arteries and the type of the implanted cardiac devices.

Results: During follow-up period 37 patients died (11.4%). Adjusted HR for all-cause mortality on depression score was 1.04, 95% CI 1.01 – 1.08. Patients without depression were accepted as a reference group with HR=1.0 for analysis of categorical indicator. HR was 1.07, 95% CI 0.46 – 2.50 in patients with mild depressive symptoms and 2.72, 95% CI 1.14 – 6.47 in patients with significant depressive symptoms.

Conclusion: Increased depressive symptoms are associated with all-cause mortality in patients with CHF and implanted cardiac devices.

P1237
Understanding the symptoms and impacts of acute and stable heart failure patients: results from a concept elicitation study
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1ICON Commercialisation & Outcomes, Clinical Outcomes Assessments, Dublin, Ireland; 2GlaxoSmithKline, Value Evidence and Outcomes, Collegeville, United States of America; 3GlaxoSmithKline, Value Evidence and Outcomes, Collegeville, United States of America

Funding Acknowledgements: GlaxoSmithKline

Purpose: To qualitatively elicit the important symptoms and impacts of HF directly from patients recently discharged after a hospitalization for acute decompensating heart failure (ADHF) and patients with HF without a recent ADHF hospitalization ("stable" patients). Elicitation was used to inform development or adaptation of a patient reported outcome (PRO) measure.

Methods: HF patients were recruited across three US clinical sites and patients provided informed consent. Acute patients had been discharged from an ADHF hospitalization: 45 days prior to enrolment; stable patients had no ADHF hospitalization in the past 6 months and no unplanned medical encounter due to HF in the past 3 months but had at least 2 HF encounters in the past 2 years. One-on-one telephone or in-person interviews were conducted to obtain patient perspectives on their HF experience. Interviews focused on the symptoms of chronic HF and ADHF, and how these symptoms affected patients’ lives and functioning using a semi-structured open-ended interview guide. Interviews were recorded and transcribed for analysis. Data were analyzed in MaxQDA, a qualitative research software program.

Results: Twenty-six patients with HF participated, including 18 stable and 8 acute patients. The sample included patients from all NYHA classes, with most in Class II (46%) or Class III (34%). The majority were male (85%), mean age was 67 years (range 41-91), and 61% were non-Hispanic White. The majority of patients reported shortness of breath (SOB) (n = 25, 96%), fatigue (n = 22, 88%), and edema (n = 23, 88%) across both groups. Cognitive changes (memory problems / difficulty concentrating) were reported by 14 patients (64%). Other symptoms were less common (reported by 6% patients). A subset of acute (n = 8) and stable (n = 6) patients, provided a description of their last acute HF episode. Of this subset, SOB was the symptom most frequently leading to hospitalization (n = 10, 71%). Patients reported impacts in physical functioning, including walking, climbing stairs, sleeping, and carrying items. These impacts were associated with difficulties with daily activities, including bathing, dressing, housework, running errands, and social outings. Patients reported curtailing recreational activities and fitness, and several stopped driving. Impacts to emotional well-being included frustration, worry about the future, depression, irritability, fear, and anxiety. Despite distinct subgroups, few differences in symptoms and impacts were identified across stable and ADHF patients. No new symptoms or symptom impacts were reported by the 18th interview, confirming concept saturation. A conceptual model of HF symptoms and impacts for the potential development or adaptation of a PRO measure is summarized in Figure 1.

Conclusion: Across a broad group of HF patients, three symptoms were consistently reported: SOB, fatigue, and edema. The conceptual model presented can serve as a starting point for further PRO development.

P1238
Influence of heart failure into quality of life of patients with heart rhythm disorders
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Influence of heart failure into quality of life was described many times, however no complex analysis in subpopulation of patients with serious heart rhythm disorders qualified for pacemaker implantation were performed.

Methods: 107 patients aged 70.72 ± 11.35 (47 women) with advanced heart rhythm disorders qualified for pacemaker implantation (ESC criteria) were included into the trial. Two subpopulations according symptoms of heart failure and ejection fraction were created: without heart failure (nHF) and with heart failure (HF). Ejection fraction was evaluated by echocardiography. In all quality of life was evaluated by using Minnesota Living with Heart Failure Questionnaire which describes self-assessment of how heart failure affects daily life. Analysis was performed in a two subgroups: related to the physical symptoms (physical domain) and related to the psychological distress (emotional domain). Fewer points mean better quality of life.

Results: General quality of life was statistically (p = 0.0255) lower in the group of heart failure (45.00 ± 10.68) if compare to those without heart failure group (40.48 ± 8.84). Similar relationship, however without significance, were noted in the physical group of quality of life: 20.47 ± 5.43 (HF) vs. 18.89 ± 4.22 (nHF), p = 0.1147, as well as emotional group 10.53 ± 4.43 (HF) vs. 8.86 ± 4.22 (nHF), p = 0.0686. Gender-dependent analysis did not show statistical differences = general quality of life in women (43.70 ± 9.47 (HF) vs. 39.48 ± 8.79 (nHF), p = 0.1926 and in men 45.59 ± 11.35 (HF) vs. 41.45 ± 3.97 (nHF), p = 0.1237. Quality of life domains-related exact results are presented in the table below.

Conclusion: Presence of heart failure worsen the quality of life patients with heart rhythm disorders qualified for pacemaker implantation.
EXERCISE TESTING AND TRAINING

P1239
Monitoring changes of end-tidal pressure of carbon dioxide in patients with chronic heart failure and chronic obstructive pulmonary disease during six minute walk test
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Background: Exercise tests are used to determine exercise tolerance in patients with chronic heart failure (CHF) and in patients with chronic obstructive pulmonary disease (COPD). Breathlessness of is one of the most common reason patients who stopped during 6-minute walk test (6MWT). Dyspnea is combined with changes of pulmonary ventilation and gas exchange of CO2. Significance of end-tidal CO2 (PETCO2) is a constant, which shows the activity of respiratory system.

Methods: We studied 52 patients with CHF in New York Heart Association (NYHA), age 58 ± 3,24 years (25 patients (48,1%) in NYHA class II, 22 patients (43,5%) in NYHA class III, 5 patients (9,6%) in NYHA class IV. Also we studied 42 patients with COPD II-III, age 60 ± 3,48 years (1st group - 22 patients (52,4%) with COPD II, 2nd group - 20 patients (47,6%) with COPD III). Control group 30 patients, age 48 ± 3,42 years. Standard 6MWT was performed. Dyspnea was evaluated on a scale of Borg, MRS and VAS. We recorded capnogram before, during, after the 6MWT and in the recovery period.

Results: Significance of PETCO2 in patients with CHF in NYHA class II was 38,2 ± 3,12 mm Hg, in patients in NYHA class III was 34,4 ± 2,22 mm Hg. In patients in NYHA class IV was 32,4 ± 1,74 mm Hg. Significance of PETCO2 in 1st group patients with COPD was 36,2 ± 2,43 mm Hg. In 2nd group patients were 34,1 ± 1,22 mm Hg. All patients performed 6MWT. The 6MWT distance in patients with CHF in NYHA class II was 284 ± 10,56 m; in NYHA class III was 290 ± 17,24 m, in NYHA class IV was 142 ± 3,51 m. The 6MWT distance in 1st group patients with COPD was 440 ± 15,48 m, in 2nd group was 384 ± 15,42 m. There is reduction PETCO2 in all patients with CHF during the 6MWT. PETCO2 in patients with CHF in NYHA class II was 33,4 ± 2,51 mm Hg, in NYHA class III was 31,75 ± 2,89 mm Hg, in NYHA class IV was 28,8 ± 1,32 mm Hg. 69,2% patients reported dyspnea as the main reason for a stop during the 6MWT. There is increase PETCO2 in all patients with COPD during the 6MWT. After the 6MWT the significance of PETCO2 in 1st group was 43,21 ± 2,81 mm Hg. In 2nd group was 45,05 ± 3,26 mm Hg. All patients reported dyspnea as the main reason for a stop during the execution 6MWT. When we analyzed the trend of PETCO2 we found that these patients showed signs of periodic breathing than control group.

Conclusion: Thus, capnography increases the diagnostic value of the 6MWT, helps to make interpretation of dyspnea in patients with CHF and COPD.

P1240
Cardiac rehabilitation: don’t forget the ones that went away
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Introduction: Cardiac rehabilitation program (CRP) is an intervention designed to promote a healthy lifestyle. In spite of a strong commitment from health-professionals, a significant number of patients (pts) leave the program. Our goal was to evaluate the socio-demographic and clinical features of pts not completing the CRP.

Methods: We analysed data from a prospective registry of 840 consecutive pts enrolled in a CRP after an acute coronary syndrome (ACS), between 2008 and 2016. Forty-two pts were excluded from the CRP due to medical reasons.

Results: From the total of 798 pts, 86% male and mean age 54,5 ± 9,9 years old. Most pts were active working (55,4%) and married (92,8%). The prevalence of the classic cardiovascular risk factors was high with 59,9% dyslipidemic; 55,8% active smokers; 42,6% hypertensive; 24,9% obese and 18.5% diabetic. The dropout rate from CRP was 7,9% (63 pts). Main reasons for dropping out were lack of economic means or transportation constraints (23,8%), need to return to work (7,1%) and available exercise sessions schedules (2,9%). Women were slightly more prone to leave CRP (p = 0,05). Pts leaving the CRP were younger (51,2 ± 8,1 vs 54,3 ± 9,8 years old, p = 0,01), more often lived alone (38,1% vs 17,1%, p = 0,001) and were unemployed/retired (55,6% vs 41,8%, p = 0,046). Prevalence of active smokers (73,0% vs 54,3%, p = 0,009) and obese (42,9% vs 22,7%, p = 0,001) was also higher among these pts. Although there was no difference in functional capacity in baseline exercise testing (METs 8,9 ± 2,3 vs 8,4 ± 2,6, p = 0,084), at 1-year follow-up, those completing CRP showed better performance (METs 10,7 ± 2,3 vs 9,0 ± 2,9, p = 0,001). Independent predictors of non-completion of CRP by multivariate logistic regression modelling were obesity (OR 2,7, 95% CI 1,6-4,6, p < 0,001), smoking (OR 2,4, 95% CI 1,3-4,3, p = 0,004), unemployment (OR 1,9, 95% CI 1,1-3,2, p = 0,077) and living alone (2,9, 95% CI 1,6-5,0, p = 0,001).

Conclusion: The benefits of CRP enrollment after an ACS are undeniable. However, dropout rates remain high and are a source of concern in CRP. Identifying those at higher risk of non-compliance, especially those with social and economic disadvantages might steer a redesign of CRP programs, and alternatives to reduce costs and inequalities in access to this cost-effective treatment option.

P1241
The effects of long-term aerobic training designed with individualized method based on lactate threshold definition
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Objective: to evaluate the effects of long-term aerobic training, designed with individualized method based on lactate threshold definition, on exercise capacity, HF severity and exercise activity.

Methods: We evaluated 196 HF patients, mean age 51 ± 9.9 years, with NYHA class III, LVEF 38.8 ± 4.38%. CPET performed on a treadmill ("Oxycon Pro") at baseline, in every 8 weeks and after 9 months. The indication catheter was inserted before CPET. Blood samples were taken at baseline and at 1-minute intervals during test. Lactate concentration in blood was measured using analyzer iSTAT, cartridge CS4 (Abbott, USA). All patients were randomized into following groups: 109 patients (56%) of study group (SG), who underwent physical training, calculated based on VO2 percentage. Results: At baseline CPET results in both groups did not significantly differ. VO2 at lactate threshold and VO2peak were 8.7 ± 0.5; 13.5 ± 0.9 ml/min/kg and 8.9 ± 0.9; 13.6 ± 1.2 ml/min/kg in study group and control group, respectively (p1=0.08, p2=0.07, respectively). After 36 weeks of training VO2LT and VO2peak were better in the study group than in control group: the increase was 16% and 24% in the main group, and 4% and 7% in the control group, respectively (p1=0.01, p2=0.05). The ergoreflex activity at baseline did not significantly differ in two study groups. After long-term aerobic training we recorded a more marked reduction in the ergoreflex activity in study group: for DBP it was 35% and 20%, VE-48% and 25%, VE/VCO2-39% and 12%, in the study group and control group, respectively. By the 24-week of training in 91 (85%) patients of the study group the severity of HF was reduced to NYHA class II, and among the patients in the control group such dynamics was observed only in 43/50% patients. Conclusions: aerobic exercise, designed with individualized method based on lactate threshold definition, increase exercise tolerance, reduces HF severity and ergoreflex activity more than aerobic training, calculated based on VO2peak percentage.

P1242
Endothelial and muscular alterations in a cardiometabolic obese rat model of heart failure with preserved ejection fraction (HFpEF)
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Funding Acknowledgements: EU Commission Framework 7 (EU 602405-2)

Despite normal left ventricular ejection fraction patients with heart failure with preserved left ventricular ejection fraction (HFpEF) present exercise intolerance which can be attenuated by exercise training. Alterations in the peripheral skeletal muscle as well as in the vascular system have been described with conflicting results and the molecular mechanisms mediating the beneficial effects of exercise training after disease onset is still unknown. The present study, therefore, used a cardiometabolic rat model to further elucidate: 1) alterations in the skeletal muscle (EDL) and the
vascular system induced by HFpEF; and 2) the effects of exercise training during secondary prevention. After 20 weeks, obese Zucker diabetic fatty spontaneously hypertensive heart failure F1 hybrid (ZSF1) rats (n=12) were compared to their lean counterparts (n=8), with a further 3 groups of obese ZSF1 rats assessed 8 weeks later following sedentary behavior (n=15), moderate-continuous training (MCT; n=11) or high-intensity interval training (HIIT; n=11). Obese rats displayed signs of HFpEF including diastolic dysfunction, LV hypertrophy, exercise intolerance (P < 0.05) and preserved LVEF. Compared to lean, obese rats showed a significantly impaired endothelial-dependent vasodilation associated with reduced eNOS activation (p < 0.05) and a trend towards elevated expression of p47phox (p = 0.09). Exercise, independent of modality, improved endothelial function, which was associated with a reduction in p47phox expression (n=0.42, p < 0.01). Compared to controls HFpEF animals showed signs of skeletal muscle atrophy lower muscle weight, lower CSA and reduced maximal absolute force, but maximal specific force was elevated (P < 0.05). At the molecular level a significant higher aktin expression and creatine kinase activity was detected whereas xanthine oxidase activity was reduced (p < 0.05). Exercise training had no significant effect. To conclude, a cardiometabolic obese model of HFpEF was associated with impaired endothelial function and still preserved specific skeletal muscle force generation. Exercise training (independent of protocol) was able to reverse these alterations in the endothelium but had no significant effect on the skeletal muscle.

Table 1. Comparison within and between subgroups (based on EOV characteristics and severity) for parameters examined.  

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<tr>
<th>Variables</th>
<th>Groups</th>
<th>p (ANOVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VO2peak (ml/kg/min)</td>
<td>M1 (n=59)</td>
<td>19.0±3.1</td>
</tr>
<tr>
<td>VO2AT (ml/kg/min)</td>
<td>M2 (n=30)</td>
<td>11.6±4.5</td>
</tr>
<tr>
<td>VE/VO2slope</td>
<td>M3 (n=60)</td>
<td>33.8±7.3</td>
</tr>
<tr>
<td>P(ETCO2)AT</td>
<td>M4 (mHg)</td>
<td>33.5±5.3</td>
</tr>
<tr>
<td>PetCO2 AT (mM)</td>
<td>M5 (n=39)</td>
<td>33.8±5.9</td>
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<tr>
<td>VO2/t slope (l/min²)</td>
<td>M6 (n=39)</td>
<td>0.47±0.29</td>
</tr>
<tr>
<td>Data compared to M1/M6, p &lt; 0.05.</td>
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</table>

**P124**

Different predictors of exercise capacity in HFpEF compared to HFrEF

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Background and Aim: Quality of life is as important as survival in heart failure (HF) patients. Controversies exist with regards to echocardiographic predictors of exercise capacity in HF, particularly in patients with preserved ejection fraction (HFpEF). The aim of this study was to prospectively examine echocardiographic parameters that correlate and predict functional exercise capacity assessed by 6 min walk test (6-MWT) in patients with HFpEF.

Methods: In 111 HF patients (mean age 63 ± 10 years; 47% female), an echo-Doppler study and a 6-MWT were performed in the same day. Patients were divided into two groups based on the 6-MWT distance (Group I: ≤ 300 m and Group II: >300 m).

Results: Group I were older (p = 0.008), had higher prevalence of diabetes (p = 0.027), higher baseline heart rate (p = 0.034), larger left atrium - LA (p = 0.011), lower systolic septal s', e', a' waves, and septal MAPSE (p = 0.015), and lower LV diastolic function (p = 0.037), shorter pulmonary acceleration time - PAAT (p = 0.006), lower left atrial lateral wall myocardial velocity (a') (p = 0.018) and lower left atrial lateral wall myocardial velocity (a) (p = 0.003), compared with Group II. Patients with HF and reduced EF (HFrEF) had lower hemoglobin (p = 0.007), higher baseline heart rate (p = 0.005), higher NT-ProBNP (p = 0.001), larger LA diameter (p = 0.004), higher septal s', e', a waves, and septal MAPSE, shorter PAAT (p < 0.001 for all), lower lateral MAPSE, higher E/A and E/e', and lower LVFT (p = 0.001 for all), lower lateral e' (p = 0.009), s' (p = 0.006), RV e' and LA e' emphysema fraction (p = 0.012 for both), compared with HFpEF patients. In multivariate analysis, only LA diameter (2.676 [1.242-5.766], p = 0.013), and diabetes (0.274 [0.084 - 0.988], p = 0.033) independently predicted poor 6-MWT performance in the group as a whole. In HFrEF, age (1.073 [1.012-1.137], p = 0.018) and LA diameter (3.698 [1.348 - 10.071], p = 0.011), but in HFpEF, lateral s' <0.295 [0.099 - 0.882], p = 0.029, and hemoglobin level [0.497 [0.248-0.998], p = 0.049] independently predicted poor 6-MWT performance.

Conclusions: In HF patients predictors of exercise capacity differ according to severity of overall LV systolic function, with left atrial enlargement in HFrEF and longitudinal systolic shortening in HFpEF as the main predictors.

**P1245**

White blood cell count in pulmonary arterial hypertension: relation to pulmonary vascular resistance

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AIM: Pulmonary vascular resistance (PVR) is an important hemodynamic variable used in the diagnosis and management of patients with pulmonary hypertension (PH). The positive relationship between WBC count and cardiovascular disease has been observed in several studies.

Methods: 20 patients (16 females) from four centers undergoing right heart catheterization having a mean age 56.20 ± 17.5 years, all belonging to group 1 PH (idiopathic
Pulmonary Hypertension (PH) is a multifactorial disease defined as mean pulmonary arterial pressure ≥25 mmHg measured by right heart catheterization (RHC). International Guidelines recommend doppler echocardiography as the method of screening to estimate the value of systolic pulmonary pressure and right ventricle systolic function (RVSF). The Tricuspid Annular Plane Systolic Excursion (TAPSE) is an indicator of RVSF, although it has been removed from the HP guidelines. The cardiac index (CI) is also an indicator of the right ventricular function and a marker of mortality. The question that arises is if there is a correlation between both techniques as indicators of RVSF. 

**Objectives:** To determine the correlation between TAPSE and CI in our population.

**Methods:** We conducted a retrospective observational, prospective study that enrolled patients derived to our service with diagnosis of PH between March 2012 and January 2017. The following data were obtained: PH classification group, clinical features, hemodynamic variables, distance in the six minutes walk test (6MWT), functional class (FC), and echocardiographic measurements, according to guidelines. Echocardiographic variables were obtained by three experienced operators, with 2 ultrasound equipments (Vivid 55 and a 3.5 mhz transducer), assessing: RVSF, TAPSE, pulmonary pressure and presence of pericardial effusion (PE). We performed RHC to confirm PH by measuring mean pulmonary artery pressure (mPAP). We also recorded right atrium, systolic and diastolic pulmonary pressure (P(i)), wedge pressure, cardiac index (CI), pulmonary and systemic vascular resistance. Studies were performed with a difference of less than 24 hours and the physicians did not know echocardiographic results. The results were incorporated into an Excel database. Bland-Altman 5.0 statistical package was used and linear correlation variables were analyzed.

**Outcomes:** We included 86 cases with hemodynamic diagnosis of HP. The average age of the population was 57.5 years (SD 20.5 years with 55.3% male. The prevalence of intermediate probability of PH was 8.6%, with nearly equal distribution between men and women (51.3 vs 48.7 %; P=NS) whereas the prevalence of high probability of PH was 4.3%, with slightly but not significant higher prevalence in female patients (43.2 vs 56.8; p=ns); PH is more prevalent in patients with chronic obstructive pulmonary disease (COPD) or left ventricle (LV) systolic dysfunction. PH prevalence increased with age. Also, spAP was significantly associated with left atrial enlargement, left ventricular ejection fraction and, in addition, an increased spAP was related to an enlargement of the right atrium and right ventricle.

**Conclusion:** PH as measured by echocardiography has low prevalence in our population, but the estimates may be higher in specific subgroups. Analysis of the registry data could be an instrument for quality control and might help identify weak points in assessment and treatment of these patients.
P1248
New insights into inpatient symptom burden in pulmonary arterial hypertension

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BACKGROUND: Despite the high symptom burden in patients with pulmonary arterial hypertension, there is a relative paucity of research in the inpatient palliative care needs of this population. The aim of this study was to assess the palliative care needs of a pulmonary arterial hypertension cohort by retrospective review.

Methods: Patients with PAH receiving PC consultation were retrospectively evaluated from a large single center advanced heart failure (AHF) center in the United States. The PC team (specially trained physician, nurse practitioner, pharmacist, social worker, chaplain) is embedded within the AHF clinical program. Data on symptom burden was collected via a modified Edmonton Scale. Data on length of stay, palliative care interventions, and final disposition were evaluated using descriptive statistics.

Results: Consultations were performed on 11 PAH (median hospital length-of-stay 6 days) from January to December in 2015. Two patients developed PAH secondary to scleroderma, one patient developed PAH secondary to systemic sclerosis, and the rest of the cohort had idiopathic PAH. In all cases, reason for PC consultation was either goals of care (4 patients), pain control (6 patients) or non-pain symptom management (1 patient). In regard to pain control, 64% reported moderate to severe pain at time of consult; at 48 hours after consult, pain was resolved or reduced to mild pain in only 43% of patients. In regard to non-pain symptom management, 27% of patients were evaluated for moderate or severe dyspnea, 8% moderate or severe depression, and 9% moderate or severe constipation. As a result of PC evaluation, 73% of patients received psychological counseling, 64% of patients received spiritual care, and 27% participated in discussions that facilitated a change in resuscitation status, and 9% of patients were referred to hospice.

Conclusions: Patients with Pulmonary Arterial Hypertension have a unique and significant symptom burdens and palliative care needs in the inpatient setting.

P1249
Invasive and non-invasive characteristics of heart failure patients, related to pulmonary hypertension due to left heart disease, in qualification process for heart transplantation

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Introduction: Left heart disease is the main cause of pulmonary hypertension (PH). PH is considered a risk factor for worse outcomes in patients with heart failure (HF). Initial evaluation of PH patients involves non-invasive methods including echocardiography and B-type natriuretic peptide tests(BNP); however, the final diagnosis requires right heart catheterization(RHC).

Aim: Characterization of patients with heart failure with reduced ejection fraction (HFREF) considered for heart transplantation (HTx/HTxH) and without PH. Evaluation of the role of non-invasive tests in diagnosis of PH in HF/EF patients.

Methods: This was a prospective analysis of 211 patients with HFREF (left ventricular ejection fraction <40%), with ischemic(ICM) and non-ischemic cardiacopathy(NICM) undergoing qualification process for HTx. Following items were analyzed: epidemiological data, laboratory results (including BNP), and chosen parameters obtained in echocardiography, cardiopulmonary exercise testing (CPET) and RHC (thermodilution method); PH was diagnosed according to the ESC guidelines.

Results: The mean age of the analyzed patients was 52 ± 10 years, and most were men(88%). 72% had NYHA class 3 and 4. There were 141 patients(n70%) with PH, including 138 with post-capillary PH and 3 with combined pre- and post-capillary PH. The patients with PH did not differ significantly from those without as to age, gender or cause for HF. They had more often NYHA class 3 and 4 (79% vs56%; p < 0.002) and showed significantly higher BNP (99±361 pg/ml,p < 0.001), larger right ventricle in echocardiography (36 mm±32 mm;p < 0.001) and higher right ventricular systolic pressure (RVSP) (47±33±8 p < 0.001). There were no significant differences as to left ventricle and EF.

There were no significant differences in CPET, but PH patients tended to show worse results: pV0/2V (4+20 ml/kg/min;p < 0.112) and VE/VCO2 slope 48±37±p < 0.077). BNP showed significant positive correlations with mean pulmonary arterial pressure (mPAP) (r=0.201), mean right atrial pressure (mRAP) (r=0.28), and pulmonary capillary wedge pressure (PCWP) (r=0.27). There was no significant correlation between BNP and transmural gradient (TPG), pulmonary vascular resistance(PVR) and mean right ventricular pressure. RVSP measurement in echocardiography correlated positively with mPAP, diastolic PAP, mean right atrium pressure (mRAP), RV, PCWP, TPG and diastolic pressure gradient(PD) measured in RHC. There were also significant correlations between RVSP and pulmonary vein resistance(PVR) (r=0.44).

Conclusions: Non-invasive test results like BNP, echocardiographic and CPET parameters correlate with invasive RHC parameters in patients with HFREF. Patients with HFREF and PH present higher NYHA class and higher BNP levels, despite similar LVEF or LV size in comparison to those without PH. Combined non-invasive parameters provide a useful and feasible tool for evaluation of HFREF patients to differentiate those with PH and without.

P1250
The impact of pulmonary hypertension on post-transplant outcomes

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Purpose: The aim of study was to evaluate the impact of pulmonary hypertension (PH) on early and late outcomes after heart transplantation (HTx).

Methods: From 2010 to 2016 we performed 80 HTx (87 – male; 23 – female). Causes of heart failure were ischemic heart disease (47,5%); 38, dilated cardiomyopathy (32,5%; 26, non-compacted myocardium (11,5%; n=9 and others (9%; n=7). Patients separated into 2 groups according to right heart catheterization results: 1st group - patients with PH (n = 47; mean PAP > 25 mm Hg) and 2nd group - without PH (n = 32; mean PAP < 25 mm Hg). Mean age of recipients in 1st group was 45±6±15±0 yrs, pulmonary vascular resistance (PVR) - 26±6±1±4 WU, PVR after right ventricle operation (bioprost 50 to 70, NO 80±p = 2±0, PVR systolic pressure < 45±3±12±7 mm Hg, pulmonary arterial wedge pressure (PAWP) - 20±5±7±8 mm Hg. In 2nd group mean age of patients was 49±6±11±9 yrs, PVR - 21±0±8±0, PAWP - 28±2±4±8 mm Hg, PAWP - 11±9±4±3 mm Hg. Outcomes were estimated by the time in ICU, outcomes of TTE, frequency of right heart failure (RHF) and vasoconstrictor indications.

Results: After HTx there was no significant difference in how much time patients with PH or without spent in ICU (4±49 vs. the mean 7±346 days). But time spent in ICU in 1st group was more complicated: RHF occurred in 9% cases due to they were implanted extracorporeal membrane oxygenation (ECMO) support, 7% - underwent tricuspid valve repair due to severe tricuspid regurgitation. There was no indications to ECMO in patients with PH and without (41% vs. 22%< 0.05). During 6 months after HTx 13% (n = 7) of recipients from 1st group treated by Sildenafil. Six months after HTx TTE results got to normal values in both groups: PVR (1st group - 18±0±5 WU vs. 2nd group - 16±0±4 WU, p = 0±05). PASP (34±8±6±7 mm Hg vs. 35±1±4±4 mm Hg, p = 0±05), PAWP (12±2±5±9 mm Hg vs. 11±1±3±9 mm Hg, p = 0±05). Six months after HTx PASP significantly decreased in 1st group from 49±3±1±8 mm Hg to 34±8±1±0 mm Hg (p = 0±01) the same as PVR – from 36±5,0±2 WU to 18±8±0 WU (p = 0±01). There was no significant difference in TTE results in 6 months and in 1 year after HTx.

Conclusions: Time in ICU of patients with PH is complicated and development of RHF is more frequent what require specific treatment. After HTx PHT full regressed.

P1251
Clinical and echocardiographic correlates of pulmonary hypertension in heart failure patients

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Background: Pulmonary hypertension (PH) is highly prevalent amongst heart failure (HF) subjects and now recognized as an independent predictor of poor prognosis. Not much is known presently in our environment about the frequency and correlates of PH in HF, its effect on management and impact on outcomes. Studies on this subject will help us in better risk stratification, management and prognostication of our heart failure patients.

Purpose: To determine the frequency of PH in an academic hospital in our environment and assess its correlates using echocardiography.

Methods: Heart failure patients, 219, in New York Heart Association (NYHA) class II-IV were consecutively recruited from the emergency room and the cardiology out-patient clinic. Those with other co-morbidities that could cause PH were excluded. Data on demographic parameters, clinical features and
eocardiography were obtained. Correlation between elevated pulmonary artery systolic pressure (PASP), mean pulmonary artery pressure (mPAP) and selected clinical/echo parameters were further interrogated.

**Results:** The frequency of PH was determined by two criteria. PH using a PASP ≥45mmHg was present in 38% of subjects. However, using the mPAP criterion of ≥25mmHg, PH was present in 31% of subjects. Heart failure subjects with PH were more likely to be male (p=0.03) with a lower body mass index (p < 0.01), lower systolic blood pressure (p < 0.01) and a worse NYHA functional class (p < 0.01) compared with subjects without pulmonary hypertension. Heart failure subjects with PH also had significantly higher left ventricular filling pressures (higher left atrial volume index and E/e'ratio), more severe mitral regurgitation (higher mitral regurgitation volume), poorer LV systolic function, and worse parameters RV structure and function compared with those without PH. Echocardiographic variables that correlated significantly mPAP include parameters of LV filling pressures (p < 0.01 for all), mitral regurgitation volume (p < 0.001), LV and ejection fraction (p < 0.02), similar correlations were obtained with mPAP. On multi-variate analyses, the left atrial volume index and E/e’ ratio were independently associated with PASP, while the LV ejection fraction, E/e’ ratio and the left atrial volume index were independently associated with mPAP.

**Conclusion:** PH is quite common amongst heart failure patients in our environment with a variable frequency depending on the assessment method employed. It is associated with higher LV filling pressure, more severe MR, poorer LV systolic function and worse RV remodeling. Routine screening for PH amongst heart failure patients is recommended for better risk stratification and management.

**P1252**

**How different responses of total pulmonary vascular resistance to exercise can influence right ventricular inotropic reserve and functional capacity in post pulmonary endarterectomy patients?**

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**Introduction:** After pulmonary endarterectomy (PEA) there is an abnormal pulmonary hemodynamic response to exercise, even in patients (pts) with near normal resting hemodynamics, causing excessive afterload of the right ventricle (RV) and exercise limitation.

**Purpose:** Determine if different responses of total pulmonary vascular resistance (TPVR) to exercise can affect RV inotropic reserve and functional capacity during exercise echocardiography (EE) in pts after PEA.

**Methods:** EE was done using treadmill exercise and modified Bruce protocol until exhaustion. During exercise, pts were symptomatic, arterial and ECG monitoring. To evaluate RV function we used right ventricle stroke volume indexed to body surface area (RVSVI); tricuspid annular plane systolic excursion (TAPSE); free RV wall S wave (S wave) and RV fractional area change (RVFAC). To evaluate total pulmonary vascular resistance (TPVR) = mean pulmonary artery pressure (mPAP/cardiac output (CO)); for this we have to evaluate mPAP = systolic pulmonary artery pressure (PSAP)− LV x heart rate. We used test duration to define functional capacity. We defined 2 groups of pts according to variation of TPVR during exercise, one in which TPVR decreased and another in which TPVR increased and other in which TPVR decreased and compared variables of RV function and test duration between them using tstudent test for independent samples.

**Results:** The group of post PEA pts consisted of 13 patients at least 6 months after PEA, with mean age of 57.0±11.7 years, 7 females. When compared to the 2 groups we verified that pts in whom TPVR increased with exercise (3 pts) had significant lower functional capacity (test duration of 606.7±46.5 vs 777.8±198.6 sec, p=0.03), significant lower increase in TAPSE (1.2±0.6 vs 2.3±1.1 mm (p=0.02)) and significant lower increase in RVSVI (0.4±2.5 vs 2.6±5.2 ml/m2 vs 11.2±4.6 ml/m2 (p=0.02). We didn’t verify significant differences in variation of RVFAC and S wave between the 2 groups.

**Conclusions:** Pts in whom TPVR increased with exercise had lower functional capacity and lower RV inotropic reserve than pts in whom it decreased with exercise. Perhaps different responses of TPVR to exercise can be used to differentiate post PEA pts with different prognosis.

**P1253**

**Pulmonary hypertension in end-stage renal disease patients undergoing haemodialysis via arterio-venous access**

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**Background:** Pulmonary hypertension (PH) has been described in a considerable proportion of end-stage renal disease (ESRD) patients on haemodialysis and been associated with worse prognosis. Our objective was to determine the right heart catheterization-derived hemodynamic data in ESRD patients on regular hemodialysis.

**Methods:** Fifty-five patients with ESRD who were on maintenance hemodialysis through an arteriovenous fistula underwent screening for PH with trans-thoracic echocardiography (TTE). Patients who were found to have PH on screening TTE, pulmonary arterial systolic pressure of >25 mmHg and tricuspid regurgitant velocity of >3.8 m/s underwent diagnostic right heart catheterization (RHC) for evaluation of their hemodynamic status.

**Results:** Out of 55 patients, 30 (54%) patients had PH in initial screening with TTE (mean age of 39 ± 11 years). Of these 30 patients, 24 patients (80%) had post-capillary pulmonary hypertension (Class II PH) and 6 patients had pre-capillary pulmonary hypertension (Class I PH) based on the RHC findings. The RHC findings are demonstrated in Table 1.

**Conclusion:** ESRD patients on maintenance hemodialysis therapy have a substantial risk of developing PH which in the vast majority of cases appears to be post-capillary.

**Table 1. Right Heart Catheterization Findings**

<table>
<thead>
<tr>
<th>Class I (PH-I)</th>
<th>Class II (PH-Iv-24)</th>
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</thead>
<tbody>
<tr>
<td>MVOD (%)</td>
<td>77.83±7.99</td>
</tr>
<tr>
<td>CI (l/min/m²)</td>
<td>5.1±2.10</td>
</tr>
<tr>
<td>PAP (mmHg)</td>
<td>41.6±15.10</td>
</tr>
<tr>
<td>PCWP (mmHg)</td>
<td>12.6±2.3</td>
</tr>
<tr>
<td>PVR (dy·sec·cm⁻⁵)</td>
<td>1.21 (0.54-3.24)</td>
</tr>
</tbody>
</table>

**Data are presented as mean±standard deviation or median (interquartile range).**

**Abbreviations:** CI: cardiac index, MVOD: mixed venous O2 saturation, PAP: pulmonary artery pressure, PCWP: pulmonary capillary wedge pressure, PVR: pulmonary vascular resistance.

**P1254**

**Prevalence and determinants of pulmonary arterial hypertension (PAH) in acute and chronic heart failure (CHF).FRESH study from GICC**

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**On behalf of:** GICC

**Objectives:** To investigate the prevalence and the determinants of pulmonary arterial hypertension (PAH) in acute and chronic heart failure (CHF) in France.

**Background:** The epidemiology of PAH in France in CHF is poorly described.

**Methods:** FRESH is an on-going multicenter survey collecting exhaustive data in both acute and chronic HF (NCT01956539). Estimate of systolic pulmonary artery pressure (SPPAP) was attempted routinely by echocardiography and was divided in three classes: ≥45mmHg (Gr1), ≤45mmHg (Gr2) and not measurable (Gr3). The diagnosis of CHF was based on symptoms signs, echocardiography NT-proBNP. Comparisons were performed using ch² tests for categorical variables and ANOVA or non-parametric Kruskal Wallis test for continuous variables. Logistic regression was used to identify factors associated with PAH≥45mmHg (Gr3).

**Results:** 2093 patients were included in FRESH. 1690 (81%) had an echocardiography of which 596 (35%) were in AHF, of whom 29%, 34% and 37% were respectively in Gr1, Gr2 and Gr3 and 1048 (55%) were in CHF of whom 31%, 48%, 21% were respectively in Gr1, Gr2 and Gr3. Independent factors associated with Gr3 (vs Gr1 and Gr2 pooled) were mitral insufficiency, High grade NYHA III/IV, increased BNP, increased LVESD and reduced TAPSE.

**Conclusion:** Using a definition of SPPAP≥45mmHg, 37% of patients with AHF and 21% of CHF had pulmonary hypertension, which was associated with LV remodeling and mitral insufficiency leading to right ventricular failure. Whether PAH a target for therapy in these populations remains to be elucidated.

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RIGHT VENTRICULAR FUNCTION

P1255
Persistent right ventricular dysfunction in patients with acute pulmonary embolism: does it have effect on prognosis?
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Background: Right ventricular (RV) dysfunction is found in at least 25% of patients with acute pulmonary embolism (PE). The presence of RV dysfunction at diagnosis of acute PE is a determinant of the severity and early clinical outcome and its detection is useful for risk stratification of the disease. However, the effect on prognosis of persistent RV dysfunction after the standard treatment for acute PE has not been defined so well.

Purpose: To evaluate the effect of persistent RV dysfunction, at the time of discharge, in patients hospitalized for acute PE. The effect was measured by post-discharge all-cause mortality.

Methods: Retrospective review of 428 consecutive patients admitted for acute PE in a single-center hospital for two years until October 2016. We identified those who underwent transthoracic echocardiogram and who were found to have RV dysfunction at the moment of hospital admission (n = 103, 24.1%). RV dysfunction was defined as the presence of either RV dilatation, TAPSE < 16 mm, S’ tricuspid < 10 cm/s or maximum tricuspid velocity regurgitation > 2.6 m/s. A second transthoracic echocardiogram was performed at discharge in 45 patients (43.7%) and the persistence of RV dysfunction was looked for. Patients were categorized in one of two groups: group 1 - those in whom RV dysfunction was present at the moment of their hospital admission and persisted at discharge (n = 26, 57.8%). Primary outcome was defined as the occurrence of all-cause mortality after discharge.

Results: We included 45 patients with acute PE and RV dysfunction at admission who were successfully discharged (mean age 66.2 ± 17.8 years, 28.9% males). Median follow-up time was 495 (interquartile range (IQR) 417) days. Mortality rate after discharge was 8.9%. Median midBNP was significantly superior in group 2 than in group 1 (median 12,957 vs. 293 pg/mL; p = 0.029). Similarly, patients in group 2 had significantly higher mortality rate than patients in group 1 (0.0 vs. 21.1%; p = 0.026).

Conclusions: In patients admitted for acute PE, mortality seems to be higher in those who have persistent RV dysfunction before discharge. Although these results must be confirmed by better-designed, prospective study cohorts, we believe our study may point to the relevance of further risk stratification of patients whose RV dysfunction is present at the initial echocardiographic evaluation and persists before discharge from the hospital.

P1256
Short-term prognostic value of shock index in normotensive oncologic patients with pulmonary embolism: keep it simple
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INTRODUCTION: The Shock Index (SI), although not included in the standard risk assessment of PE, showed better performance than the ELSO model in normotensive patients suffering for acute PE. The value of SI to predict short-term mortality in normotensive oncologic patients with symptomatic PE is currently unknown. In this study, we aimed to assess the value of SI to predict 30-day all-cause mortality in normotensive oncologic patients with acute symptomatic PE.

Methods: Retrospective, observational study that included all normotensive cancer patients with acute PE diagnosed during emergency room stay by MDCT between January 2010 and December 2011. Demographic and clinical data, MDCT variables and blood tests results were collected for all patients. The primary endpoint of this study was 30-days all-cause mortality. We used a test to compare means of SI between patients that died at 30-days and those that have survived. A receiver operating characteristics (ROC) curve was used to test SI as a predictor of the primary endpoint and to obtain the best cut-off value. Then we transformed SI into a categorical variable with 2 groups and conducted a Cox regression survival analysis to test the strength of prediction for 30-days overall mortality.

RESULTS: Between January 2010 and December 2011, 69 normotensive oncologic patients (42 males, median age 73 years) were diagnosed with acute PE by MDCT during emergency room stay. 19 (27.5%) patients died at 30 days of FU. There were significant differences in Mean Arterial Pressure (100.15 ± 23.55mmHg vs 88.37 ± 20.44mmHg, p = 0.01), Log Lactates (0.18 ± 0.03mmol/L vs 0.34 ± 0.06mmol/L, p = 0.02) and SI (0.68 ± 0.03 vs 0.83 ± 0.04, p < 0.01) between survivors and non-survivors at 30 days of follow-up. There were no other significant differences between the 2 groups, including cardiac biomarkers and a sPESI score > 2. As there was a significant interaction between SI, Log Lactates and Mean Arterial Pressure, only SI was included in cox regression analysis. The area under the curve (AUC) for SI was 0.71 (p < 0.01), yielding moderate discriminative power. We considered the best cut off point to be a SI of 0.62 (sensitivity 94.7 and specificity 40.5). In a cox regression analysis a SI equal or greater than 0.62 was strongly associated with a worse prognosis during the first month of follow-up (unadjusted OR 10.37 with a 95% confidence interval 1.38 – 77.71, p = 0.02).

Conclusion: SI is simple and strong independent predictor of 30-day all-cause mortality in normotensive cancer patients admitted in the emergency room with acute PE. In our population, a sPESI score > 2 was not a predictor of fatal outcome at 30 days of FU.
Late ventricular potentials in patients with arterial hypertension and coronary artery disease
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Background: Late ventricular potentials (LVPs) recorded by signal-averaged electrocardiography (ECG) are used as a prognostic factor for ventricular arrhythmias in patients with arterial hypertension (AH) and with coronary artery disease (CAD). However, the impact of combination of both diseases on LVPs has not been fully studied.

Purpose: To reveal factors influencing on LVPs in patients with AH and CAD.

Methods: The study enrolled 190 patients: 85 with AH, 39 with CAD and 66 with combined CAD and AH. All patients were divided into 2 groups: 41 subjects (mean age 44.3 ± 13.2 years) with LVPs (group I) and 149 subjects (mean age 44.8 ± 12.6 years) without LVPs (group II). Signal-averaged ECG was recorded using the standard Simson method. ECG signal averaging has been applied for 300 complexes based on the automatic algorithm the quantitative evaluation of three parameters was performed with the following criteria for LVPs: filtered QRS complex duration (TQRS) ≥ 120 milliseconds, duration of low amplitude signals lower than 40 μV (LARS40) ≥ 38 ms, and less than 20 μV of the root mean square signal amplitude in the last 40 milliseconds of the filtered QRS complex (RMS40).

Results: Group I patients were higher than groups of II (175.6 ± 8.4 vs 171.1 ± 8.02 cm, p<0.001). Significant differences were detected in group I compared to group II in the number of man (40 (87.6%) vs 124 (83.2%) p = 0.018), previous myocardial infarction (18 (43.9%) vs 40 (26.8%), p = 0.042) and right ventricular (RV) dimension (25.0 ± 2.94 vs 23.45 ± 4.35 mm, p = 0.049); aorta size (34.37 ± 4.20 vs 32.93 ± 3.73 mm, p = 0.037); left ventricular ejection fraction (LVEF) (56.76 ± 6.88 vs 59.95 ± 7.23%, p = 0.003), as well as the tendency for difference in left ventricular size was observed (51.17 ± 3.92 vs 49.68 ± 4.44 cm, p = 0.067). No difference between the groups was found in age, smoking status, AH, angina and circulatory insufficiency. LVPs recorded in patients with AH was 15 (17.6%) vs 7 (17.9%) in patients with CAD: 19 (28.1%) in patients with CAD and AH. Logistic regression showed the association of probability of LVPs with RV enlargement (OR 1.16, 95% CI 0.953 to 0.999, p = 0.049). Conclusion: LVPs were independently associated with RV dimension and LVEF in patients with AH and CAD.

Shock Index is an independent predictor of long-term mortality in normotensive oncologic patients with pulmonary embolism
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Introduction: The Shock Index (SI), although not included in the standard risk assessment of PE, showed better performance than the EIC model in normotensive patients suffering for acute PE in a recently published study. The value of SI to predict long-term mortality in normotensive oncologic patients with symptomatic PE admitted in the emergency room is currently unknown. In this study, we aimed to assess the value of SI to predict 1-year all-cause mortality in normotensive oncologic patients with acute symptomatic PE.

Methods: Retrospective, observational study that included all normotensive cancer patients with acute PE diagnosed during emergency room stay by MDCT between January 2010 and December 2011. Demographic and clinical data, MDCT variables and blood tests results were collected for all patients. The primary endpoint of this study was a 1-year all-cause mortality. We used a 1 test to compare means of SI between patients that died at 1 year of follow-up and those that have survived. A receiver operating characteristics (ROC) curve was used to test SI as a predictor of the primary endpoint and to obtain the best cut-off value. Then we transformed SI into a categorical variable with 2 groups and conducted a Cox regression survival analysis to test the strength of prediction for 1-year overall mortality.

Results: Between January 2010 and December 2011, 69 normotensive patients (42 males, median age 73 years) were diagnosed with acute PE by MDCT during emergency room stay. 38 (55.1%) patients died at 1 year of FU. There were significant differences in Mean Arterial Pressure (103.31 ± 33.9mmHg vs 91.88 ± 24.4mmHg, p < 0.01); Log Lactates (0.16 ± 0.05mmol/L vs 0.34 ± 0.06mmol/L, p < 0.05) and SI (0.65 ± 0.04 vs 0.77 ± 0.03, p = 0.02) between survivors and non-survivors at 1 year of follow-up. There were no other significant differences between the 2 groups, including cardiac biomarkers and a sPESI score2. As there was a significant interaction between SI and Log Lactates only SI was included in the box regression analysis. The area under the curve (AUC) for SI was 0.66 (p = 0.02), yielding fair discriminative power. We considered the best cut off point to be a SI of 0.73 (sensitivity 71.1 and specificity 65.5). In a Cox regression analysis a SI equal or greater than 0.73 was strongly associated with a worse prognosis during the first year of follow-up (unadjusted OR 3.11 with a 95% confidence interval 1.54 – 6.30, p < 0.01).

Conclusion: SI is simple and strong independent predictor of 1 year all-cause mortality in normotensive cancer patients admitted in the emergency room with acute PE. In our population, a sPESI2 was not a predictor of fatal outcome at 1 year of FU.
Previous studies reported the altered contribution of radial versus longitudinal motion to right ventricular (RV) global systolic function in patients underwent heart transplantation (HTX). However, the diastolic wall motions of the RV may be of high interest as well. Our aim was to quantify the longitudinal and radial components of diastolic RV wall motion in HTX patients compared to healthy volunteers. 47 heart transplant recipients (HTX, median of 258 days after HTX) were enrolled in the study, and 35 age- and gender matched healthy volunteers (CTL) served as the control group. Full volume datasets of the RV were acquired and 3D beutel models were created and exported volume-by-volume. Beyond conventional echocardiographic parameters, such as RV end-diastolic volume (EDV) we have determined the early (E) and late (A) diastolic filling volumes as well. Using our custom method, we were able to decompose the motion of the RV along the three orthogonal axes and quantify the relative contribution of radial and longitudinal motion to the two phases of diastolic filling (Elong, Erad, Arad, Along) and also the overall contribution of these components (DiARad and DiAlong). Compared to CTL, HTX patients have significantly higher EDV (HTX vs. CTL 96±28 vs. 79±26 mL, p < 0.01). In the CTL group, the early diastolic filling volume was significantly higher, while in HTX patients the late diastolic filling was more prominent (HTX group: 21.1±9 vs. 28±10 mL, p < 0.01). It has been suggested that reduction of early diastolic filling volume is associated with increased filling pressures, and this finding has been considered as a marker of diastolic dysfunction. However, the results of this study suggest that the late diastolic filling volume is significantly lower in the HTX group, both in early and late diastole. The late diastolic filling volumes were significantly lower in the HTX group, both in early and late diastole. The late diastolic filling volumes were significantly lower in the HTX group, both in early and late diastole. The late diastolic filling volumes were significantly lower in the HTX group, both in early and late diastole. The late diastolic filling volumes were significantly lower in the HTX group, both in early and late diastole.

The authors aimed to discover subclinical left ventricular (LV) dysfunction in diabetic patients, and estimate risk stratification of patients according to LV dysfunction and nocturnal blood pressure (BP) pattern. Methods: A total of 109 asymptomatic normotensive diabetic patients were divided into two groups according to ambulatory BP pattern: group of dippers (n=71) and group of non-dippers (n=38). Conventional and Tissue Doppler (TDI) echocardiographic parameters were assessed. Follow up period for all patients was three years for adverse cardiac events. Results: Value of GLS was significantly lower (-17.0±2.05 vs. -18.1±1.56, p = 0.059) and ratio of early diastolic velocities from mitral inflow and from annular TDI (E/Em) significantly higher (11.2±3.44 vs. 9.4±2.37; p = 0.001) in non-dipping group. Using the GLS cut-off value of -17% as index of LV systolic dysfunction GLS was performed in all patients. Comparisons between two study groups in clinical, laboratory and echocardiographic parameters were assessed. Follow up period for all patients was three years for adverse cardiac events. Conclusions: Subclinical LV systolic dysfunction in non-dipping group is significantly common than in dipping group. GLS is a powerful parameter in early detection of subclinical systolic dysfunction and stratification of patients at higher risk for the future cardiac events.
P1264
Longitudinal and circumferential myocardial strain in patients with STEMI with various types of left ventricular remodeling
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Aim: to explore the changes of global longitudinal and circumferential deformation of the heart at 6 months after STEMI by two-dimensional Strain in patients with various types of left ventricular (LV) remodeling.

Methods: The study included 53 subjects with STEMI (30,2 ± 9,7 years). Inclusion criteria were the absence of hemodynamically significant stenoses of the coronary arteries except the infarct-related, previous myocardial infarction and other cardiovascular diseases. Echocardiography was performed on the ultrasonic scanner MyLab 90 (Esaote, Italy) at 7 days and 6 months from the onset of the disease. Global longitudinal (GLS) and global circumferential strain (GCS) were determined using X-Strain ™ software. Among the traditional indicators the end-diastolic volumetric index (EDV index) was analyzed.

Results: According to the degree of LV dilatation at 6 months 2 groups of patients were allocated conditionally: group 1 (N=23; 43,4%) which was characterized by rapidly progressive remodeling with an increase of EDV index on 8% or more; Group 2 (N=30; 56,6%), without remodeling when EDV index increased less than 8% since STEMI. GLS initially in groups 1 and 2 had the value (–16,7 ± 8,4 and (–15,7 ± 4,7); GCS (–17,0 ± 6,9 and (–20,4 ± 6,3). After 6 months, these values corresponded to GLS (–15,6 ± 6,5 and (–17,8 ± 5,1%), GCS (–19,0 ± 5,3 and (–22,6 ± 5,7). And GLS dynamics in groups 1 and 2 was 12,6 and 11,8%, respectively, GCS - 9,6 and 8,9%.

Conclusion: In groups of patients with STEMI rapidly progressive LV remodeling and absence of remodeling the global longitudinal and circumferential deformation does not have significant differences, and after 6 months of follow-up their values have not changed significantly.

P1265
Determination of minimal allowable hemoglobin level in patients undergoing CABG surgery
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Background. The research proved that the reduction of gas transport function of the blood caused by low level of hemoglobin has a significant negative effect on myocardial function. But there is no clear minimal Hb level which would help to balance between myocardial contractility and blood gas transport functions.

Purpose: Determination of the minimal level of Hb for providing functional myocardial state in accordance to oxygen transport blood function.

Methods: The explorations have been conducted on 72 patients who underwent isolated CABG with the imposition of aorto-coronary grafts. The average age of the patients was 66,9 ± 1,81 years, average weight – 86,5 ± 1,44 kg. In our study we took into consideration Hb, cardiac index (CI), contractility index (CI), left ventricular stroke work index (LVSWI), oxygen delivery index (ODDI). In order to calculate the minimum permissible level of Hb we used the method of least squares and linear programming. Unknown quantities were identified in the following manner: Hb = z, CI = x1, CI = x2, LVSWI = x3, ODDI = x4. The least squares method we obtained the next variables' coefficients: a0=9,250213; a1=0,915040; a2=0,408034; a3=0,1035031; a4=-8,383198. 10,3. The obtained equation was as follows: z=9,250213+0,218565x1+0,408034x2+0,1035031x3+0,2,831839 10,3. The coefficient of determination was R2=0,900012; correlation coefficient R=0,848747. The closeness of the correlation coefficient to 1 showed that the mathematical model shows the relationship between the parameters. For calculating minimal Hb level we used simplex method with the following limitations: x1≥0; x2≥0; x3≥0; x4≥0 for solving the linear programming task. As a result, the following figure of zmin=89,7583 was obtained.

Conclusions: To sum up, in observed group of patients, minimal allowed level of Hb is 90±1 providing myocardial contractility function needed for maintaining normal systemic hemodynamics.

HYPERTENSION – LV HYPERTROPHY - RENAL DENERVATION

P1266
Orthostatic hypotension is associated with masked hypertension in the very elderly treated hypertensives
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Objective: Masked hypertension (MHT) and isolated nocturnal HT are associated with increased risk of target organ damage and cardiovascular events. We investigated prevalence and predictors of these two entities (NP) phenotypes in very elderly treated hypertensives. Methods. Office BP evaluation (simultaneous bilateral brachial BP measurement in supine position and then after 2 minutes of standing) and 24-h ambulatory BP monitoring (ABPM) were performed in 67 treated hypertensive subjects older than 80 years (age 84,1 ± 3,1 (M±SD) years, 25,5% male, mean office brachial systolic BP 134,8 ± 23,3 mm Hg) with a validated oscillometric cuff-based device. Patients with left ventricular ejection fraction < 40% and severe comorbidities were not included. Orthostatic hypotension (OH) was defined as a decrease in systolic BP of at least 20 mm Hg upon standing and orthostatic hypertensive (OH) for a corresponding increase.

Results: The prevalence of MHT was 47,7 ± 1% in the entire study population and 71,1% among patients with office-controlled hypertension (BP ≤165/100 mm Hg). 78,2% patients with MHT had isolated nocturnal HT. Orthostatic reaction was abnormal in 34,3% subjects; 22,4% had OH while incidence of OH was 19,9%. OH was significantly associated with MHT (odds ratio 1,7, 95% confidence interval 1,04-2,78).

Conclusion: OH is predictive for MHT in the very elderly treated hypertensives. Evaluation of orthostatic reaction in very elderly may help to detect a population that would benefit from ABPM.

P1267
Gene polymorphism ABCB1 polymorphic marker C3435T, antihypertensive efficacy and safety of amiodipine in hypertensive patients
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Purpose: To explore the relationship of polymorphism ABCB1 gene polymorphic marker C3435T, antihypertensive efficacy and safety of amiodipine in patients with arterial hypertension (AH)- I-II degree.

Methods: 100 patients with hypertension I-II art. (M - 36, w.- 64) between the ages of 47 to 73 years (av. age 58 ± 4 years) with various gene polymorphisms ABCB1 evaluated parameters efficacy and safety of amiodipine in a daily dose of 5 mg. Genotyping of polymorphic marker C3435T ABCB1 gene was performed by polymerase chain reaction, Antihypertensive efficacy is excellent at lowering blood pressure <140/90; good - with a decrease in blood pressure of 10 mm Hg, but without achieving the target values.; satisfactory - with a decrease in blood pressure of 10 mm Hg; unsatisfactory - in the absence of blood pressure dynamics. Safety was assessed by the incidence of adverse drug reactions (ADR) according to the survey. The duration of observation - 3 months. Statistical processing was performed on the basis of IntelPortum 4 processors using package “STATIST” statistical programs.

Results: Excellent and good antihypertensive efficacy in patients with genotype TT polymorphic marker C3435T ABCB1 was 76,1%; SS - 47,1%, CT - 67,0%. Significant group differences in the Mann Whitney SisVart statistics with p=0,06; CvsDVT with p=0,04; CTxVTT with p=0,05; ANOVA with p=0,04. According to the office BP measurement SBP decreased in patients with the CC genotype at 7,36 ± 9,2%,- CT on 9,07 ± 3,1%, the TC - on 8,40 ± 3,1%; DBP by 4,12 ± 2,5%; 5,46 ± 2,7% and 4,98 ± 2,4% respectively (p < 0,05 in all cases). ADR rate with genotype SS was 35,3%, CT - 24,3%, CT - 11,3%. On multivariate ANOVA analysis revealed significant differences in CC and TT genotypes in the degree of decreases in SBP (p = 0,02), antihypertensive...
P1268
Renal sympathetic denervation improves LV filling pressures in patients with resistant hypertension and LV diastolic dysfunction
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Background: Renal sympathetic denervation (RSD) is a procedure aimed at treating resistant arterial hypertension (RAH) by ablating and thus lowering sympathetic activation of renal artery wall nerves. Current clinical trials are evaluating the potential effect of RSD on other diseases associated with an overactive sympathetic drive. It is known that abnormally activated sympathetic tone can alter diastolic function of the heart and worsen prognosis of heart failure patients. The aforementioned activation particularly increases during exercise. We performed the present study to examine RSD effect on diastolic function of the left ventricle (LV) during stress.

Purpose: To investigate the RSD effect on LV filling pressures during stress in patients with RAH and LV diastolic dysfunction.

Methods: Prospective study enrolled 15 patients with RAH (age 56 ± 7 years, 8 males, using 5 ± 1.2 antihypertensive drugs, mean 24-hour ambulatory blood pressure (BP): systolic 161.9 ± 16.7, diastolic 99.2 ± 11.5 mmHg, who underwent bilateral RSD. All 15 patients had diastolic LV dysfunction (13 patients had impaired relaxation, 2 – pseudonormal diastolic function) and preserved systolic LV function, confirmed by echocardiography. LV filling pressures during stress were determined by performing exercise echocardiography at workload of 50 Watts and assessing indirect estimates of LV filling pressures: estimated pulmonary capillary wedge pressure (PCWP, mmHg) by Naghshineh equation (1.24 × [P/ELV] + 1.9) and the difference between the duration of pulmonary venous atrial reversal wave and the duration of the mean arterial pulse (P/ELV). Ventricular-arterial coupling (VAC) was assessed as Ea/Ees. Continuous variables were checked for normal distribution by Shapiro-Wilk statistic. Normally distributed variables were compared by paired Student’s t-test, while non-normally distributed variables were compared using the Wilcoxon signed rank test. A p value < 0.05 was considered statistically significant. Data was analysed using SPSS V22 statistical package.

Results: Mean ambulatory BP decreased significantly 6 months after RSD: systolic BP decreased to 151.5 ± 20.2 mmHg (p < 0.039), diastolic BP to 91.7 ± 8.9 mmHg (p = 0.009). Peak stress systolic, diastolic BP and heart rate were 201.2 ± 25.5 and 198.7 ± 24.9 mmHg, 100.5 ± 14.5 and 102.7 ± 14.3 mmHg, 103.3 ± 13.4 and 104.5 ± 10.4 bpm at baseline and after 6 months, respectively (p = 0.005 for comparison). Estimated PCWP reduced significantly at six months after the procedure (from 16.4 ± 10.7 to 12.1 ± 3.27 mmHg, p = 0.007), as well as AF-Abur-Adar (from 18.23 ± 25.78 to 8.62 ± 24.98 mmHg, p = 0.002).

Conclusions: In addition to lowering 24-hour ambulatory BP, our study revealed that renal sympathetic denervation reduces LV filling pressures during stress in patients with resistant arterial hypertension and LV diastolic dysfunction. This effect could be of benefit in halting the progression of heart failure in patients with resistant hypertension.

P1269
Fixed dose combination nebivolol/hydrochlorothiazide improve diastolic function in elderlyhypertensives with heart failure with preserved ejection fraction and high pulse pressure
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BACKGROUND: Heart failure with preserved ejection fraction (HFpEF) is common, increasing in prevalence, and unfortunately, no disease-specific therapy exists to improve prognosis. Hypertension is worldwide spread and represents the leading cause of death and HFpEF. High blood pressure is associated with left ventricular hypertrophy and diastolic dysfunction. Epidemiological evidence suggests increasing proportion of elderly people. Hypertension occurs in one half/two thirds of them. High pulse pressure is a marker of central arterial stiffness and a predictor for mortality. Old people are in high risk, have high pulse pressure and comorbidities. ESC/ESH guidelines suggest the use of fixed dose combination from the beginning in the therapy of hypertensives at high risk because fixed dose combination ensures a better and quicker therapeutic effect, better compliance, with diminished adverse effects and simplification of therapy.

PURPOSE: The aim of our study was to evaluate the efficacy of the fixed dose combination nebivolol/hydrochlorothiazide 5/12.5 mg (NH) on BP, pulse pressure, left ventricular hypertrophy and diastolic dysfunction in elderly hypertensives (over 65 years old) with HFpEF, and high pulse pressure.

Methods: We performed a prospective study, lasting 3 months, in which 56 never-treated elderly hypertensives, with high pulse pressure (≥ 60 mmHg), and HFpEF (EF ≥50%), medium age 72 ± 4.5 years, received once a day fixed combination NH. The assessment of echocardiographic parameters of left ventricle was performed at baseline and after 3 months of treatment. Office blood pressure and pulse pressure were monitored every month.

Results: Blood pressure was significantly reduced by treatment, both systolic (167.5 ± 22.5 vs 134 ± 11.5 mmHg, p < 0.01) and diastolic (91.5 vs 83 ± 12 mmHg, p < 0.03). Pulse pressure decreased from 67.5 ± 15 mmHg to 58 ± 19 mmHg (p < 0.03). LVMI decreased from 137.5 ± 17 to 113.5 ± 14.3 g/m² (p < 0.001), E/A ratio increased from 0.98 ± 0.05 to 1.18 ± 0.24 (p < 0.05), Treatment was well tolerated.

Conclusions: Treatment with fixed dose combination nebivolol/hydrochlorothiazide in elderly hypertensives with HFpEF and high pulse pressure ensured a good control of BP, and already after 3 months, a regression of cardiac hypertrophy with improvement in LV diastolic function.

P1270
Effects of antihypertensive treatment on ventricular-arterial coupling in hypertensive patients
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Objective: To evaluate left ventricular-arterial coupling in hypertensive patients after therapy with a beta-blocker and its fixed dose combination (FDC) with amlodipine.

Design and methods: 28 patients (age 53.9 ± 7.2 (M ± SD), 20 males, blood pressure (BP) 149 ± 13/97 ± 1.4 mmHg, heart rate (HR) 83 ± 10 bpm, abdominal obesity in 55%, dyslipidemia in 53%, smoking in 42%) with untreated uncomplicated hypertension underwent simultaneous echocardiography and BP measurement at baseline, after 4 weeks of bisoprolol 5-10 mg monotherapy and after 8 weeks after switching to bisoprolol 5-10/amlodipine 5-10 mg FDC. Doses were titrated to reach BP <140/90 mmHg. Arterial stiffness (Ea) and LV diastolic stiffness (Ees) at rest were calculated as end-systolic pressure (ESP)/stroke volume and ESP/ind-systolic volume. Ventricular-arterial coupling (VAC) was assessed as Ea/Ees. VAC optimal range is considered as 0.5-1.2. Mechanical FRACTION of aortic valve (Ea) and peripheral arterial resistance (PAR) were evaluated. p < 0.05 was considered significant.

Results: After monotherapy with bisoprolol BP decreased to 146.5 ± 19.65 ± 11 mmHg (p<0.05 vs baseline), HR decreased to 68 ± 9 bpm (p<0.05 vs baseline), after FDC – to 132 ± 11/76 ± 11 mmHg and 65 ± 7 bpm, respectively (p<0.05 vs baseline). Bisoprolol decreased Ees from 4.45 ± 1.9 to 3.37 ± 0.98 mmHg/ml/m² (p<0.05) whereas Ea (1.88 ± 0.39 vs 1.92 ± 0.38 mmHg/ml/m²), PAR (137.1 ± 35.3 vs 128.9 ± 35 dyn s·cm−5) did not change significantly. Ea/Ees increased significantly from 0.47 ± 0.16 to 0.55 ± 0.14 (p<0.05). Switching to bisoprolol/amldipine FDC resulted in decrease of Ea to 1.48 ± 0.17 mmHg/ml/m², PAR – to 106.6 ± 28 dyn s·cm−5. Ea did not change from that on bisoprolol. Ea/Ees remained at baseline levels (0.45 ± 0.1), ELV did not change significantly throughout a study.

Conclusions: In untreated patients with uncomplicated arterial hypertension monotherapy with bisoprolol reduces initially increased Ees without negative effect on Ea and PAR. Switching to bisoprolol/amldipine FDC results in additional Ea reduction. Thus the study confirms potential benefits of bisoprolol/amldipine combination in arterial hypertension in terms of cardiovascular.
Purpose: A relation between percentage of heart failure (HF) and EF is extended to obtain other new relations between percentage of HF and indexes derived from the parameters of the non-linear ESPVR.

Methods: The approach used is based on the theory of large elastic deformation of the myocardium, the active pressure $P_{\text{isom}}$ generated by the myocardium is included in the formula describing the ESPVR. Ratios of pressures can be calculated in a non-invasive way, which allows non-invasive clinical applications.

Results: Application to clinical data is shown in the Figure. From a relation between EF and the percentage occurrence of HF (Figure center), the relation between percentage of HF and $P_{\text{isom}} - P_{m}$/$P_{m}$ was derived (Figure right); data are for cases of aortic stenosis ($\circ$) and normal group ($\ast$). Notice the minimum of the curve of percentage of HF around the normal group for $EF > 0.67$ and ($P_{\text{isom}} - P_{m}$/$P_{m} < 1.3$, while the cases of aortic stenosis appear more scattered into three subgroups in and around the normal group. Calculations indicate optimal value of $SW/\text{SWx} = 0.8$ ($\text{SW} =$ stroke work, $\text{SWx} =$ maximum stroke work), and optimal value of $\text{tang}/\text{eam} < 4$ ($\text{tang} =$ slope of the tangential to the ESPVR, $\text{eam} =$ max. arterial elastance). $SW_{\text{R}}/SW_{\text{x}}$ measures the stroke work reserve and $SW/\text{TW}$ is the total area under the ESPVR curve, the quantities $\text{SWR}/\text{SW} = 0.25$ and $\text{SW/\text{TW}} =$ 0.5 were also calculated; estimated optimal values of some indexes (minimum of the percentage of HF curve) are summarized in the Table. These indexes can be used for classification of clinical groups into normal, mildly depressed and severely depressed state of the ventricle.

Conclusion: The EF is commonly used to assess the performance of the heart ventricles. Many indexes derived from the ESPVR can also be calculated in a non-invasive way and can be used for the same purpose. Biivariate (or multivariate) analysis of indexes is a better approach for studying HFpEF. The curve of the percentage of HF can easily be implemented for classification of clinical groups in a non-invasive way.

<table>
<thead>
<tr>
<th>Estimated optimal value of some indexes</th>
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<tr>
<td>EF ($P_{\text{isom}} - P_{m}$/$P_{m}$)</td>
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<td>$EF &gt; 0.67$</td>
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Symbols are defined in text.

EF, % of HF and ($P_{\text{isom}} - P_{m}$/$P_{m}$) relations

P1273

The association of cardiac autonomic neuropathy and left ventricular diastolic dysfunction: from Korean women's chest pain registry (KoROSE)

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On behalf of: KoRan wOmen’S chest pain rEgistry

Background: The clinical implications of cardiac autonomic neuropathy (CAN) had been repeatedly studied in patients of heart failure with reduced ejection fraction and diabetes mellitus. But the association between diastolic dysfunction (DD) and CAN has not been well investigated. The aim of this study is to evaluate the relation of CAN with DD in patients who presented with exertional dyspnea and chest tightness but had no significant coronary stenosis.

Methods: 347 patients (F:M=268:81, 58.5 ± 10.5yrs) who had ≥50% of left ventricular ejection fraction and no significant coronary stenosis were included from KoRan wOmen’S chest pain rEgistry. Treadmill exercise test (TET) and transthoracic echocardiography were performed in all patients. The diastolic function was classified as normal, indeterminate and DD by 2016 ASE/EACVI guideline. Autonomic dysfunction was assessed by heart rate recovery (HRR1min; maximal heart rate - heart rate at 1minute after exercise) and blood pressure response (BPR3min; systolic blood pressure (SBP) at 3 minutes after exercise / maximal SBP)

Results: Among 347 patients, DD was present in 21 patients (6%) and 52 patients (14.9%) were indeterminate group. The presences of diabetes and hypertension were more common in patients with DD (diabetes: 26.6% vs 7.7 % in indeterminate vs 8.8%, in normal, P=0.03, and hypertension: 57.1% vs 55.8% in indeterminate vs 36.5%, in normal, P=0.004 respectively). HR1min was progressively disminished from normal, indeterminate and to DD group. BPR3min also progressively decreased from DD to normal group. During TET, exercise duration was lower in DD group than that of indeterminate and normals (6.54 ± 2.3 vs indeterminate: 8.23 ± 2.0 vs normal: 8.88 ± 2.3 minutes, P<0.001). There was significant relation between HR1min and exercise duration ($R=0.283$, $P<0.001$), but BPR3min was not ($R=0.46$, $P=0.428$). HR1min was independently related with DD after adjusting age, sex, hypertension, diabetes, body mass index by multivariate analysis ($R=0.93$, 95% CI=0.88-0.99, P<0.02).

Conclusion: The patients with DD had impaired cardiac autonomic function. This association is irrelevant to age, diabetes, hypertension and was related with decreased exercise tolerance. It could be concluded that CAN may be one of contributors for developing and worsening symptoms of heart failure with preserved ejection fraction.
patients were divided into three groups according to their body mass index (BMI): normal-weight patients (BMI < 25 kg/m²; n=28, 11.1%), overweight patients (BMI 25-29.9 kg/m²; n=119, 45.7%), and obese patients (BMI ≥ 30 kg/m²; n=113, 44.8%.

Results: Obese patients were significantly younger (p < 0.001), but despite higher percentage of hypertension, dyslipidemia and/or diabetes there was lack of any significant difference in comparison to the overweight and those with normal BMI. We couldn't find more pronounced diastolic dysfunction in overweight/obese groups compared to the normal BMI group. However, patients who were obese showed significantly reduced global LV longitudinal strain (GLS) in comparison to those either overweight or with normal weight (−16.1 ± 4.3% vs.−17.9 ± 3.9% vs.−18.3 ± 2.8%; p < 0.0001, respectively) as well as there was significant correlation between GLS and BMI (r=0.230, p = 0.0001). Multivariate regression analysis adjusted for age, hypertension and diabetes presence, showed a direct and independent effect of BMI on GLS (β = 0.210; CI 95%: 0.135-0.412; p < 0.0001).

Conclusion: Obesity is independently related to more pronounced subclinical LV systolic dysfunction expressed as reduced GLS in patients with HFpEF; thus may imply increased risk and/or worse prognosis.

P1274

Quantitative assessment of myocardial stiffness using transthoracic shear wave imaging in healthy and hypertrophic cardiomyopathy adults

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Objectives: Myocardial stiffness is an important prognostic and diagnostic parameter in heart failure. Up to now, there is no non-invasive tool for quantitative evaluation of this parameter. We introduced recently a new ultrasound based technique called Shear wave imaging (SWI) to quantitatively assess the intrinsic tissue stiffness. The goal of our study was to investigate the potential of Myocardial SWI to quantify non-invasively the diastolic myocardial stiffness (MS, kPa) in healthy adult volunteers (HV) and in hypertrophic cardiomyopathy populations with heart failure with preserved ejection fraction (HCM-HFpEF).

Methods: We included prospectively 80 adults: 60 HV (divided into three groups: 20-40, 40-60, and 60-80 yo group respectively, the mean MS was 2.59 ± 0.18 kPa, 4.70 ± 0.88 kPa, 6.08 ± 1.06 kPa (p < 0.01 between each group). MS strongly correlated with age (r=0.88). For the HCM-HFpEF group (mean MS=12.68 kPa), the MS was significantly higher than in the healthy volunteers (HV) and in hypertrophic cardiomyopathy populations with heart failure with preserved ejection fraction (HCM-HFpEF).

Results: From 20-40, 40-60, and 60-80 yo group respectively, the mean MS was 2.59 ± 0.18 kPa, 4.70 ± 0.88 kPa, 6.08 ± 1.06 kPa (p < 0.01 between each group). MS strongly correlated with age (r=0.88). For the HCM-HFpEF group (mean MS=12.68 kPa), the MS was significantly higher than in the healthy volunteers (HV) and in hypertrophic cardiomyopathy populations with heart failure with preserved ejection fraction (HCM-HFpEF).

Conclusion: MS=12.68 kPa strongly correlated with age (r=0.88). For the HCM-HFpEF group (mean MS=12.68 kPa), the MS was significantly higher than in the healthy volunteers (HV) and in hypertrophic cardiomyopathy populations with heart failure with preserved ejection fraction (HCM-HFpEF). For 20-40, 40-60, and 60-80 yo group respectively, the mean MS was 2.91 ± 2.8% μ, 6.08 ± 2.8% μ, 6.15 ± 2% μ (p < 0.001 between each group). MS strongly correlated with age (r=0.88). For the HCM-HFpEF group (mean MS=12.68 kPa), the MS was significantly higher than in the healthy volunteers (HV) and in hypertrophic cardiomyopathy populations with heart failure with preserved ejection fraction (HCM-HFpEF).

P1275

Impact of changes in consensus diagnostic recommendations on the echocardiographic prevalence of diastolic dysfunction

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AIMS: Evaluation and scoring system for preclinical and symptomatic diastolic dysfunction are still under debate due to the lack of evidence-based grading systems. 2016 ASE/EACVI guidelines considerably changed the diastolic grading system. However, the impact of these changes on the prevalence and severity of diastolic dysfunction in healthy patients has not been studied.

Methods and Results: Patients from the community-based prospective STANISLAS Cohort France underwent 2-dimensional transthoracic echocardiography with comprehensive diastolic function evaluation. Patients without a history of heart failure and with LVEF >50% were classified according to the presence and degree of diastolic dysfunction following the 2016ASE/EACVI guidelines scoring system and compared with previously published diastolic dysfunction evaluation systems. Of the 1485 study participants (47 ± 14 years, 20 (1.3%) had diastolic dysfunction according to 2016 criteria, and the proportion of diastolic dysfunction significantly increased with higher age. The prevalence of diastolic dysfunction using previous guidelines were respectively 6%, 5.7% and 5.9% according to Appleton definition, 2007 consensus statement and 2009ASE/EACVI guidelines (when only considering 2 and 3rd grade of diastolic dysfunction). When considering the subset of patients aged <60, the proportion of diastolic dysfunction was 3.1% using the 2016 criteria vs 9.1%, 10.2% and 12.9% according to Appleton definition, 2007 consensus statement and 2009ASE/EACVI guidelines.

Conclusion: The choice of published algorithms used for diastolic dysfunction identification has a wide impact on the proportion classified as having diastolic dysfunction. Outcome based studies might help identify a consistent, evidence-based and clinically useful definition of diastolic dysfunction in the future.
Patients with significant coronary artery disease were excluded. 105 patients (89%) suffered from AF, 85 (66%) had persistent and 20 (13%) had paroxysmal AF. Patients with persistent AF were in worse New York Heart Association functional class (p = 0.006), and more often suffered from chronic obstructive pulmonary disease (p = 0.018) than patients with paroxysmal AF or sinus rhythm. They had higher levels of N-terminal pro-brain natriuretic peptide (NTproBNP) (p < 0.001), and worse renal function (p = 0.041). Invasive hemodynamics showed higher right atrial pressures (p = 0.014) and pulmonary capillary wedge pressures (p = 0.050). Echocardiography revealed more pronounced atrial dilation (p < 0.001) as well as a more dilated right ventricle (p = 0.001) and higher systolic pulmonary artery pressures (p = 0.037). By CMR left and right atria as well as the right ventricle were more dilated (p = 0.001, 0.002, and 0.001, respectively) and left and right ventricular ejection fractions were lower in patients with persistent AF (p = 0.002, < 0.001 and 0.055 respectively). Furthermore, these patients had higher levels of ECV by T1 mapping (p = 0.018). After a median follow-up of 46 months (13-71) 63 patients (41%) reached the combined endpoint defined as hospitalization for HF and/or cardiovascular death. By multivariate Cox regression analysis only persistent AF (p = 0.039, HR 2.013, 95% CI 1.035-3.915) and six-minute walk distance (p = 0.013, HR 0.997, 95% CI 0.994-0.999) were independently associated with outcome.

Conclusion: More than 50% of HFpEF patients suffer from persistent AF. Persistent but not paroxysmal AF is significantly related with markers of disease severity, extracellular volume accumulation, and worse cardiovascular outcome.

P1278

Prognostic significance of diffuse myocardial fibrosis evaluated by cMR in patients with heart failure with preserved ejection fraction.

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Background: Myocardial fibrosis is known as one of the potential pathophysiologic mechanisms in heart failure with preserved ejection fraction (HFpEF). The aim of this study was to evaluate the prognostic significance of diffuse fibrosis estimated by extra cellular volume (ECV) in HFpEF patients.

Methods: Between January 2015 and October 2016, we prospectively enrolled 118 consecutive patients with HFpEF (78±8 years, 63% women) defined by ESC guidelines. Diffuse myocardial fibrosis was estimated by ECV quantified by 3 Tesla cMR with the Modified Look-Locker Inversion Recovery sequence. High level of diffuse fibrosis was determined by an ECV age- and sex-adjusted cutoff value (cutoff=33%) corresponding to mean + 2 standard deviations in 26 age- and sex-matched volunteers (76±5 years, 65% women) without previous cardiac history. Patients were followed up for overall survival and a composite outcome of all-cause mortality and first HF hospitalization.

Results: Mean ECV value in HFpEF patients was 32.9±4.8%. During a mean follow-up of 11.1±6 months, we observed 43 events (11 all-cause deaths and 32 first HF hospitalizations). Cox analysis identified hemoglobin level (HR=0.62 [0.44-0.89], p=0.009), ECV ≥33% (HR= 14.18 [1.78-112.7], p = 0.015) and BMI (HR= 0.86 [0.79-0.97], p = 0.015) as significant predictors of all-cause mortality. Thirty eight patients (32%) reached the combined end point. Presence of diabetes (HR= 1.38 [1.04-3.76], p = 0.038) and hemoglobin (HR= 0.81 [0.67-0.98], p = 0.028) were significantly associated with the composite outcome even after adjusting for important clinical and imaging covariables. The ability of ECV≥33% to improve this model was then tested and added significant prognostic information (z= 4.457, p = 0.035). Kaplan Meier event free survival curves showed that HFpEF patients with ECV≥33% have poorer 1-year prognosis than those with ECV<33% (56±8% vs 82±5%, p = 0.001, Figure).

Conclusion: Among HFpEF patients, high level of fibrosis defined by ECV ≥33% was associated with all cause mortality and poor prognosis with higher rate of all cause death and first HF hospitalization, suggesting that the evaluation of diffuse myocardial fibrosis could be useful for the risk stratification. Besides, hemoglobin level was a strong predictor of short term composite outcome, as often demonstrated in HFpEF.

P1279

Sex specific differences in quality of life and diastolic function in HFpEF

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Funding Acknowledgements: Société Française de Cardiologie, Medtronic Balken Research Center, Swedish Research Council, Swedish Heart and Lung Foundation

INTRODUCTION: Heart failure with preserved ejection fraction (HFpEF) is relatively more common in women. However, sex differences within HFpEF remain poorly characterized.

PURPOSE and Methods: In the Karolinska-Rennes (KaRRen) Study of HFpEF, we performed a comprehensive assessment of gender differences in clinical, biomarker, echocardiography, quality of life, therapy and prognostic data.

Results: Among 425 patients, 241 were women (57%). Women were older, median (IQR), 79 (73-84) vs. 77 (68-83) years, p = 0.011, had higher heart rate, 70 (65-75) vs. 65 (60-70), p = 0.027, and lower diastolic blood pressure (mmHg), 73 (60-80) vs. 75 (67-85), p = 0.011. NT-proBNP (ng/L) levels were similar, 1409 (509-2443) vs. 1376 (517-2862), p = 0.438. Prevalence of atrial fibrillation/flutter (AF) (62 vs. 64%), hypertension (80 vs. 79%), diabetes type 2 (DM2) (72 vs. 31%), history of myocardial infarction (12 vs. 18%) and stroke (10 vs. 12%), were similar; while coronary artery disease (CAD) was less common in women, 28% vs. 36% (p = 0.028). Despite similar New York Heart Association class, women rated lower quality of life (QoL) than men in ED-Q5, 50 (45-70) vs. 60 (50-75), p = 0.011. Female gender predicted ED-Q5 below 50 independent of age and NTproBNP, OR 1.90, 95% CI 1.08-3.35, p = 0.026. There was no difference in use of heart failure medication or diuretics. Ejection fraction was higher in women; median (IQR), 64 (57-68) compared to men, 62 (57-66), p = 0.020. Female gender was associated with diastolic dysfunction measured as E′/e′, OR 1.11 (95% CI 1.06-1.17), p = 0.001 but not LAVI, nor E/e′ ratio. Over a median follow-up of 893 (515-1208) days, there was no difference in survival free from HF hospitalization (Figure 1) in univariate (HR 0.91, 95% CI 0.651-1.072, p = 0.140) or multivariable (HR 0.79, 95% CI 0.57-1.10, p = 0.159) analyses, adjusted for age, NTproBNP, eGFR, AF, DM2 and CAD.

Conclusion: In this un-selective HFpEF cohort, men and women were similar in most regards, including prognosis, with the notable distinction of worse quality of life and more pronounced diastolic dysfunction in women.
Background: Approximately half of all heart failure (HF) patients present with a near normal ejection fraction (HFpEF). It is known that more women than men suffer from HFpEF, but studies investigating further gender differences in this disease are scarce.

Methods: Between December 2010 and November 2016, 260 consecutive patients diagnosed with heart failure; 2) the last echocardiography at the end of patients’ life-time indicated that LVEF≥50%. All P values <0.05 were accepted as statistically significant.

Results: Among 154 elderly patients with HFpEF aged from 60 to 99 years old, there were 142 male (92.2%) and 12 female (7.8%) with mean age of 85.7 ± 7.4 years old. According to pathological criteria, the incidence of CHD among HFpEF cases was 68.2% (105/154), incidence of AMI was 12.3% (19/154), incidence of OMI was 50.6% (78/154), incidence of chronic myocardial ischemia was 18.2% (28/154) (Figure 1). Grade III and more severe stenosis of left anterior descending branch were very common, reaching 51.9% (Figure 1). Clinical diagnosis of CHD was 81.8% (126/154) among HFpEF patients, missed diagnosis rate of CHD was 9.5% and misdiagnosis rate was 63.3%. Missed diagnosis rates of AMI and OMI were 57.2% and 57.7% respectively, misdiagnosis rates were 10.4% and 23.7% respectively (Table1).

Conclusions: The incidence of CHD was high in the elderly patients with HFpEF and severe stenosis of anterior descending branch was common. Missed diagnosis rate of CHD in HFpEF was high and missed diagnosis rates of AMI and OMI were high. Further coronary artery evaluation should be emphasized in elderly patients with HFpEF.

Differences between clinical and autopsy diagnosis in elderly patients with HFpEF

<table>
<thead>
<tr>
<th>CHD</th>
<th>Both clinical diagnosed and pathological diagnosed</th>
<th>Clinical diagnosis (%)</th>
<th>Pathological diagnosis (%)</th>
<th>Misdiagnosis (%)</th>
<th>Either diagnosed neither by autopsy nor clinical diagnosis (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD</td>
<td>95</td>
<td>109.5%</td>
<td>3163.3%</td>
<td>18</td>
<td>121</td>
</tr>
<tr>
<td>AMI</td>
<td>8</td>
<td>1157.9%</td>
<td>1410.4%</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>OMI</td>
<td>33</td>
<td>4557.7%</td>
<td>1823.7%</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>
Sex differences in long-term health status in heart failure with preserved ejection fraction

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Background: Little is known about sex differences in health status over time in heart failure with preserved ejection fraction (HFpEF).

Purpose: 1. Describe longitudinal sex-specific patterns of global- and heart failure-specific health status. 2. Identify factors associated with reduced health status in women with HFpEF.

Methods: Data source: TOPCAT trial. Health status was measured at 0 and 12 months. Health status measures were Kansas City Cardiomyopathy Questionnaire (heart failure-specific; KCCQ) and visual analog scale (global; VAS). Analysis was restricted to Americas due to very low event rates in Russia/Georgia.

Results: Heart failure was diagnosed in 28 out of 60 patients (46.7%). 18 patients (64.3%) were in NYHA class III, while 10 (35.7%) were in NYHA class II. Left ventricular ejection fraction was preserved in 19 out of 28 patients with heart failure (67.9%). Presence of heart failure was correlated with age ($r = 0.373, p < 0.001$), diabetes mellitus, mean age $68 \pm 9$ years, hospitalized for hypertension related problems. We recorded demographic data, clinical characteristics, rest ECG and transthoracic echocardiography with Tissue Doppler imaging at the level of the lateral and septal mitral annulus. Blood tests have been performed as clinically indicated.

Results:

Health Status Box Plot

Patient characteristics

<table>
<thead>
<tr>
<th>N=1767</th>
<th>Women</th>
<th>Men</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>72.1±9.9</td>
<td>71.0±9.5</td>
<td>0.0209</td>
</tr>
<tr>
<td>Atrial fibrillation (afib)</td>
<td>348 (39.5%)</td>
<td>395 (44.7%)</td>
<td>0.027</td>
</tr>
<tr>
<td>Coronary artery disease (CAD)</td>
<td>336 (38.1%)</td>
<td>479 (54.3%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hypertension (HTN)</td>
<td>807 (91.5%)</td>
<td>781 (88.5%)</td>
<td>0.039</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>87 (9.9%)</td>
<td>120 (13.6%)</td>
<td>0.018</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>596 (67.5%)</td>
<td>654 (74.1%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Diabetes</td>
<td>354 (40.1%)</td>
<td>434 (49.2%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>243 (27.6%)</td>
<td>90 (10.2%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Bone fracture</td>
<td>160 (18.2%)</td>
<td>106 (12.0%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Estimated glomerular filtration rate (eGFR)</td>
<td>63.0±22.3</td>
<td>66.0±20.5</td>
<td>0.0032</td>
</tr>
<tr>
<td>Body Mass Index (BMI)</td>
<td>34.4±5.5</td>
<td>38.8±7.4</td>
<td>0.0030</td>
</tr>
<tr>
<td>Comorbidity count</td>
<td>5.5±1.9</td>
<td>5.4±1.8</td>
<td>0.4816</td>
</tr>
<tr>
<td>PHQ score (N=1427)</td>
<td>8.4±6.6</td>
<td>7.4±6.3</td>
<td>0.0019</td>
</tr>
</tbody>
</table>

1 sum of the following comorbidities: afib, CAD, stroke, COPD, asthma, hypertension, PAD, dyslipidemia, diabetes, thyroid disease, fracture, obesity (BMI ≥30) depression (PHQ-9 ≥9), CKD (GFR ≤60)
Conclusions: Development of heart failure is frequent in patients with arterial hypertension and type 2 diabetes mellitus. Left ventricular ejection fraction is preserved in 3 independent predictors: left atrial diameter, plasma HDL-cholesterol level and mean platelet volume.

P1294
Hypertensive left ventricular hypertrophy is a risk factor for the development of a HFPEF but not a depressed left ventricular ejection fraction within eight years

Background. Hypertensive heart disease is a major cause of the development of heart failure with preserved ejection fraction (HFPEF). However, rate and determinants of the transition from asymptomatic left ventricular hypertrophy (LVH) to HFPEF and whether LVH is a common precursor to depressed LVEF is poorly understood.

Purpose: to determine rate and predictors of the transition from asymptomatic hypertensive LHV to HFPEF and whether LVH is a risk factor for the development of a reduced LVEF.

METHODS AND RESULTS. From 2002 through 2010, 350 patients at our Out-Patient Department underwent echocardiography and had asymptomatic hypertensive heart disease. LVH is defined as normal LVEF and LVMI >150g/m². Of these, 229 had a follow-up clinical and echocardiographic assessment by March 2016. The primary outcomes were the development of HFPEF or depressed LVEF. After a median follow-up of 8.1 years, the most of patients with asymptomatic concentric LVH (161, or 72%) developed HFPEF. Transition from asymptomatic LVH to HFPEF was associated with deterioration of LV diastolic dysfunction (DD): increase of DD grade occurred in 51% patients, and an increase of DD grade provided 100% sensitivity for predicting HFPEF. Multivariable analysis identified three independent predictors of the development of HFPEF namely: an old age, an increase of LV mass index >10% during follow-up, and an absence of taking of statins (P < 0.05 for all). Yet, 34 (15%) patients developed low LVEF, but only in 16 of them (7% of whole group) it occurred without interval myocardial infarction (MI). All these 16 patients had only mild systolic dysfunction (LVEF >40%) and all but one patient had concentric LVH. Independent predictors of the development of low LVEF by this 'internal' mechanism were chronic atrial fibrillation and high mass body index (P < 0.05 for both).

Conclusions: In hypertensive heart disease, the transition from asymptomatic LVH to HFPEF was frequent (72%) after long-term follow-up, and was related to deterioration of LVDD and an absence of taking of statins. The transition from a normal LVEF to a low LVEF, however, was infrequent (7%) in the absence of interval MI and did not result in a change in the LV geometry from a concentric to an eccentric phenotype.

P1295
Exercise hemodynamics and 6 minute walk distance in patients with HFpEF: importance of workload corrected pulmonary capillary wedge pressure

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BACKGROUND: Patients with heart failure (HF) and preserved ejection fraction (HFpEF) are characterized by an abnormal hemodynamic response to exercise and varying degrees of functional impairment. The 6-minute walk test (6MWT) serves as a standardized test for functional capacity quantification in HF patients, and is associated with cardiovascular outcomes. However, the association between 6MWT and hemodynamic parameters at rest and during exercise in HFpEF patients is unknown.

Objectives: Identify invasive hemodynamic variables at rest, light to moderate exercise, and peak exercise associated with 6MWT in patients with HFpEF.

Methods: We studied 64 patients enrolled in the REDUCE LAP-HF trial who completed a 6-minute walk test (6MWT) at baseline and cardiac catheterization with measurement of hemodynamic variables at baseline, light to moderate exercise (20 W), and at peak supine exercise. Univariate linear regression models were used to assess the associations between 6MWT and measured or derived hemodynamic variables at baseline, light to moderate exercise (20 W), and at peak supine exercise. Variables were added to multivariable models with stepwise forward selection (p < 0.1).

Results: The average 6MWT distance was 318 ± 106 meters. At rest, only pulmonary capillary wedge pressure (PCWP) was associated with 6MWT in a multivariable model (p = 0.033). During peak exercise, central venous pressure (CVP), cardiac index (CI), and PCWP/CI correlated with 6MWT, however the workload corrected PCWP (wPCWP) was the only variable independently associated with 6MWT (Figure; r = -0.42, p < 0.001, multivariable, p = 0.002). Changes in CI and wPCWP from baseline to peak exercise were associated with 6MWT after multivariable adjustment (p = 0.0027 and p = 0.052, respectively).

Conclusion: Workload corrected PCWP correlated best with 6MWT performance. While non-cardiac factors clearly play a role in determining 6MWT distance, this study suggests that workload corrected PCWP could be an important target for intervention when aiming at improving functional capacity in HFpEF.

P1296
Gender differences in left ventricular remodeling features in patients with stent restenosis following primary percutaneous coronary intervention

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We aimed to compare Left Ventricle (LV) remodeling and function between genders in patients with in-stent re-stenosis who underwent primary percutaneous intervention (PCI) due to acute coronary syndromes (ACS).

Methods: Patients who developed in stent re-stenosis during 12 months after PCI due to acute coronary syndromes were studied. Study subject (total number 70) were included in groups according gender (52 males and 18 females). Gender differences in rate of LV hypertrophy (LVH), systolic and diastolic dysfunction and Heart Failure (HF) were analyzed. Gender differences in rate of LV hypertrophy (LVH), systolic and diastolic dysfunction and Heart Failure (HF) were analyzed. Gender differences in rate of LV hypertrophy (LVH), systolic and diastolic dysfunction and Heart Failure (HF) were analyzed.

Results: we aimed to compare Left Ventricle (LV) remodeling and function between genders in patients with in-stent re-stenosis who underwent primary percutaneous intervention (PCI) due to acute coronary syndromes (ACS).
P1287

Hepatitis-c virus infection is a risk factor for coronary artery disease in egypt
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Objectives: We aimed to assess the time table of patient care who presented with acute first attack of STEMI. We are getting more to the ideal door to needle time of 30 minutes, as we still have thrombolytic therapy as the first choice after exclusion of diabetes, hyper-tension, chronic renal diseases, clinical liver cirrhosis and history of ischemic heart disease. There was male predominance in group 1 with statistical significance. In this study 99% of patients with HCV seropositive had abnormal coronary angiography while 66.9% of HCV seronegative had abnormal coronary angiography and this difference showed statistical significance (P < 0.001). The number of the affected vessels was higher in HCV seropositive than seronegative groups (1 vessel disease (49% versus 56.3%), 2 vessel disease 25% versus 6.3% and multivessel 25% versus 3.1% in HCV seropositive and seronegative respectively) with P < 0.001. LM was present in 5 patients in group I and no patient in group II. In this study univariate logistic regression analysis the predictors of coronary artery disease were sex (P = 0.002), smoking (P = 0.037) and HCV seropositivity (P = 0.041). Also in multivariate logistic regression analysis the predictors of coronary artery disease were smoking (P = 0.011) then HCV seropositivity (P = 0.032) and lastly age (P = 0.40).

Conclusion: Hepatitis C virus is a risk factor for coronary artery disease and associated with increased angiographic burden of coronary artery disease in patients with HCV seropositivity.

P1288

34 minutes is the mean door to needle time in Egyptian patients with first attack of STEMI who showed myocardial recovery after receiving thrombolytic therapy
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Objectives: We aimed to assess the time table of patient care who presented with acute first attack of STEMI.

Patients and methods: The study included 42 patients with first attack of STEMI admitted to our CCU unit who showed symptoms and signs of successful reperfusion after pharmacological thrombolytic therapy, the patients were classified into two groups: group I included 28 patients who associated with improvement of RWMA score. Group II included 14 patients without improvement of RWMA score. All patients were subjected to the following: informed consent, personal, demographic data collection, time table from ER entrance till beginning of thrombolytic therapy, reperfusion therapy by streptokinase I.V, baseline conventional transthoracic echocardiography evaluation, 2D speckle tracking echocardiographic study within 72 hours after the successful reperfusion, medical follow-up for 3 months and follow-up conventional transthoracic echocardiography for RWMA score assessment.

Results: The baseline clinical characteristics were matched in both groups. Group I who showed myocardial recovery had mean door to needle time of 34.28 ± 7.9 minutes while group II who showed no myocardial recovery had a mean door to needle time of 51.42 ± 17.3 minutes.

Conclusion: The shorter the door to needle time the more was the recovery of myocardial function in patients with first attack of STEMI. We are getting more to the ideal door to needle time of 30 minutes, as we still have thrombolytic therapy as the wide used option in Egypt.
Incidence, timing, predictors and impact of acute heart failure complicating an acute coronary syndrome

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Introduction: Acute heart failure (AHF) is a common complication of an acute coronary syndrome (ACS), resulting in higher costs of treatment and poor prognosis. This study pretends to evaluate the incidence, timing, predictors and impact of AHF in a population with ACS.

Methods: Retrospective, descriptive and correlational study with all patients admitted with an ACS in a Cardiology department between the 1st of October 2010 and 31st of August 2015. Patients with AHF (Killip Class > 1) were compared to patients without AHF, and between patients with AHF at presentation and those who developed in-hospital AHF. The 1-year follow-up was made through phone call by a Cardiologist. We performed a univariate and multivariate statistical analysis of the study pretends to evaluate the incidence, timing, predictors and impact of AHF in a population with an ACS.

Methods: AND RESULTS: 346 patients were enrolled in the study and initially randomized into 3 groups. Group 1 included 100 patients in whom complete myocardial revascularization was performed during initial PCI. Group 2 consisted of 124 patients, in whom complete myocardial revascularization was performed during initial hospitalization and group 3 included 122 patients in which complete revascularization was performed at different periods after the initial hospitalization. Criteria: patients with ACS without ST-segment elevation with multi-vessel coronary artery lesion (SYNTAX score>23-33); high and medium risk on GRACE scale; no history of myocardial revascularization. Long-term results were assessed in 192 patients. After 12 months in patients of group 3 it had significantly more often cardiovascular complications compared to patients of group 2 (p<0.05). It was revealed that the implementation of complete myocardial revascularization later than 30 days from a day of diagnosed acute coronary syndrome, adversely affects the prognosis of the disease.

Conclusion: AHF commonly complicates ACS and is independently predicted by older age, female sex, diabetes, STEMI, atrial fibrillation and lower LVEF. In this study, AHF, regardless of its timing, was an independent predictor of in-hospital death and 1-year mortality or hospitalization.
were accompanied by molecular modifications involved in mitochondria induced apoptosis (Cyt C, mitochondrial p53 and mitochondrial mass (SDO). In particular, Cyt C release was dramatically increased into cytosolic fraction at 3 h post IR and reduced at 24 h. Similarly, p62 was increased in response to stress at 3 h with a partial reduction at 24 h. Inversely, SOD level was reduced at 3h but normalized at 24h as compared to basal, indicating recovering of mitochondrial mass. Mitochondria damage was also evaluated by expression of the different complexes (I to IV) composing the mitochondria respiratory chain through RT-PCR. At 3 h post-IR complexes expression and ATPase were recovered. A recently described modulator of mitochondrial survival, GRK2, was investigated in a related in vitro model. In H9C2, over-expression of GRK2, induced a rightward shift in time for mitochondrial alterations and ROS production, which occurred after 8 hours after IR. Opposite, GRK2 silencing lead to anticipated mitochondrial impairment and no recovery occurred at 8h. Mechanistically, IR exposure produced interaction of GRK2 with MFN1 and 2, key molecules of mitochondrial recovery process, at 3h post IR. IR induces an acute cardiomyopathy that is associated to an altered mitochondrial morphology and function.

P1295 Pre-existing systemic inflammation does not influence onset or severity of heart failure
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Funding Acknowledgements: The Transplant Unit, University Hospital of South Manchester

Background: The immune system is considered integral to the development of left ventricular (LV) failure. However, whilst inflammation can induce cell-death in native tissue, it is also required for repair and therefore may have a bidirectional effect in heart failure. This is supported by trials of anti-inflammatory therapy in heart failure models, a neutral effect on clinical outcomes and, at worst, an increase in mortality. The relationship between inflammation and heart failure development and recovery is poorly understood and warrants further investigation.

Purpose: This study was conducted to examine if baseline asymptomatic inflammation in healthy sheep would affect the time to development of, the severity of or the recovery from heart failure induced by tachycardic pacing. We hypothesised that pre-existing inflammation would increase susceptibility to the development of heart failure and lead to a more severe disease phenotype.

Methods: 8 healthy Welsh mountain sheep underwent VM pacemaker implant and paced at 210bpm until they developed overt clinical signs of heart failure when pacing was terminated and the animal was allowed to recover. A panel of cytokines was quantified via a protein array at baseline to determine the degree of asymptomatic inflammation. The severity of LV dysfunction was assessed by serial measurements of fractional shortening on echocardiography at baseline, heart failure and recovery. Fractional shortening has previously been validated as an accurate measure of LV function in sheep. Sheep with high levels of baseline inflammation (upper quartile of inflammation) were assigned to the experimental group and at worst, an increase in mortality. The relationship between inflammation and heart failure development and recovery is poorly understood and warrants further investigation.

Purpose: This study was conducted to examine if baseline asymptomatic inflammation in healthy sheep would affect the time to development of, the severity of or the recovery from heart failure induced by tachycardic pacing. We hypothesised that pre-existing inflammation would increase susceptibility to the development of heart failure and lead to a more severe disease phenotype.

Results: Of the 8 healthy sheep, the 2 sheep in the upper quartile of inflammation had significantly higher baseline levels of all pro-inflammatory cytokines interferon-gamma, CXCL9, IP10, IL17A and IL21 compared to the remaining 6 sheep. Compared to sheep with low baseline inflammation, sheep with baseline inflammation demonstrated no difference in fractional shortening (Figure 1A) at any time point or the number of days of pacing required to induce heart failure (Figure 1B).

Conclusion: In this study systemic inflammation had no impact on susceptibility to or severity of heart failure in sheep exposed to tachycardic pacing. This challenges the widely accepted dogma that inflammation would negatively impact heart failure disease progression and severity. These findings need to be confirmed in a larger population and expanded to other models of myocardial injury.

P1296 Effect of candesartan cilexetil and extract of Polygonum sp. on the number of endothelial progenitor cells in vivo
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Background: Cardiovascular diseases are widespread in many countries of the world, therefore development and formulation of new drugs and their combinations, as well as characterization of new properties of available medicines appears extremely relevant.

Purpose: To study the effect of candesartan cilexetil, which is an angiotensin-II receptor blocker, and extract of Polygonum sp. on the contents of endothelial progenitor cells in vivo.

Methods: Male C57Bl/6 mice (n = 80) were selected for the study. They were divided into 8 groups (10 test animals in each). Mice of 7 groups received daily intragastrically candesartan cilexetil and extract of Polygonum sp. for 7 weeks. The substances were dissolved/suspended in 1% starch solution. Group 1 was supplied candesartan cilexetil at 1.5 mg/kg dose, groups 2 – 4 were administered extract of Polygonum sp. at 1 mg/kg, 10 mg/kg and 50 mg/kg doses, respectively, groups 5 – 7 received candesartan cilexetil at 1.5 mg/kg dose coupled to extract of Polygonum sp. at 1 mg/kg, 10 mg/kg and 50 mg/kg doses, respectively. The control group was provided with 1% starch solution. Quantitative evaluation of endothelial progenitor cells (CD117+) in bone marrow and blood of C57Bl/6 mice was performed by flow cytometry.

Results: In this study we investigated the effect of candesartan cilexetil and extract of Polygonum sp. in different dosages on the number of endothelial progenitor cells. Cell surface marker CD117 (or c-kit) was chosen for analysis. It’s a cytokine receptor, KIT gene product. CD117 is expressed on the surface of stem cells, including endothelial progenitor cells. It was shown in this study that candesartan cilexetil at 1.5 mg/kg dose resulted in a significant rise of CD117+ stem cell ratio in blood as compared to the control. Extract of Polygonum sp. at 10 mg/kg and 50 mg/kg doses stimulated generation of CD117+ cells in bone marrow and blood of C57Bl/6 mice in comparison with the control (p < 0.05). The first evidence was recorded that concerted application of candesartan cilexetil at 1.5 mg/kg dose and extract of Polygonum sp. at 10 mg/kg and 50 mg/kg doses promoted considerably production of CD117+ cells in bone marrow and blood of C57Bl/6 mice (p < 0.05), with the resulting values higher than those obtained for individual substances. The largest increment of the number of endothelial progenitor cells in bone marrow and blood was observed in variant with combination of candesartan cilexetil at 1.5 mg/kg dose and extract of Polygonum sp. at 50 mg/kg dose. Conclusion: It was originally demonstrated that combination of candesartan cilexetil and extract of Polygonum sp. was effective to induce mobilization of endothelial progenitor cells in bone marrow and to increase their ratio in blood of C57Bl/6 mice. The experimental data may be used in formulation of new complex drug for the treatment of cardiovascular diseases, capable to promote the mobilization of endothelial progenitor cells in the body.

P1297 Exercise preconditioning increases serotonin vasoconstriction of isolated pulmonary artery in ovariectomy female rats with hypoxic pulmonary hypertension
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Introduction: Endothelial dysfunction is one of reason of hypoxia pulmonary hypertension (HPAH). There is an imbalance between vasoconstrictors and relaxators.
with the development of this disease. Sarcomerogenesis is involved in triggering pulmonary hyperperfusion. Exercise training (ETR) may have protective effects in the cardiovascular system. Experiments in the animals have shown that ETR induces endothelium-dependent vascular relaxation via the nitric oxide, prostacyclin, and hyperpolarization pathways. There are conflicting data on the effect of ETR on the development of PHAH.

The aim of the study was to test the hypothesis that ETR will decrease serotonin-dependent constriction of pulmonary vessels and reduce the degree of pulmonary hypertension. Methods and design. Female Wistar rats were used. They were divided into 7 groups: four were with PHAH (H) and three without (C). Two groups from (H) and (C) rats were gonadectomized (HS) and CGS, and two were with ovariates (HN and CN).

One group from HG, CG, HN, CN were with exercise preconditioning (groups HGEx, CGEx, HNEx) and one group were without exercise (groups HGC, CGC, HNC, CNC). The procedures followed the FELASA/ICLAS for use of the laboratory animals (Guide for use of the laboratory animals, National Academy Press, Washington, D.C, 1996). PHAH was induced by exposure to hypobaric hypoxia (10 h a day, 2 wk, O2 concentration reduced to 10%). For exercise preconditioning rats were subjected to exercise training (aerobic swimming during 30 min/day) for a period of 2 weeks to hypoxia. Systolic right ventricle pressure (SRVP) was measured. Right ventricular (RV) hypertrophy was calculated as RV weight/heart wt. Perfusion pressure of isolated pulmonary and systemic (pulpoetal) artery to vasoconstrictor serotonin (3.3 x 10^-8 – 10^-5M) was measured. Results. Two weeks after chronic hypoxia exposure all (H) groups of rats developed PHAH with different extent of the disease. SRVP was lower by 24% in group HGEx compared with group HGC (p < 0.05). There are no differences between other hypoxic groups. Pulmonary artery response to serotonin (3.15 x 10^-7M) in HGC group was less by 59% than in HNC group (p < 0.05) without effect in systemic vessels. Pulmonary vessels of gonadectomized rats with PHAH, which had exercise preconditioning demonstrated the increase of vasoconstriction in response to serotonin (3.10^-7M serotonin in 4 times p < 0.05) than HGC. However, response to serotonin (3.10^-6M) in systemic vessels was less by 65% in HGEx group compared with HGC (p < 0.05).

Conclusions. Aerobic exercise preconditioning (30 min. swimming) causes a protective effect in isolated systemic vessels without effect in pulmonary vessels. Decreasing SRVP by gonadectomy do not connect with change response vessels to serotonin.

Myosin protein kinases in signaling in heart failure and hypertrophy and in the development of the heart

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Mechanical forces - play a significant role in signaling in hypertrophy and heart failure (HF), but the link between physical stimuli and biological responses remains not well understood. Various concepts have been introduced to explain signaling at the molecular level, including myosin activating protein kinases participation. Cardiac myocytes differ from other cells in that they contain sarcomeres which are essential for the generation of forces. Sarcomerogenesis is activated in cardiac hypertrophy and HF and is characteristic for development of the heart too. There are hypertrophy changes in HF due to dilated cardiomyopathy (DCM). The phosphorylation of myosin - main protein of cardiac myocyte contractile machinery plays an important role in the sarcomerogenesis regulation. Myosin activating protein kinases can directly phosphorylate myosin light chain kinase (MLCK108), skeletal MLCK and such kinases as Rho-associated protein kinase (ROCK), zipper-interacting protein kinase (ZIPK) and integrin-linked kinase (ILK) with broader specificity. In our study the expression levels of protein kinases ROCK-1, ROCK-2, ZIPK and ILK serve dual function: not only as mechanoreceptor but also as a nodal regulator of adaptive, prohyperthrophics signaling. MLCK108, MLCK210, skeletal MLCK and DAPK jointly regulate sarcomerogenesis in heart development.

AKIP1 promotes physiological cardiac hypertrophy

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Background: Overexpression of A Kinase Interacting Protein 1 (AKIP1) promotes physiological hypertrophy in cultured cardiomyocytes by activating AKT-mediated growth pathways. Whether AKIP1 regulates physiological cardiac hypertrophy in vivo is unknown.

Methods and results: Mice with cardiomyocyte-specific overexpression of AKIP1 (AKIP1-TG) and their wild type (WT) littermates were subjected to 4 weeks of voluntary wheel running, whereas control mice were kept sedentary. Heart Wet Weight data showed a 0.3 mg/mm in AKIP1-TG vs. WT mice. (p < 0.05). The augmentation of exercise-induced cardiac hypertrophy was associated with a 6-fold increase in AKT-phosphorylation and the activation of its downstream pathways ribosomal rpS6 and translation elongation factor eEF2.

Conclusion: Cardiomyocyte-specific overexpression of AKIP1 promotes physiological cardiac hypertrophy after voluntary exercise by activating AKT. These findings suggest that AKIP1 may serve as a nodal point to induce beneficial reprogramming of hypertrophic heart disease.

Cardiopulmonary characterization of a feline HFpEF model induced by slow progressive pressure overload

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Background: Heart Failure with preserved Ejection Fraction (HFpEF) represents a major public health problem. Little is understood about the causative mechanisms and there are no proven effective treatments for HFpEF, partially attributable to the lack of well-established animal models for HFpEF.

Purpose: To establish a feline HFpEF model induced by slow progressive pressure overload and to characterize structural and functional cardiopulmonary consequences in this model.

Methods: Male domestic short hair cats (n = 17; 2 months), underwent either sham (S) procedures (n = 8) or aortic constriction (n = 9) with a customized pre-shaped band (B), resulting in slow progressive pressure overload during growth in contrast to immediate pressure overload. Terminal pulmonary function, gas exchange, and invasive hemodynamic studies before and after dobutamine infus (5ug/kg/min), were performed 4 months post-banding. Data is presented as mean ± SE.

Results: Terminal 4-month echocardiography revealed preserved global systolic function (fractional shortening: (S) 32.8 ± 1.3% vs (B) 31.8 ± 0.70%, p = 0.99), significant concentric left ventricular hypertrophy (LV Wallthickness) and left atrial (LA) enlargement (Figs. LAMax mic m, impaired LV diastolic function: (B) vs. (S) cats. While cardiac output and dp/dtmax did not differ significantly between groups at baseline, after dobutamine infusion the increase in dp/dtmax was significantly attenuated in (S) (4810 ± 1157mmHg/s) vs (B) cats (5085 ± 430mmHg/s, p = 0.05), indicating impaired inotropic reserve. Terminal in vivo measurements of pulmonary function and gas exchange demonstrated marked impairment in (B) cats, reflected by a significant reduction in respiratory compliance, reflective of increased lung stiffness, decrease in the Pco2/Fio2 (PF) reflective of impaired oxygenation, and an increase in alveolar-arterial oxygen gradient (A-aDo2)
Reflective of an increase in intrapulmonary shunt. (B) cats showed a significant increase in the percentage of LV Thoctric and myocyte cross-sectional area.

Summary and Conclusion: Slow progressive pressure overload in cats induces severe LV concentric hypertrophy, LA enlargement and dysfunction without causing LV dilation or systolic dysfunction. The cardiac findings mimic some discriminant clinical hallmarks of HFpEF patients. In addition, this study presents seminal observations of the impact of LA impairment on pulmonary function and gas exchange, which are in agreement with clinical observations of dyspnoea at rest and exercise-induced reduction of diffusion capacity in humans with HFpEF. Collectively, these data support the translational efficacy and potential utility of this novel feline HFpEF model to explore therapeutic options (HDAC inhibition) for humans.

Cardiopulmonary Impairments

**P1301**

**Targeting the nitric oxide-unresponsive soluble guanylate cyclase in a rat model of pressure overload induced left ventricular hypertrophy and heart failure**

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**Background:** Chronic pressure overload of the left ventricle induces the manifestation of pathological left ventricular hypertrophy (LVH) that entails gradual deterioration of cardiac function. Recently, preclinical studies have indicated that the impairment of the soluble guanylate cyclase (sGC) - cyclic guanosine monophosphate (cGMP) → protein kinase G signaling contributes to the development of LVH associated cardiac dysfunction.

**Purpose:** Therefore we investigated the effect of the sGC activator cinaciguat in a rat model of pressure overload-induced LVH and heart failure.

**Methods:** Abdominal aortic banding (AB) was carried out to induce pressure overload for 6 or 12 weeks. Sham operated animals served as controls. The experimental groups were treated from the 7th to the 12th postoperative week, with 10 mg/kg/day cinaciguat (Cin) or with placebo (Co) p.o., respectively. The temporal effect of cinaciguat was assessed in mice with IA/AAR ratios respectively at 39.8% ± 2.6% (Cin) and 42.1% ± 3.2% (Co) at 30 days. The infarct size was reduced in Colchicine treated mice in comparison to control mice. No adverse haemodynamic effects were reported in pigs that underwent RD immediately after AMI. RD and control pigs did not differ in the extent of myocardium at risk (83 ± 41% of left ventricle, P=N.S.). At 30 days, RD significantly reduced the amount of gadolinium delay enhancement (17 vs. 31% of LV, p < 0.001) with improved myocardial salvage index (74% vs 44%, p = 0.001). Cardiac output in RD pigs was significantly higher than control at 30 days (37.8 ± 0.8 vs 26.6 ± 0.7 L/min, p = 0.001), with a trend for lower LV end diastolic volume (91 ± 16 vs 113 ± 31 ml, p = 0.14).

**Conclusions:** RD performed immediately after AMI results in increased myocardial salvage and better cardiac remodeling. The reduction of neurohumoral activation following AMI warranted by RD, may be in cause.

**P1303**

**Interest of colchicine in the treatment of acute myocardial infarct responsible for heart failure in a mouse model**

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**BACKGROUND:** Inflammation is deeply involved in the pathophysiology of ischaemia-reperfusion (IR) lesions and ventricular remodeling due to acute myocardial infarction (AMI). Colchicine as a pleiotropic anti-inflammatory molecule may exert cardiacprotective effects under acute coronary artery occlusion. Therefore, we aimed to evaluate the impact of colchicine on reperfusion injury in a mouse model.

**Methods:** Myocardial ischaemia/reperfusion (IR) injury were induced in C57BL6 male mice, after 45 min ligation of the left coronary artery. They were followed by reperfusion. 400 μg/kg of colchicine or the vehicle were administrated intraperitoneally (i.p) 25 minutes before the reperfusion (blinded administration). Mice were sacrificed 24 hours after the acute myocardial ischemia (AMI) and the area at risk (AAR) and the infarcted area (IA) were evaluated after Evans blue/TTC staining. Circulating level of troponin and cytokines profile were assessed 4 hours after the AMI. An echocardiography was performed in a follow-up group mice, 48 hours and 9 weeks after the AMI.

**Results:** The AAR/total area ratios were similar in the colchicine and the vehicle group (52.6% ± 1.1 vs 53.1% ± 0.6, P=0.75) and the infarct size was reduced in Colchicine treated mice in comparison to control mice with IA/AAR ratios respectively at 39.8% ± 3.5 vs 52.9% ± 3.2, p=0.05. Troponin was significantly lower in the Colchicine treated mice (7015.7 ± 1423.7 pg/mL, n= 5 vs 30723.7 ± 7959.9 pg/mL, in the placebo group, n=6, p=0.0001). Fibrosis was decreased in the Colchicine group (24.5 ± 3.13 vs 11.3 ± 2.46 % in the colchicine group, p=0.03). In the follow-up group mice (n= 8), there were no differences between mice treated with placebo (n=9) and mice treated with colchicine (n= 9) regarding to cardiac remodeling parameters but outflow approximated by the ITV was higher in the Colchicine group. No death was observed in any group.

**Conclusion:** In conclusion, colchicine allowed a significant reduction of infarct size in mice, improves haemodynamic parameters and decrease cardiac fibrosis.
Background: Oxidative stress is related to the evolution of cardiac remodeling to heart failure (HF). Although eplerenone (Eple) decreases morbidity and mortality in patients with HF, the molecular mechanisms underlying this protection have not been studied. The aim of this study is to characterize the effect of Eple on the enzymatic system endothelial nitric oxide synthase (eNOS).

Methods: Human left ventricular (LV) explants from patients undergoing transplantation, LV of healthy donors as well as the infarcted LV area of animals from a rat model of myocardial infarction (MI), were analyzed. MI was induced by ligation of the left anterior descending coronary. The animals (n = 10 / group) were distributed within two groups: untreated or treated with Eple from the day of ligation up to 4 weeks (150 mg/kg/day). The control group underwent the same surgery but without ligation. The eNOS expression and activity were evaluated by RT-qPCR and Western blot, respectively. The levels of BH4 and MDA were assessed by colorimetry. The activities of catalase (CAT), glutathione peroxidase (GPx-3) and ROS were measured by fluorometry. Each value has been referred to the control group and has been expressed as mean ± standard error.

Results: Compared with healthy donors, the failed VVs showed decreased levels of eNOS (32 ± 12) and BH4 (21 ± 8), as well as an accumulation of eNOS in its monomeric (inactive) form and a significant increase in oxidative damage: ROS (63 ± 13), GSSG (35 ± 8) and MDA (12 ± 8). In an experimental study, in relation to control, animals submitted to MI showed decreased levels of eNOS (49 ± 13), BH4 (35 ± 8), and an accumulation of eNOS in its monomeric (inactive) form. Moreover, as showed by decreased oxidative damage characterized by an increase in ROS (3 ± 0.5), MDA (12 ± 4) and a decrease in CAT (32 ± 12) and GPx-3 (3 ± 14%). Treatment with Eple increased eNOS expression (89 ± 15) and BH4 levels (78 ± 21), as well as homodimeric levels of eNOS (active). Furthermore, treatment with Eple reduced oxidative damage by decreasing ROS (1.5 ± 0.9) and MDA (3 ± 0.3) and increasing CAT (87 ± 12%) and GPx-3 (78 ± 17%).

Conclusions: Eplerenone, through overexpression and increased activity of eNOS and its cofactor BH4, prevents post-MI adverse cardiac remodeling.

P1305
Cardiac bone marrow-derived cell-based therapy associated with scaffold for heart regeneration
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Purpose: The development of patched associating of bone marrow derived cells (BMDC) and a substrate/scaffolds provided evidence of beneficial outcomes and optimal delivery approaches on myocardial infarction (MI). Preclinical trials are usually performed with BMDC isolated from healthy donors (HD, n=12), or from infarcted donors (ID, n=7) or epicardial application of the biological patches obtained with 2 million BMDC isolated from healthy and infarcted Lewis male rats. MI was induced in 52 female descending coronary in male Wistar rats. The animals (n=10/group) were distributed within two groups: untreated and treated with Eple, from the day of ligation up to 4 weeks (100 mg/kg/day). The control group underwent the same surgery but without ligation. All miRNAs except miR-23-5p were detected in plasma from rats and mice. No significant differences were observed between the circulating miRNAs in the Ren2 rats and AngII-treated mice when compared to the healthy control animals (all P > 0.05), and no robust associations with cardiac function could be found.

Results: Compared with clinical donors, the failed VVs showed decreased levels of eNOS (32 ± 12) and BH4 (21 ± 8), as well as an accumulation of eNOS in its monomeric (inactive) form and a significant increase in oxidative damage: ROS (63 ± 13), GSSG (35 ± 8) and MDA (12 ± 8). In an experimental study, in relation to control, animals submitted to MI showed decreased levels of eNOS (49 ± 13), BH4 (35 ± 8), and an accumulation of eNOS in its monomeric (inactive) form. Moreover, as showed by decreased oxidative damage characterized by an increase in ROS (3 ± 0.5), MDA (12 ± 4) and a decrease in CAT (32 ± 12) and GPx-3 (3 ± 14%). Treatment with Eple increased eNOS expression (89 ± 15) and BH4 levels (78 ± 21), as well as homodimeric levels of eNOS (active). Furthermore, treatment with Eple reduced oxidative damage by decreasing ROS (1.5 ± 0.9) and MDA (3 ± 0.3) and increasing CAT (87 ± 12%) and GPx-3 (78 ± 17%).

Conclusions: Eplerenone, through overexpression and increased activity of eNOS and its cofactor BH4, prevents post-MI adverse cardiac remodeling.
P1308 Myocardial fibrosis and fat infiltration in obese and streptozotocin-induced diabetic Göttingen minipigs

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Background: Diabetes mellitus and obesity are associated with cardiovascular disease, and cardiovascular complications are the most common cause of death in diabetic patients. Diabetes related myocardial fibrosis and fat infiltration has been associated with the development of heart failure.

Purpose: The present study aimed to assess the effect of high-fat/high-cholesterol diet and streptozotocin-induced diabetes on left ventricular (LV) myocardial fibrosis and fat infiltration in Göttingen minipigs.

Methods: Twenty-nine castrated male Göttingen minipigs (5–6 months) were divided into three groups. A control group fed standard pig chow: C (n=7); and two groups fed high-fat/high-cholesterol diet: HFD (n=14) and HFD-D (n=8), the latter group with superimposed streptozotocin-induced diabetes. To avoid severe hyperglycemia, fasting blood glucose was maintained at 12–15mm by treating animals with insulin glargine. After 58 weeks all pigs were euthanized, body and heart weight measured, and myocardial samples from the LV free wall were collected.

For each animal the degree of myocardial interstitial fibrosis and fat infiltration as well as perivascular fibrosis and fat infiltration was semi-quantitatively scored as 0 = no fibrosis, 1 = mild fibrosis, 2 = moderate fibrosis, and 3 = severe fibrosis. Heart samples were fixed in formalin and stained with Masson’s trichrome for histological analysis.

Results: Total plasma cholesterol and triglycerides were higher in HFD [11.82 (9.39–13.18)mm; median and quartiles: P=0.003; and 0.64 (0.54–8.89)mm; P=0.004] and HFD-D [17.45 (14.01–27.00)mm; P=0.002; and 1.22 (0.75–1.64)mm; P=0.0014] compared to C [1.69 (1.36–2.18)mm; and 0.34 (0.29–0.35)mm]. Heart weight was higher in HFD [199 (181–208)g; P<0.001] and HFD-D [175 (138–205)g; P=0.02] compared to C [131 (115–142)g]. No differences between groups were found when heart weight was normalized to body surface area. No differences between groups were found in degree of myocardial interstitial fibrosis [C: 1.50 (1.00–2.00); HFD: 1.58 (1.00–2.29); and 0.34 (0.29–0.35)mm]. Heart weight was higher in HFD [199 (181–208)g; P<0.001] and HFD-D [175 (138–205)g; P=0.02] compared to C [131 (115–142)g]. No differences between groups were found when heart weight was normalized to body surface area. No differences between groups were found in degree of myocardial interstitial fibrosis [C: 1.50 (1.00–2.00); HFD: 1.58 (1.00–2.29); and 0.34 (0.29–0.35)mm].

Conclusion: Obesity and diabetes did not increase myocardial fibrosis and fat infiltration in Göttingen minipigs. Further studies are needed to determine the possible influence of breed, sex and exposure time; and the significance of the vascular changes.

P1309 Impact of intra coronary allogeneic cardiac progenitor cell administration on myocardial edema and functional recovery in sub-acutely infarcted swine

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Background: Myocardial edema is associated to impaired regional function and conductivity and as such has been proposed as a therapeutic target, since it. On the other hand, intracoronary (IC) allogeneic cardiac progenitor cell (CPC) administration has been recently used for MI therapy in experimental models, and is currently being evaluated in clinical trials.

Purpose: We undertook this study to evaluate the effects of IC porcine CPC (pCPC) administration on myocardial edema and its relationship to cardiac function after experimental infarction in swine.

Methods: Female domestic pigs surviving a 90 minutes balloon occlusion of the mid-LAD were subjected to an IC injection of 5x10^6 pCPC (n=7, group 1) or vehicle (n=7, group 2) one week after AMI. Cardiac MR was performed before injection and one and 10 weeks after. Myocardial edema/area-at-risk (AAR) was calculated as a percentage of the left ventricle in a mid-slice using T2-weighted imaging. Other parameters studied included Ejection Fraction (EF), End Diastolic Volume (EDV), End Systolic Volume (ESV) and infarct size. Myocardial Salvage Index (MSI) was then computed as AAR at mid-slice minus final infarct size (FIS) in an equivalent slice divided by AAR (MSI=(AAR-FIS)/AAR).

Results: No differences were seen between groups in any MR-derived parameter before pCPC or vehicle injection, thus confirming that both AAR and infarct sizes, and their effects on functional parameters (EF, EDV and ESV) were comparable. Injection was successful in all cases, in absence of major adverse cardiac events. There was a significant decrease in edema in the treated group one week after pCPC injection (from 27.29±8.44% to 15.00±4.24%, p=0.009), while no significant change in this parameter was seen in Group 2 (from 23.43±5.94% to 18.71±4.35%, p=0.128). At ten weeks there were no significant differences in scar sizes, despite a trend towards smaller scars in treated animals (5.86% ± 4.14% versus 8.29% ± 2.81%), However, MSI was significantly higher in the treated group (MSI=0.63 ± 0.17 in Group 1 and MSI=0.35 ± 0.20 in Group 2, p=0.01), evidencing a cardioprotective effect of the cells. In terms of cardiac function, a clear trend towards EF recovery was seen in Group 1, that was absent in non-treated animals. Ventricular volumes were also significantly smaller in Group 1 [EF was 50.23 ± 4.92% and 42.14 ± 10.00%, EDVI was 94.01 ± 11.42mL/m2 and 119.03 ± 24.84mL/m2 (p=0.019) and ESVI was 46.96 ± 6.19mL/m2 and 70.45 ± 25.53mL/m2 (p=0.018) in Groups 1 and 2, respectively].

Conclusion: The Intra coronary injection of 5x10^6 pCPC one week after experimental Infarction could be able to exert a beneficial decrease in myocardial edema, which after 10 weeks is associated to improved cardiac function and a two-fold increase in MSI. The exact mechanisms by which pCPC are related to myocardial edema decrease need to be further clarified, but it could represent another therapeu-tic target for early cell therapy.

P1310 Lower dietary fat intake increases cardiac hypertrophy and left ventricular remodelling in a hypertensive rat model

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Funding Acknowledgements: UCD SMMS

Background: Much attention has been paid to the clinical effects of lipid intake on the development of coronary heart disease, however, the effects of dietary fats on the development and progression of heart failure have been largely ignored. The present study compares the effect of a high-fat diet (HFD) versus a low-fat diet (LFD) on left ventricular remodelling in the presence of hypertension.

Methods: Experiments were performed with approval from the local animal ethics committee. Adult, male Wistar-Kyoto (WKY, n=10) and spontaneously hypertensive rats (SHR, n=20) were fed low (10 kcal% fat) or high (45 kcal% fat) saturated fatty acid-based diets for 16 weeks. Cardiac structure and function were determined in vivo using 2D M-mode echocardiography. Excised hearts were weighed, dissected and formalin-fixed. Left ventricular collagen deposition and cardiomyocyte hypertrophy were assessed using a digital image analysis system (Aperio) following Picosiris red and H&E staining, respectively.

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Results: no change in final body weight was recorded among groups. SHR exhibited increased arterial pressure vs. normotensive WKY controls (systolic pressure 15/11 mmHg vs. 13/11 mmHg). Following 16wks of dietary intervention SHR-LFD displayed left ventricular (LV) remodeling with significantly increased LV mass, myocardial cross-sectional area, perivascular and interstitial fibrosis compared WKY. These effects were not seen in the SHR-HFD. Correspondingly, echocardiography revealed significantly increased LV anterior and posterior wall dimensions in SHR-LFD.

Conclusion: These results demonstrate that in the presence of hypertension, low dietary fat intake leads to increased cardiac growth and structural remodelling of the left ventricle, effects that are attenuated by high dietary fat intake. Future work aims to elucidate the role of inflammatory mediators in these phenomena.

P1311 Erythropoietin reduces collagen deposition after myocardial infarction but does not improve cardiac function in male rats
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Funding Acknowledgements: FAPEESP

Background: Myocardial remodeling includes inappropriate collagen deposition in the interstitium. Erythropoietin (EPO) may have cardioprotective effects. We aimed to assess the role of EPO on myocardial remodeling.

Methods: We studied 60 Wistar rats divided into: Control (CT), Control + EPO (CT + EPO), Infarcted (MI) and Infarcted + EPO (MI + EPO). The interstitial collagen volume fraction (ICVF) and intact size were quantified. Echocardiography was performed for geometry and ventricular function. Western Blotting was used to evaluate inflammatory proteins (TNF-α, TGF-β1) and tissue inhibitors of metalloproteinases (TIMP-1 and TIMP-2). Zymography was applied for MMP-2. Parametric and non-parametric analysis was performed according to normality test. Results: ICVF was greater in MI groups (p < 0.001) and was attenuated by EPO (p < 0.05). We did not observe any difference in intact size, with or without EPO treatment (MI + EPO vs. CT + EPO). The TIMP-1 and TIMP-2 showed lower values of ICVF (MI vs MI + EPO, p = 0.79), LVSSD (MI vs MI + EPO, p = 1.00) or dysfunction (EF: MI: 41% ± 15, EF (MI + EPO): 45% ± 12, p = 1.00). The infarcted groups showed lower values of ejection fraction (EF) and larger LVSSD and LVSSD compared to the controls. Relative wall thickness did not show any difference between MI vs MI + EPO (p = 1.00) neither Tel index (p = 0.78). The inflammatory proteins studied were increased in the infarcted groups but without statistical significant. Again the EPO did not modulate these protein synthesis after 4 weeks of MI (TNF, p = 0.08 and TGF, p = 0.15). The TIMP-1 had increased amount in the MI + EPO group but with no statistical significance, p = 0.16. The TIMP-2 also had no statistical difference, p = 0.55. The activity of MMP-2 did not show any difference between groups after 4 weeks of MI, p = 0.79. We found a strong positive correlation between EF and TIMP-1 (p < 0.05 and r = 0.95) and TIMP-2 (p < 0.05 and r = 0.95) in MI + EPO group. Conclusions: We concluded that EPO attenuated interstitial collagen accumulation, but did not relate from heart dilation or dysfunction. This protection seems to be not related to those studied inflammatory proteins modulation neither to collagen degradation pathways.

P1312 Cyclic GMP deficiency and cardiac fibrosis in diabetic cardiomyopathy: an experimental model of type 2 diabetic cardio-nephropathy
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Background and Purpose: Cyclic guanosine 3',5'-monophosphate (cGMP) is important in the preservation of cardiac function and disruption of this signal transduction process contributes to cardiac dysfunction. In type 2 diabetes mellitus (DM), we define neurohumoral dysregulation leading to cardio-nephropathy.

Methods: Ten genetically designated Zucker diabetic fatty (ZDF) rats and ten nondiabetic ZDFL control rats received echocardiography with strain imaging, vital sign monitoring and neurohumoral blood and urine collection over 32 weeks. At conclusion, cardiac and renal tissues were harvested for fibrosis assessment.

Results: DM in the ZDF rats was confirmed by glucose and HbA1c measurements. There was increased fibrosis in both the left ventricle (LV) and kidney with cardiac and renal dysfunction in the DM vs control rats. There was increased 24 hr proteinuria and a trend for worsened early diastolic strain rate in the DM rats. Despite similar plasma BNP levels, plasma cGMP was significantly attenuated in the diabetic vs control rats.

Conclusion: In this Zucker type 2 DM rat model, there was cGMP deficiency with evidence of cardiac fibrosis and dysfunction. Future studies are warranted to determine if enhancing the cGMP system with nephrin inhibition or administration of exogenous natriuretic peptide would improve cardiac function.

P1313 Ovariotomy reduces the passive stiffness of left ventricular myocardial tissue in a post-menopause mouse model
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Background: Heart failure (HF) is usually associated with diastolic dysfunction. Although post-menopause women are at increased risk of HF and diastolic dysfunction, poor attention has been paid to clinically and experimentally investigate this group of patients. In particular, whether myocardial stiffness is affected by the loss of sex hormones after menopause is unknown.

Purpose: To characterize the passive stiffness of left ventricular myocardial tissue in a mouse model of ovariotomy (OXV).

Methods: After 6 months of bilateral OVX, 8 mice (C57BL/6J) were sacrificed and passive tension-length curves were measured (Aurora Scientific, 300C-LR) in fresh left ventricular myocardial strips (7x1x1 mm). Data were fitted to a constitutive model (31.4  ± 0.4 304 ± 0.01). In this model, OXV did not show protective effects on ventricular dilatation LVDD (MI vs MI + EPO, p = 0.79), LVSSD (MI vs MI + EPO, p = 1.00) or dysfunction (EF: MI: 41% ± 15, EF (MI + EPO): 45% ± 12, p = 1.00). The infarcted groups showed lower values of ejection fraction (EF) and larger LVSSD and LVSSD compared to the controls. Relative wall thickness did not show any difference between MI vs MI + EPO (p = 1.00) neither Tel index (p = 0.78). The inflammatory proteins studied were increased in the infarcted groups but without statistical significant. Again the EPO did not modulate these protein synthesis after 4 weeks of MI (TNF, p = 0.08 and TGF, p = 0.15). The TIMP-1 had increased amount in the MI + EPO group but with no statistical significance, p = 0.16. The TIMP-2 also had no statistical difference, p = 0.55. The activity of MMP-2 did not show any difference between groups after 4 weeks of MI, p = 0.79. We found a strong positive correlation between EF and TIMP-1 (p < 0.05 and r = 0.95) and TIMP-2 (p < 0.05 and r = 0.95) in MI + EPO group. Conclusions: We concluded that EPO attenuated interstitial collagen accumulation, but did not relate from heart dilation or dysfunction. This protection seems to be not related to those studied inflammatory proteins modulation neither to collagen degradation pathways.

P1314 Cyclic GMP deficiency and cardiac fibrosis in diabetic cardiomyopathy: an experimental model of type 2 diabetic cardio-nephropathy
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Background and Purpose: Cyclic guanosine 3',5'-monophosphate (cGMP) is important in the preservation of cardiac function and disruption of this signal transduction process contributes to cardiac dysfunction. In type 2 diabetes mellitus (DM), we define neurohumoral dysregulation leading to cardio-nephropathy.

Methods: Ten genetically designated Zucker diabetic ZDF rats and ten nondiabetic ZDFL control rats received echocardiography with strain imaging, vital sign monitoring and neurohumoral blood and urine collection over 32 weeks. At conclusion, cardiac and renal tissues were harvested for fibrosis assessment.

Results: DM in the ZDF rats was confirmed by glucose and HbA1c measurements. There was increased fibrosis in both the left ventricle (LV) and kidney with cardiac and renal dysfunction in the DM vs control rats. There was increased 24 hr proteinuria and a trend for worsened early diastolic strain rate in the DM rats. Despite similar plasma BNP levels, plasma cGMP was significantly attenuated in the diabetic vs control rats.

Conclusion: In this Zucker type 2 DM rat model, there was cGMP deficiency with evidence of cardiac fibrosis and dysfunction. Future studies are warranted to determine if enhancing the cGMP system with nephrin inhibition or administration of exogenous natriuretic peptide would improve cardiac function.
Background: Chagas' disease is one of the major cause of cardiomyopathy and heart failure in Latin America. It is characterized by intense myocardial fibrosis which is directly related to a complex cascade of pathways, such as inflammation, oxidative stress and apoptosis. As well air pollution leads to intense activation of these same pathways which would amplify the response against the infection. We aimed to assess the role of air pollution upon progression of Chagas cardiomyopathy in the acute phase (60 days) of the disease.

Methods: 100 females Snim Hamsters were divided into 4 groups: Control (Ct), Control + Pollution (Ct+P), Infected (Inf) and Infected + Pollution (Inf+P). The animals were exposed to pollution by inhalation of particulate matter produced by burning diesel fuel. Echocardiography and electrocardiogram (ECG) were performed. Survival curve was analyzed during the acute phase. Results: We observed ventricular dilatation (left ventricular diastolic diameter and left ventricular systolic diameter) in infected groups compared to controls, p = 0.04 and p = 0.002, respectively. However, the pollution did not increase mortality (Inf=68%, Inf+P=68%). Conclusions: We observed that infected groups had higher HR than controls, mainly Ct + P vs Inf and Inf + P. Simus rhythm was similar among groups, and ventricular arrhythmias were the same in all groups at 60 days. Survival analysis showed a high mortality in infected groups (88%) compared to the controls (4%) and air pollution did not increase mortality (inf=68%, Inf+P=68%). Conclusions: We observed that air pollution at the acute phase of Chagas disease did not worsened ventricular dilatation or function neither increased mortality.
Aquaporins are a family (AQP1-12) of transmembrane water channels known to mediate rapid water movements following osmotic gradients, as created under a variety of tissular stresses. Some isoforms may be permeable to additional small molecules (e.g. H2O2 in plants) although such function in mammalian Aqp1 is undefined. We clearly identified Aqp1 in peripheral membranes of both capillary endothelial and cardiac muscle cells by immunohistochemistry. Aqp1 co-segregated with cavin-1 and other cavinoid residents in lipid rafts/caveolae. Surprisingly, we observed that genetic deletion of Aqp1 in mice failed to build a normal hypothrophic response to phenylephrine. By analogy with plant aquaporins, we hypothesized that Aqp1 mediates transmembrane transport of extracellular H2O2 generated by, and mediating the hypothrophic response to alpha1-adrenergic activation. Indeed, genetic deletion of Aqp1 reduced the intracellular detection of ROS (by HD-DCFDA) or H2O2 (with the specific ROS/F2-Orp1 sensor) in cardiac myocytes exposed to graded concentrations of extracellular H2O2, demonstrating a role for Aqp1 in transmembrane transport of H2O2. Notably, incubation of wild-type myocytes with phenylephrine increased ROS/H2O2 signals, but co-treatment with phenylephrine and cavin-1-impermeable (i.e. non-phosphatidylated) cavin abrogated both the intracellular ROS signals and the hypothrophic response. Similarly decreased ROS/H2O2 signals were observed upon exposure of myocytes from Aqp1 KO mice to phenylephrine normalized fluorescence, TX10: 132 i+/-34 vs 400 i/-16 in WT; P<0.05), suggesting that Aqp1 mediates the import of H2O2 produced extracellularly upon alpha1-adrenergic stimulation. To test the functional importance of Aqp1 deletion on cardiac remodeling, we treated Aqp1 KO mice (and wild type mate) with minipump infusion of angiotensin II for 14 days. To control for loading conditions, blood pressure was continuously measured in all mice by implanted telemetry. Ang II resulted in similar increases in BP in both genotypes (SBP in WT: 164 i/-8 vs Aqp1 KO: 174 i+/-13 mmHg; P; n.s). WT mice developed cardiac myocyte hypertrophy and fibrosis, which were significantly attenuated in Aqp1 KO mice (myocyte area (WGA): 462 i/-152 vs 762 i/-14 μm2 in WT; P<0.01). Similar reductions in hypertrophy and fibrosis were observed in Aqp1 KO mice after TAC (myocyte area (WGA): 454 i/-152 vs 762 i/-14 μm2 in WT; P<0.01). We conclude that cardiac aquaporin-1 mediates transmembrane transport of H2O2 and critically modulates the hypothrophic response to phenylephrine.

Introduction. Pathophysiologial stresses including oxidative stress (e.g. H2O2) and pro-inflammatory cytokines (e.g. interleukin 1, IL1) activate the stress-regulated mitogen-activated protein kinases (MAPKs) and -c-Jun N-terminal kinases (JNKs) in cardiomyocytes. They also cause cardiac dysfunction and cardiomyocyte death, so components of the pathways are potential therapeutic targets for treatment of heart failure. MAPKs are final components of cascades in which upstream kinases that regulate p38-MAPK in cardiomyocytes: H2O2 signals to p38-MAPK via ASK1 whereas interleukin-1-beta signals via TAK1. Our hypothesis is that different pathological stimuli signal through specific MAPKs to MKK4/7 whilst p38-MAPks are activated by MKK3/6. MKKs are phosphorylated and activated by upstream protein kinases, MAP3Ks, but the MAP3Ks for activation of p38-MAPKs and JNKs in cardiomyocytes. We aim to identify the MAP3Ks that activate p38-MAPKs and JNKs in cardiomyocytes. We hypothesized that different pathological stimuli signal through specific MAP3Ks to MKK4/7 and MKK3/6. Methods and results. Proteomics analysis of neonatal and adult rat ventricular myocytes (ARVMs) and ARVMs detected significant expression of MAP3Ks 1-7 and MAP3K11. MAP3K11 and MAP3K12 were also detected at the mRNA level. Only MAP3K3 (ASK1) was expressed at a higher relative level in ARVMs although others including MAP3K7 (TAK1) remained relatively highly expressed in ARVMs. We compared the effects of H2O2 and IL1 on phosphorylation (i.e. activation) of ASK1 and TAK1 in cardiomyocytes by immunoblottling extracts with antibodies to phosphorylated and total kinases. H2O2 promoted phosphorylation of ASK1, but not TAK1 (maximal activation with 1 mM H2O2, 5 min). In contrast, IL1 (25 ng/ml) stimulated phosphorylation of TAK1, but not ASK1 (maximal activation at 5 min). Similar results were obtained in Langendorff perfused rat hearts. phosphorylation of MAP3K3 results in the appearance of a reduced mobility.
band on immunoblots. Such a band shift was detected in cardiomyocyte extracts in response to either HDAC (1mM or 1L). To dissect the role of ASK1 in activation of stress-regulated MAPKs, we examined the effects of a small molecule inhibitor of ASK1, selonsertib, on phosphorylation (i.e. activation) of p38-MAPKs and JNKs by immunoblotting cardiomyocyte extracts with antibodies to phosphorylated and total kinases. Selonsertib selectively inhibited activation of p38-MAPK by HDAC2 with no effect on activation of p38-MAPK by IL1j and no effect on activation of JNKs by either agonist. Conclusions: Several MAPKs are expressed in cardiomyocytes and can signal to stress-regulated MAPKs. Our data identify selective signalling through specific MAPKs in response to different stimuli. Thus, oxidative stress signals through ASK1 to p38-MAPK, not JNKs, whereas IL1j does not activate ASK1, but activates TAK1 instead. It will therefore be important to target different MAPKs under different conditions to manipulate p38-MAPK and/or JNK signalling for the management of heart failure.

P1322
In vivo silencing of histone deacetylase 1 displays anti-atherosclerotic effects in hypercholesterolemic apolipoprotein E deficient mice
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Background - The beneficial effects of several pan-histone deacetylase (HDAC) inhibitors have been demonstrated in various experimental models of heart failure and hypertension. However, the role of HDACs in atherosclerosis and the rationale of using HDAC inhibitors as therapeutic strategies are not established. HDAC1 is an essential isoform of the HDAC family and control a large number of physiological activities. Up-regulation of HDAC1 induces histone deacetylation resulting in transcriptional repression of genes that normally function in cellular proliferation, differentiation, and apoptosis. In addition, HDAC1 may act on and modulate the function of multiple non-histone proteins such as transcription factors to induce/repress the gene expression.

Purpose: To establish the specific contribution of HDAC1 isoform in mediating oxidative stress and inflammation in atherosclerosis.

Methods: A nanotechnology-based procedure was employed for in vivo siRNA delivery in hypercholesterolemic apolipoprotein E deficient (Apoe-/-) mice. Male Apoe-/- mice were randomized to receive normal (ND) or high-fat cholesterol-rich diet (HD) for 10 weeks (intermediary lesions). Aged-matched C57BL/6J mice maintained on normal diet were used as controls. Atherosclerotic Apoe-/- mice (HD) were treated with 0.5 mg/kg of targetted (control) or HDAC1 siRNA. One week after siRNA administration, the animals were sacrificed and aorta was analysed by Oil Red O staining and Western blot. To set-up the optimal conditions for systemic siRNA delivery, FITC-labelled siRNA and in vivo imaging (IVIS Caliper, Perkin Elmer) were used. The fluorescence signal was detected at different time points after FITC-siRNA administration to assess the biodistribution and the uptake efficiency of the FITC-siRNA (blood and various organs).

Results: We found that HDAC1 protein level was significantly elevated in the aorta of Apoe-/- mice fed a HD compared to Apoe-/- mice maintained on ND. Ex vivo imaging revealed that FITC-siRNA was abundant in the blood and several organs (liver, lungs, and pancreas) and to a lesser extent in the kidneys. Systemic delivery of HDAC1 siRNA resulted in a significant decrease in HDAC1 protein expression level in the aorta of atherosclerotic Apoe-/- mice (HD). In vivo silencing of HDAC1 correlated to a significant decreases in the expression of NOS2, CD45, MMP9, fibronectin, fibronectin (NGS2, MMP9, CD45), matrix deposition and remodeling (fibronectin, MMP9), and cell proliferation (PCNA) markers.

Conclusion: Our preclinical study indicates that selective targeting of a specific HDAC isoform (e.g., HDAC1) rather than pan-HDAC inhibition may be a novel therapeutic strategy to counteract vascular oxidative stress and inflammation in atherosclerosis.

P1323
Protein expression profiling of histone acetyltransferases and histone deacetylases in human and experimental atherosclerosis
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Background. Changes in chromatin configuration due to histone acetylation play a major in epigenetic regulation of gene expression. Histone acetylation is regulated by the activities of two major enzyme families, namely Histone acetyltransferases (HAT) and Histone deacetylases (HDAC). As general principle, histone acetylation induces chromatin relaxation, a condition that facilitates the accessibility of transcription factors to their cognate DNA elements in the genome. Thus, histone acetylation is associated with active gene expression. Several non-histone proteins such as transcription factors may be the substrates of HAT/HDAC activity. The beneficial effects of various pan-HDAC inhibitors were demonstrated in several experimental models of cardiovascular diseases. Hitherto, the regulation of HAT/HDAC and their implication in atherogenesis and also the rationale of using HDAC inhibitors are not completely understood.

Purpose: The aim of this study was to investigate the protein expression profile of representative HAT (type A: p300, type B: HAT1) and HDAC (class I: HDAC1, HDAC2, class IIa: HDAC4, class IIb: HDAC6, class III: Sirt1, class IV: HDAC11) isoforms and to estimate the overall histone acetylation status in human and mouse atherosclerosis.

Methods: Non-atherosclerotic (superior thyroid artery) and atherosclerotic (carotid artery) samples obtained as discarded tissues from patients undergoing carotid endarterectomy and apolipoprotein E deficient (Apoe-E-/-) mice were used. At 7 weeks of age male Apoe-/- mice were distributed into experimental groups to receive normal or high-fat cholesterol-rich diet for 10 weeks. Aged-matched C57BL/6J mice maintained on normal diet were used as controls. Oil red O staining was employed to assess lipid deposition within atherosclerotic lesions. The expression/localization of HAT and HDAC subtypes, the level of H3K27ac, oxidative stress and inflammatory markers were determined by Western blot/microscopy.

Results: We found that p300, HAT1, HDAC1, HDAC2, HDAC4, Sirt1, and HDAC11 isoforms were significantly up-regulated in atherosclerotic plaques derived from human carotid artery compared to non-atherosclerotic samples. A similar expression pattern of HAT and HDAC proteins was found in the aorta of atherosclerotic Apoe-/- mice. Interestingly, the increased expression of HAT and HDAC subtypes correlated with the severity of atherosclerotic lesions and plasma cholesterol level in Apoe-/- mice. An overall increase in H3K27ac (marker of active gene expression) level was detected in both human and mouse atherosclerotic lesions as compared to the corresponding non-atherosclerotic controls. Our study provides the first evidence that the histone acetylation system is altered in atherosclerosis. Both HAT and HDAC subtypes are up-regulated in atherosclerosis suggesting the existence of a feed-back mechanism whereby increased expression of HATs is compensated by up-regulation of HDACs and vice versa.

P1324
Understanding the poor angiogenic capacity of the mammalian heart
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Purpose: The reason why a hypoxic tumor forms its own vasculature, mainly through the secretion of the Vascular Endothelial Growth Factor (VEGF), whereas an ischemic heart cannot, still remains obscure. We hypothesize that cardiac endothelial cells (ECs) loose their capacity to proliferate soon after birth, similar to what happens to mammalian cardiomyocytes.

Methods and Results: The injection of a adenovirus-associated vector (AAV) encoding for VEGF into either the adult skeletal muscle or the embryonic heart induced a massive formation of capillaries and arterioles. In contrast, the same vector injected into an adult heart did not result in any increase in endothelial cell proliferation. To understand whether the different angiogenic potential of the three organs depends on intrinsic properties of ECs or rather on the presence of some inhibitory factors within the adult heart, we purified ECs using CD31 magnetic beads. By flow cytometry we could detect the presence of an EC sub-population characterized by high expression levels of VEGFR2 and CD105, two tip cell markers, in the embryonic/neonatal but not in the adult heart ECs. Consistently, the formation of filopodia by tip cells and vessel-like tubular structures in response to VEGF was much more evident for embryonic/neonatal than for adult cardiac ECs. RNAseq data from the three EC types reveal a differential expression profile for coding genes, miRNAs and IncRNAs. ECs purified from the heart of EGFP transgenic pups formed capillaries and integrated into the vascular network of the skeletal muscle but not of the adult heart, suggesting the presence of an anti-angiogenic factor in this latter organ. The expression of VEGFR1 and its soluble isoform sVEGF1 is significantly increased in adult compared to embryonic hearts, consistent with the role of sVEGF1 in keeping the cornea completely avascular. Cancer cells injected into the heart of adult syngeneic mice grew much less compared to the same number of cells injected into the skeletal muscle, possibly indicating that the impaired angiogenic potential of the heart inhibited tumor growth. Conclusions: Collectively, these results indicate that both cell-autonomous and non autonomous mechanisms halt the proliferation of ECs in the post-natal heart and pave the way to novel therapeutic opportunities to promote angiogenesis in cardiac ischemia and, possibly, to control tumor progression.
P1325 Pharmacological evaluation of the agonists of nuclear and G protein coupled estrogen receptors in arterial hypertension associated with estrogen depletion

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Background - In the presence of premenopausal hypertension it may intensify a cardiac dysfunction when estrogen depletion occurs, this study aimed to evaluate the estrogen receptor agonists in the estrogen depletion in normotensive (WKY) and spontaneously hypertensive (SHR) rats.

Methods: Protocols were approved by Animal Care and Use Committee at University. Females WKY or SHR (12 weeks old) were divided into groups, Sham and oophorectomized (OVX) treated subcutaneous with vehicle, G1, PPT or DPN, 24 μL/kg, 28 days. Diastolic function was determinate by the ratio between early transmitral filling velocity (E) and rapid mitral annular velocity (e'), and left ventricular and diastolic pressure (LVEDP). In addiction was analyzed mean blood pressure (MBP).

Results: There was uterine atrophy in OVX. There was weight gain in the WKY and SHR and reduced in WKY-OVX-PPT. The heart/tibia increase in OVX, WKY and SHR compared to Sham, and reduction in WKY-OVX-PPT and SHR-OVX treated with G1 or PPT. The E/e' was elevated in the SHR-OVX treated to SHR-Sham and the SHR-OVX G1 treatment reversed. MBP were increased in SHR-Sham compared to WKY-Sham, from 107.8 ± 4.72 to 112.7 ± 7.54 mmHg (P < 0.05), in SHR-OVX was intensified to 143.7 ± 7.66 mmHg (P < 0.05). Treatment with G1, DPN and PPT promoted partial reduction of MBP in SHR-OVX. OVX in WKY increased from PVEDP when compared to WKY-Sham from 2.05 ± 0.66 to 8.12 ± 1.7 mmHg (P < 0.05), which was not reduced with treatments. We observed that SHR-Sham presented increased PVEDP in relation to WKY-Sham 7.38 ± 0.88 mmHg (P < 0.05) and increased in SHR-OVX to 13.81 ± 2.10 mmHg compared to SHR-Sham (P < 0.05). SHR-OVX-DPN presented PVEDP reduction to 5.79 ± 0.92 mmHg, (P < 0.05) compared to SHR-OVX.

Conclusion - We observed improvements in cardiac structure and functional parameters with the different estrogen agonists in equimolar doses.

P1326 Pharmacokinetics of ubiquinol, administered intravenously

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Introduction: Coenzyme Q10 (CoQ10) plays an important role in the generation of the cell energy - ATP, being part of the electron transport chain in process of oxidative phosphorylation in the internal membrane of mitochondria. Many diseases of the cardiovascular system and congestive heart failure, in particular, depend on decreased content of CoQ10 and myocardial CoQ10 content tends to decline as the degree of heart failure worsens. Additionally, CoQ10, through its antioxidant effects, may reduce oxidative stress, which is known to adversely affect left ventricular ejection fraction and alter disease outcomes. The long-term supplementation of CoQ10 in patients with HF seems safe, appears to produce symptomatic improvements, and, more importantly, has been found to significantly reduce major adverse cardiovascular events and mortality. Ubiquinol is the reduced form of coenzyme Q10. This drug is expected to complement coenzyme Q10, which is naturally found in the organism, helping the cells to produce more energy and thus relieve the symptoms of this disease.

Purpose: - investigation of the pharmacokinetics of ubiquinol, administered intravenously, for the urgent increase of its concentration in blood and myocardium.

Methods: Solution (1%) of solubilized ubiquinol (dose 10 mg/kg) was administered intravenously to male Wistar rats. Samples of blood and myocardium were taken in 0, 0.25, 0.5, 1, 2, 4, 8, 24, 32, 48 h after i.v. injection. 5 rats were used for each time point that means 50 rats were used for the study. Levels of ubiquinol were measured by HPLC with an electrochemical detector.

Results: High levels of ubiquinol were detected in blood during the whole period of observation, and it was 10-fold higher than baseline level 48 h after iv administration. The significant increase in the myocardial level of ubiquinol was detected in 15 min after iv injection. The maximal increase in the myocardial level of ubiquinol by 50-80% maintained during 24 h and reached the initial level in 48 h.

Conclusion: Intravenous administration of the solubilized ubiquinol is followed by the fast increase in its concentrations in blood and myocardium that could be used for the treatment of acute heart failure as well as ischemia/reperfusion conditions.

Table 1: P1324 Animal characteristics

<table>
<thead>
<tr>
<th></th>
<th>WKY</th>
<th>SHR</th>
<th>Sham</th>
<th>OVX</th>
<th>G1</th>
<th>PPT</th>
<th>DPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ulterior</td>
<td>22.28 ± 4.59</td>
<td>3.23 ± 0.54</td>
<td>3.19 ± 0.17</td>
<td>5.17 ± 1.02</td>
<td>3.68 ± 0.66</td>
<td>17.80 ± 3.10</td>
<td>3.50 ± 0.48</td>
</tr>
<tr>
<td>Body weight</td>
<td>249.0 ± 4.9</td>
<td>334.0 ± 21.6</td>
<td>306.6 ± 7.3</td>
<td>290.3 ± 7.5</td>
<td>264.4 ± 12.3</td>
<td>224.2 ± 4.3</td>
<td>286.0 ± 18.5</td>
</tr>
<tr>
<td>Heart/tibia</td>
<td>25.84 ± 0.87</td>
<td>32.64 ± 0.65</td>
<td>31.11 ± 0.68</td>
<td>26.81 ± 1.82</td>
<td>31.05 ± 1.08</td>
<td>28.74 ± 1.01</td>
<td>31.33 ± 1.49</td>
</tr>
<tr>
<td>Filling pressure (E/e')</td>
<td>19.39 ± 5.57</td>
<td>20.82 ± 1.00</td>
<td>22.16 ± 4.61</td>
<td>21.82 ± 1.48</td>
<td>23.55 ± 3.41</td>
<td>23.02 ± 1.42</td>
<td>31.15 ± 2.02</td>
</tr>
</tbody>
</table>

E/e' Rapid filling transmirtal velocity/rapid mitral annular velocity. Data were expressed as mean ± EPM. "p < 0.05 compared to WKY-Sham; "p < 0.05 compared to WKY-OVX; "p < 0.05 compared to SHRS-Sham; "p < 0.05 compared to SHRS-OVX.
Poster Session 2 341

P1328 An investigation of cal2 + regulation abnormalities underlying hypertrophic cardiomyopathy in cat hearts

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Background: Hypertrophic cardiomyopathy (HCM) is the most common cardiac disease affecting 1 in 500 humans. HCM is even more prevalent in cats and affects breeds but the mutations in other cats are unknown. At the clinical and physiological level, feline HCM is closely analogous to human HCM, but little is known about the primary causative mechanism.

Purpose: The aim of this project is to compare tropinin regulation by Ca2 + and phosphorylation in HCM and wild-type cats with human HCM and to ascertain if treatments that reverse the abnormalities in human samples also work in HCM cats.

Methods/Results: Quantitative in vitro motility assays were performed with troponin extracted from post-mortem hearts of 8 cats diagnosed with HCM including one HCM cat with a homozygous MYBPC3 R120M mutation and 5 wild-type HCM unaffected cats. Two cats showed MYBP-C haploinsufficiency, but genotypes are currently unknown. All the HCM cats have a higher Ca2 + sensitivity than the WT cats (EC50 of 0.097 ± 0.005 μM, n=44 compared to 0.092 ± 0.006 μM, n=24) with an average increase of x2.05 ± 0.13. This is equivalent to that found in many studies of Ca2 + regulation in HCM mutations (1.87 ± 0.07 fold, n=71; Marston, Front physiol. 2016, 7(424), 410). This differs from human myectomy samples, where Ca2 + sensitivity is the same as donor, probably due to secondary changes. A major phenotype of human HCM is that the relationship between tropinin phosphorylation and Ca2 + sensitivity is uncoupled. This uncoupling is also observed in all the HCM cats examined (EC50/EC50unP = 1.05 ± 0.02, n=25) whereas at the WT cats tested show normal coupling (EC50/EC50unP = 1.83 ± 0.11, n=8). We showed previously that in myectomy samples the uncoupling was due to an abnormality of Troponin T and we have likewise been able to restore coupling in cat HCM by replacing Tnt with wild-type [human] protein. Similarities between cat and human HCM are further emphasised by the observation that the enhanced Ca2 + sensitivity and uncoupling due to HCM mutations can be reversed by 100 μM Epigallocatechin-3-gallate (EGCG) in the cat as has been previously demonstrated in human heart muscle (EC50/EC50unP cat HCM = EGCG = 2.13 ± 0.17, n=12).

Conclusions: To conclude, our result further demonstrate that feline HCM is an excellent model for the human disease both at the fundamental cellular level with respect to Ca2 + regulation of sarcomeric proteins and at the clinical level in disease expression.

P1329 Functional mini-gene analysis reveals aberrant splicing due to an infrequent intrinsic mutation in the cardiomyopathy-associated MYBPC3 gene

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Background: Mutations in the myosin-binding protein (MYBPC3) gene are the most common cause of hypertrophic cardiomyopathy (HCM). There is evidence to suggest that MYBPC3 point mutation localized in the donor splice site of intron 32 (MYBPC3 c.3627 +1G>A) is associated with a severe HCM phenotype in patients. Purpose: The aim was to functionally analyze MYBPC3 c.3627 +1G>A mutation, as a first step towards understanding whether this mutation could account for a HCM phenotype in vivo.

Methods: Mutation screening of the MYBPC3 gene was performed by bidirectional Sanger sequencing of genomic DNA from a heterozygous patient with HCM undergoing genetic testing at a molecular laboratory. Both MYBPC3 splice-site consensus (control) and c.3627 +1G>A mutated regions were amplified from this genomic DNA by PCR and cloned into mini-gene dual tagged (H-terminal FLAG and C-terminal c-Myc) expression plasmids. The resulting plasmids were amplified, endotoxin-free purified, confirmed by DNA sequencing, and transfected into COS-7 cells. The expression of mini-gene plasmids was analysed in transfected COS-7 cells at the protein level by Western blot and transcript RT-PCR level. Results: To verify the potential role of the MYBPC3-c.3627 +1G>A mutation identified by genetic screening, we used the multi-algorithm software suite: all five algorithms showed that this mutation impairs the donor splice site. It results in the conserved splice-donor site of intron 32 and is expected to lead to disruption in MYBPC3 transcription. Consensus and mutated MYBPC3 alactic mini-genes (900 bp and 1928 bp) were generated using the patient genomic DNA as template. Western blot and RT-PCR analyses at different time points after transfection revealed that: (1) consensus mini-gene constructs were processed as predicted by computer analysis generating intronless transcripts which were translated into the protein detected by anti-FLAG and anti-Myc antibodies, (2) neither the normally processed transcripts nor FLAG/Myc-tagged proteins were detected in COS-7 cells transfected with mini-gene constructs carrying the c.3627 +1G>A mutation, and (3) the length of the mini-gene sequence did not significantly influence the expression response of COS-7 cells transfected by either consensus or mutated plasmids.

Conclusions: The results strongly suggest that the intron c.3627 +1G>A mutation of the MYBPC3 gene could result in haplosufficiency, potentially modifying the disease phenotype.

P1330 Insights into disease mechanisms of cardiomyopathy in the presence of the CRS3P C696G mutation

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Funding Acknowledgements: British Heart Foundation (Intermediate Fellowship to KS/F/12/40/29712; Centre of Research Excellence Oxford RE/13/13/30181)

Purpose: Missense mutations in CRS3P, the gene coding for Muscle LIM Protein (MLP), are known to cause Hypertrophic Cardiomyopathy (HCM). MLP is not localised to the myofilaments and this challenges the paradigm of HCM being a disease of the sarcomere. We hypothesise that HCM mutations in signalling proteins such as MLP can cause perturbations in hypotrophic signalling cascades in the heart, resulting in cardiomyopathy. Supporting this hypothesis, MLP has recently been identified as an endogenous inhibitor of protein kinase C and reduction of inhibition may contribute to cardiomyopathy and heart failure.

Methods: A knock-in mouse model was generated by homologous recombination, introducing the C696G mutation into the mouse MLP protein. Heterozygous and homozygous knock-in mice were generated and their cardiac function assessed in vivo by echocardiography and invasive haemodynamic measurements. Tissues harvested from these animals were analysed for molecular markers of hypertrophy and heart failure as well as aberrant activation of protein kinase C alpha signalling by measuring phospho-targeted tyrosine kinase activity.

Results: Heterozygous MLP C696G knock-in mice display no overt phenotype and
show a similar hypertrophic response to trans-aortic constriction when compared to wildtype littermates. Homozygous MLP C58G knock-in mice have a phenotype resembling diluted cardiomyopathy, with compensatory activation of hypertrophy. At the molecular level, markers of heart failure and hypertrophic signalling are induced in these mice. Total MLP protein is significantly reduced (approximately 20% of wild type levels), consistent with previous studies suggesting the mutation causes protein destabilisation. The mutant protein lacks phosphorylation (compared with MLP being 30-50% in mono-phosphorylated state in wildtype) although protein kinase C alpha activity is elevated.

Conclusion: The mouse model recapitulates aspects of human Hypertrophic Cardiomyopathy caused by MLP missense mutations (such as protein destabilisation) and is a valuable tool to study molecular mechanisms resulting in cardiomyopathy, in particular how MLP integrates protein kinase C signalling into hypertrophic signalling cascades.

P1331 Myocardial and peripheral gene expression profile modulations in both acute cellular and antibody-mediated rejection of cardiac allograft

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Funding Acknowledgements: Fédération Française de Cardiologie, Société Françophone de Transplantation

Background. Heart transplantation is the last treatment in case of terminal heart failure. Acute rejection after heart transplantation raises several issues due to its occurrence despite immunosuppressive therapies and the requirement of invasive and repeated endomyocardial biopsies (EMB) that have several histological grading limitations. Non-invasive diagnostic and predictive criteria are needed.

Purpose. Characterize acute cellular (ACR) and antibody-mediated rejections (AMR) of cardiac allograft using a molecular approach, in myocardium and peripheral blood.

Methods. We characterized myocardial and peripheral blood gene expression profiles (GEP) during ACR and AMR by means of microarray analyses. By a retrospective study conducted on a historical EMB collection, we first showed a strong myocardial immunologic modulation during ACR. For the same ACR histological grading, two transcriptional profiles were identified corresponding to distinct inflammation gene expression profiles. Moreover, myocardial GEP modifications were observed one month before the occurrence of ACR, while histological characteristics showed no abnormality. A second study conducted on a prospective collection of both EMB and peripheral blood samples confirmed the results obtained on EMB and showed peripheral blood GEP modulations during both ACR and even one month earlier. Finally, we have also shown for the first time in heart transplantation, myocardial and peripheral GEP modulations during AMR, including common pathways between ACR and AMR.

Conclusion. Identification of modulated pathways in both ACR and AMR indicates important pathophysiological mechanisms, and should allow for the determination of common rejection biomarkers.

P1332 Novel nesprin-1 mutations in diluted cardiomyopathy cause nuclear envelope disruption and defects in myogenesis

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On behalf of: Catherine Shahanah

Funding Acknowledgements: British heart foundation

Nesprin 1 and 2 are highly expressed in skeletal and cardiac muscle and together with SUN (Sad1p/UNC84)-domain containing proteins and lamins form the Linker of Nucleoskeleton and Cytoskeleton (LINC) bridge complex at the nuclear envelope (NE). Mutations in nesprin-1 and -2 have previously been found in patients with autosomal dominant Emery–Dreifuss muscular dystrophy 4 (AD-EDM4, OMIM 612998) and 5 (AD-EDM55, OMIM 612999) as well as diluted cardiomyopathy (DCM). In this study, three novel rare variants (R897Q, S838LC, N849K) in the C-terminus of the Syn-1 gene (nesprin-1) were identified in 7 DCM patients by mutation screening. Expression of these mutants caused nuclear morphology defects and reduced lamin A/C and SUN1 staining at the NE, and GST-pull down indicated that SUN1/lamin/nesprin-1 interactions were disrupted. Nesprin-1 mutations were also associated with augmented activation of the ERK pathway in vitro and in hearts in vivo. During C2C12 muscle cell differentiation nesprin-1 levels are increased concomitantly with kinase light chain (KLC1/2), and immunoprecipitation and GST-pull down showed that these proteins interacted via an LEWD domain in the C-terminus of nesprin-1. Expression of nesprin-1 mutants in C2C12 cells caused defects in myoblast differentiation and fusion associated with dysregulation of myogenic transcription factors and disruption of the nesprin-1/KLC-1/2 interaction at the outer NE. These findings support a role for nesprin-1 in myogenesis and muscle disease, and uncover a novel mechanism whereby disruption of the NE-LINC complex may contribute to the pathogenesis of DCM.

P1333 Transforming growth factor beta 1 - new chronic ischaemic heart failure decompensation marker?

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Introduction. Cardiovascular diseases remain important cause of morbidity and mortality in developed countries. Atherosclerosis of coronary arteries is dominant element and often leads to ischemic heart failure (HF). Transforming growth factor beta 1 (TGF-β1) is one of the crucial cytokines in atherosclerosis development and progression as well as in HF formation. Accurate knowledge of its role in these processes may allow for early implementation of appropriate management in order to improve the prognosis of patients with ischemic HF.

Purpose. The aim of the study was to compare TGF-β1 transcriptional activity in patients with ischemic decompensated HF, after their compensation as well as in patients with advanced coronary artery disease without HF, constituting control group.

Methods. Studied group involved all consecutively admitted to the cardiology department patients with HF in the course of coronary artery disease in III and IV NYHA class (n=52). The control group consisted of patients with advanced coronary artery disease without HF coexistence (n=23). RNA was obtained from peripheral blood mononuclear cells. Transcriptional activity of TGF-β1 using QRT-PCR method in patients with advanced HF due to coronary artery disease and in patients with coronary heart disease without coexisting HF as well as their expression in the stage of both: decompensation and in compensated period was assessed. Enrolled patients were evaluated within first 24 hours and then after 4-8 weeks since admission, when HF compensation was achieved.

Results. Obtained data are presented in figure below. To the left, transcriptional activity of TGF-β1, statistically significantly lower in patients with advanced heart failure in the course of coronary artery disease (red color) compared with controls – ischemic subjects without HF (green) has been shown. To the right side transcriptional activity of TGF-beta 1 in patients with decompensated ischemic HF (red) and during their compensation (yellow) has been presented.

Conclusions. Statistically significant reduction of TGF-β1 transcriptional activity in patients with congestive heart failure and their further reduction during decompensation suggest importance of that gene in the development and decenpensation of heart failure, making it useful diagnostic and prognostic clinical marker identifying subjects with coronary heart disease and high risk for HF developing, its decompensation and compensation.
**P1334**

**The relevant role of SR Ca leak in the development of heart failure**

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**On behalf of:**

German Centre for Cardiovascular Research (DZHK), partner site Goettingen, Germany

**Funding Acknowledgements:**

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**Purpose:**

Increased sarcoplasmic reticulum (SR) Ca2+ leak via the cardiac ryanodine receptor (RyR2) has been suggested to have a mechanistic role in the development of heart failure (HF). So we tested the hypothesis whether inhibiting or inducing SR Ca2+ leak modulates HF progression.

**Methods:**

Wild-type C57BL/6J mice, subjected to transaortic constriction (TAC)-induced pressure overload (PO) or permanent coronary artery ligation-induced myocardial infarction (MI), were treated with a selective RyR2 stabilizing Rycal S36. Moreover, Ryr2RS/WT knock-in mice with the patient catecholaminergic polymorphic ventricular tachycardia (CPVT)-associated RyR2 mutation (R2474S) were subjected to shunt-induced volume overload (VO).

**Results:**

In the TAC model, SR Ca2+ leak was significantly reduced in S36- versus placebo-treated mice. However, both treatment groups exhibited comparable contractile deterioration. Interestingly, S36-treated mice exhibited an improved survival after TAC. Implanted ECGs showed a markedly decreased arrhythmia score by ≈42%. Arrhythmia inducibility in perfused hearts was dramatically reduced by ≈72% post-TAC. Consistently, MI mice, treated with Rycal S36, experienced improved survival and reduced arrhythmias vulnerability. However both MI S36 and MI placebo hearts developed similar pump dysfunction. In the VO model, although SR Ca2+ leak was massively increased in Ry2RS/WT mice, both WT and Ry2RS/WT mice had a similar depressed pump function post-shunt.

**Conclusions:**

These results suggest that SR Ca2+ leak may not primarily influence contractile remodeling in three different HF models, whereas ventricular arrhythmias were significantly reduced and survival was improved by Rycal S36 treatment. Thus selective SR Ca2+ leak inhibition via the Rycal S36 might be a promising option for treatment of cardiac arrhythmias in patients with HF and CPVT.

**P1335**

**Autonomic regulation of cardiac activity in patients with prehypertension**

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**Hypertensive disease (HD) is a disease dysregulation, and at the stage of formation of the disease the clinical picture is dominated by manifestations of autonomic dysfunction. The purpose of research - study of heart rate variability (HRV) and to assess the relationship between the sympathetic and parasympathetic divisions of the autonomic nervous system (ANS) in patients with HD and prehypertension (preHTN) emissions during the orthostatic test. The study involved 30 patients with HD (20 men, 10 women), average age 46.6 ± 1.4 years and 25 with preHTN (16 men and 9 women), average age 34.8 ± 2.1 years. The control group consisted of 12 healthy people, the average age of 26.1 ± 3.2 years. All patients conducted daily Holter ECG. The total capacity of the spectrum of neurohumoral modulation in patients with HD was 1253 ± 470 ms2 / Hz, preHTN 2.4 times higher - 3032 ± 978 ms2 / Hz in the control group - 3778 ± 1022 ms2 / Hz. In 55.7% of patients with HD and y 17.3% of patients with preHTN has been a transition to the system of regulation of autonomic reflex level to a lower humoral-metabolic, who is able to quickly provide the homeostasis of the cardiovascular system. In the analysis of the balance of ANS at 71.1% HD patients prevailed activity of the sympathetic division, at 28.8%-with preHTN and 26.9%-the control group. Balanced type of autonomic modulation of cardiac rhythm was observed in 50% of cases with preHTN, in 55.8% - healthy and 21.1% - with the HD; parasympathetic predominance was seen in 21.1% of patients with preHTN and in only 3.8% of HD patients. Thus, in patients with preHTN notes balanced type of autonomic modulation of cardiac rhythm without changing the spectral parameters.
Rapid Fire 4 - Therapy and management

1377 Age and effect of implantable cardioverter-defibrillator (ICD) in patients with non-ischemic systolic heart failure.

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Methods: In the DANISH study 1116 patients with non-ischemic symptomatic systolic heart failure and left ventricular ejection fraction (LVEF) <55% were randomized to ICD implantation or control. Assessment of interaction between age and ICD implantation was done with age as a continuous variable. Causes of death were divided into sudden cardiac death and non-sudden death (a composite of non-cardiovascular death and non-sudden cardiac death, and compared between the two youngest tertiles and the oldest tertile. Incidence rates were calculated as events per 100 patient years.

Results: There was a linear correlation between the effect of an ICD on all-cause mortality and decreasing age, p = 0.03. Causes of death differed significantly for patients not treated with an ICD and respectively below and above 68 years, p = 0.01. For patients younger than 68 years the rate of sudden cardiac death was 2.0 (1.4 – 2.7) events/100 patient years and the rate of non-sudden death was 2.6 (2.0 – 3.6) events/100 patient years, and for patients older than 68 years the incidence rate of sudden cardiac death was 1.6 (0.7 – 2.4) events/100 patient years and the rate of non-sudden death was 4.7 (3.4 – 6.5). Expressed in percent, sudden cardiac death occurred in 12% of patients younger than 68 years, whereas 15% in this age group died from a different cause. In contrast, patients ≥68 years old only 8% died of sudden cardiac death compared to 28% who died in a different way.

Conclusion: In patients with systolic heart failure not caused by ischemic heart disease the effect of ICD implantation decreased with increasing age. Patients younger than 68 years had roughly equal incidence rates of sudden cardiac death and non-sudden death and had a significant reduction in all-cause mortality when treated with an ICD. Patients older than 68 years were relatively more likely to die from other causes than sudden cardiac death which may explain why implantation of an ICD did not benefit survival in this age group.

Funding Acknowledgements: Supported by grants from Medtronic, St. Jue Medical, ThygFonden, and The Danish Heart Foundation.

1378 Use of mineralocorticoid receptor antagonists in a real-world population with heart failure and reduced ejection fraction: an analysis of 24,529 patients from the Swedish heart failure registry

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Purpose: To assess predictors of MRA non-use in a large unsolicited cohort of patients with HF and EF.<ref>© 2017 The Authors
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Background: Mineralocorticoid receptor antagonists (MRAs) improve outcomes in heart failure with reduced ejection fraction (HFrEF), but may be under-utilized in contemporary clinical practice.

Methods: In the nationwide Swedish Heart Failure registry (SwedeHF), we all included patients with HFrEF (EF <40%) during years 2000-2012. Logistic regression analysis was performed to identify the predictors of MRA non-use among 38 variables (demographical, clinical, treatments). Missing data were managed by multiple imputation.

Results: Of 24,529 patients, 29% were female; mean age was 72 ± 12 years; Only 8,102 (33%) patients were receiving MRAs. Demographic, clinical characteristics and concomitant treatments independently associated with MRA non-use are shown in the figure. Notable characteristics were, in descending order of magnitude, no need for diuretics, absence of implantable cardioverter or cardiac resynchronization device, higher ejection fraction, shorter HF duration, higher blood pressure, estimated glomerular filtration rate, older age, lower NYHA class, male gender, followed-up in primary rather than in specialized care, history of ischemic heart disease, higher NT-proBNP levels, concomitant atrial fibrillation/flutter, being registered in internal medicine/geriatrics rather than in cardiology department and being married/cohabitating rather than living alone. There was a trend toward underuse of MRAs in patients with mid-range potassium serum levels (3.5-5.0 mEq/L) vs. those with low (< 3.5 mEq/L) and high (> 5.0 mEq/L) levels.

Conclusions: MRAs remain underused in HFrEF. MRAs may be used to supplement diuretics and for K-sparing. Their use does not appear to decrease with elevated K. The underuse may be linked to non-specialist care and follow-up and non-use of other HF interventions, suggesting specialized referral, a better education and understanding of the indications and benefits of MRAs in guideline appropriate HF-EF patients should be encouraged.

1379
Oral anticoagulant use in patients with atrial fibrillation and concomitant heart failure: an analysis of 22,719 patients from the swedish heart failure registry
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Background. Atrial fibrillation (AF) is common in patients with heart failure (HF). HF is considered a risk factor for both thromboembolic and bleeding risk in patients with AF.

Purpose: To assess oral anticoagulants (OACs) use in a large unselected cohort of HF patients with concomitant HF and to identify patient characteristics associated with their non-use.

Methods: We included patients with AF, HF and no previous valve replacement enrolled in the Swedish Heart Failure Registry. Multivariable logistic regression analysis was performed to identify independent predictors of OAC non-use among 39 variables (demographical, clinical, treatment). Missing data were managed by multiple imputation.

Results: Of 22,719 included patients, 37% were female. The mean age was 76 ± 10 years. Approximately half of the patients enrolled (52%) had HF with reduced ejection fraction (EF), while the 22% had HF with mid-range EF and 26% had HF with preserved EF. In total, 13,153 patients (99%) were receiving OACs at baseline. The demographic and clinical characteristics and concomitant treatments associated with OAC non-use are shown in the figure. Notable characteristics were, in descending order of magnitude, treatment with platelet inhibitors, absence of implantable cardioverter or cardiac resynchronization device, paroxysmal (vs. permanent) AF, history of severe bleeding, followed-up in a primary rather than in specialized care, low haemoglobin levels, current smoking, living alone (vs. being married/cohabitating), older age (>75 years), no history of stroke/transient ischemic attack or ischemic heart disease, low income, concomitant lung disease, being an inpatient (vs. outpatient), having fewer children, longer HF duration and lower creatinine clearance.

Conclusions: In this nationwide registry, we found low utilization of OACs among patients with AF and concomitant HF. Platelet inhibitors appeared inappropriately used in lieu of OACs. Some characteristics associated with OAC underuse were linked to older age, history of severe bleeding, low haemoglobin levels and less use of HF therapy supporting a generalised fear of OACs in frailter patients, despite their greater stroke risk. Furthermore, there are additional unwarranted predictors of non-use, such as paroxysmal AF and socio-economic conditions.

Purpose: SGLT2 inhibitors differentially reduce extracellular fluid volume relative to blood volume: a hypothesis for heart failure protection
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Introduction. In the EMPA-REG cardiovascular outcomes trial, treatment with the sodium glucose cotransporter 2 inhibitor (SGLT2i) empagliflozin significantly reduced heart failure hospitalization and cardiovascular death. This result was unexpected, and there is currently no consensus understanding of the mechanism for this protective effect. Improvements were apparent very early in the trial, suggesting the mechanism may have “rescued” individuals who were on the verge of cardiac decompensation.

Purpose: SGLT2i causes osmotic diuresis due to glucosuria. We hypothesize that SGLT2i-induced osmotic diuresis, a distinctly different mechanism than other diuretic classes, results in greater electrolyte-free water clearance, which in turn causes greater clearance of fluid from the extracellular fluid (ECF) space than from the circulation. In heart failure patients, this may result in greater clearance of congestion with minimal impact on arterial filling and organ perfusion.

Methods: 24-hour urinary volume and sodium and plasma sodium data from a previously conducted study in healthy subjects (n=62) administered either the SGLT2i dapagliflozin or the loop diuretic bumetanide for seven days were coupled with a 3-component mathematical model of blood, ECF, and peripheral sodium and water, to simulate the effect of each drug on ECF and blood volume. Drug-induced water and sodium excretion with either dapagliflozin or bumetanide were applied as model inputs, with the magnitude and time profile determined by fitting to the clinically measured 24-hour urinary sodium and urine volume. The model was constrained by fitting measured plasma Na+ concentration, and ECF volume and blood volume changes were simulated.

Results: With dapagliflozin, the reduction in ECF volume was predicted to be 2-3-fold greater than the reduction in blood volume, while with bumetanide, the reduction in ECF volume was 23% less than the reduction in blood volume. Model-based analyses further illustrated that, in general, as electrolyte-free water clearance increases, there is a greater reduction in ECF volume relative to blood volume, and that this effect may be mediated by peripheral sequestration of sodium in order to buffer ECF sodium concentration.

Conclusions: These results support the hypothesis that by increasing electrolyte-free water clearance, SGLT2i reduces ECF volume with a smaller effect on blood volume, compared to loop diuretics. Heart failure is often characterized by excess fluid accumulation in both the blood and interstitial space, yet many heart failure patients actually experience arterial underfilling due to low cardiac output, and treatment must balance the need to relieve congestion while maintaining arterial filling. SGLT2i may reduce intestinal congestion without deleterious effects of arterial underfilling, hypotension, reduced organ perfusion, and neurohormonal activation that can accompany excess blood volume depletion with other forms of diuretics.

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SGLT2 inhibition differentially reduces extracellular fluid volume relative to blood volume: a hypothesis for heart failure protection
K Melissa Hallow1; G Helmlinger2; PJ Greasley1; DW Boulton2
1University of Georgia, School of Chemical, Materials, and Biomedical Engineering, Athens, GA, United States of America; 2Astrazeneca, Waltham, MA, United States of America

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Background and purpose: To estimate healthcare resource utilization among patients with heart failure (HF) with preserved (HFpEF) versus reduced (HFrEF) ejection fraction using population data from two Swedish counties.

Methods: Patients with HF were identified via electronic medical records (EMRs) from primary and/or secondary care in Uppsala and Västerbotten, linked via unique identifiers to data from the National Patient Register and Swedish Prescribed Drug Register. Local echocardiography data were used to identify HFrEF (defined as ejection fraction ≥50%) and HFpEF (defined as <50%). Patients aged ≥18 years with ≥2 diagnoses of HF between 01/01/2010 and 31/03/2015 and an ICD-10 diagnostic code of I50 (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I110, I130 or ≥18 years with ≥2 diagnoses of HF between 01/01/2010 and 31/03/2015 and an ICD-10 diagnostic code of I50 (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I110, I130 or I132 in any position were included. Patients were followed from date of first diagnosis (index date) to end of study period or EMR collection, date of death or loss to follow-up for other reasons, whichever came first. Unadjusted all-cause and cardiovascular disease (CVD)-related hospitalization rates were assessed using a Cox proportional hazards model, accounting for age, sex, setting of first diagnosis (primary vs secondary care), HF phenotype and NT-proBNP level.

Results: In total, 8702 patients with HF were identified. HF phenotype was known in 3167 patients; 64.6% had HFrEF, 35.4% had HFpEF. Patients with HFpEF were younger (mean age SD: 69.9 ± 13.7 years vs 74.2 ± 12.6 years) with a lower Charlson comorbidity index (1.66 ± 1.83 vs 1.66 ± 1.83) than those with HFrEF. All-cause hospitalization rates were marginally lower for HFpEF than for HFrEF (mean [95% CI] proportion of patients hospitalized within 1 year of diagnosis, 72.5 [70.1–74.8]% vs 73.8 [70.7–77.0]%); hazard ratio [HR] over whole follow-up period, 0.87 [0.79–0.97], p = 0.0093). The proportion of patients hospitalized was higher for those diagnosed in secondary care than in primary care, particularly within 1 year of diagnosis (1-year rate, 68.6 [68.3–7.01]% vs 59.1 [54.8–61.5%]; HR, 1.15 [1.07–1.23], p = 0.0002). Similar trends were observed for CVD-related hospitalization rates for HFpEF vs HFrEF (1-year rate, 69.7 [67.1–71.9]% vs 70.7 [67.5–74.0%]; HR, 0.89 [0.81–0.99], p = 0.0030) and for patients diagnosed in secondary vs primary care (1-year rate, 66.6 [63.3–68.0]% vs 66.2 [53.8–58.5%]; HR, 1.15 [1.07–1.24], p = 0.0001). Numbers of hospitalizations and outpatient visits decreased with time after diagnosis for HFpEF, but increased slightly for HFrEF after 2 years (Figure). The mean ± SD total number of all-cause days of hospitalization during the first year after diagnosis was lower in patients with HFpEF vs HFrEF (19.9 ± 26.1 vs 26.3 ± 34.5 days), while the number of HF-related days of hospitalization was similar (16.0 ± 22.4 vs 17.2 ± 24.0 days).

Conclusions: Number and duration of hospital stays were significantly lower over time in patients with HFpEF than HFrEF; this may be explained by the comorbidity burden in the latter group.
Significance of ischemic heart disease in patients with heart failure with preserved, mid-range and reduced ejection fraction - A nationwide cohort study

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Background: The importance of ischemic heart disease (IHD) is well established in heart failure with reduced ejection fraction (HFrEF). However, its epidemiological and prognostic significance in heart failure with preserved and mid-range ejection fraction (HFpEF) is much uncertain.

Purpose: We explored the relationship between ischemic heart disease (IHD), all three HF types and outcomes in the nationwide Swedish Heart Failure Registry (SwedishHF).

Methods: A total of 42,987 patients from SwedishHF were characterized according to EF and IHD status at baseline and followed for new IHD events, other outcomes and EF changes. Associations between baseline IHD and HF type and HF type, baseline IHD and outcomes were assessed using multivariable Generalized Estimating Equations and multivariable Cox regression, respectively.

Results: Overall, 23% of patients had HFrEF (52% IHD, 29% prior myocardial infarction [MI], 21% had HFpEF [61% IHD, 41% prior MI] and 56% had HFpEF [60% IHD, 43% prior MI]). The association with prevalent IHD was similar for HFrEF and HFpEF (OR 1.00, 95% CI 0.98-1.01), and lower in HFpEF (RR 0.89 [0.84-0.95] vs. HFrEF). Prevalent IHD was independently associated with increased risk of new IHD events in all EF categories, although more pronounced in HFrEF (HR for IHD vs. no IHD 3.13, 2.87-3.40) than in HFpEF (HR 2.43, 2.14-2.75) and HFpEF (HR 2.34, 2.10-2.62). Prevalent IHD was also associated with an increased risk of all other events except all-cause mortality in HFpEF. Patients with IHD, particularly those with new IHD events, were more likely to change to a lower EF category and less likely to change to a higher EF category over time.

Conclusion: HFrEF resembled HFpEF rather than HFrEF with regard to both a higher prevalence of IHD and a greater risk of new IHD events. Prevalent IHD was an important determinant of prognosis in all HF types suggesting that management of IHD is important in these patients and that further evaluation of management strategies is warranted.

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Physical activity measured with implanted devices predicts heart failure outcomes

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Background: There is increasing evidence that physical activity (PA) levels have prognostic value in patients with chronic heart failure (HF). Purpose - The aim of this research is to assess PA as a surrogate endpoint for HF clinical outcomes in patients indicated for cardiac resynchronization therapy (CRT).

Methods: Data from 2,408 randomized patients with implantable cardioverter defibrillator (ICD) with or without CRT enrolled in the RAFT and REVERSE studies were pooled. The devices continuously measured and stored total daily active time (single-axis accelerometer). Average activity measured in minutes per day over a 30-day period at 1 and 6 months post-implant were examined. Statistical analyses were adjusted for age, LBBB, diabetes mellitus, ischemia, NYHA class, and diastolic blood pressure in a multivariable model. The main effect of PA and the interaction between PA and assignment to CRT was tested.

Results: Device data available from 2,249 patients were analyzed (85 ± 10 years; 62% men; left ventricular ejection fraction, 23 ± 6%; NYHA III). Of these patients, 404 died and 445 experienced a HF hospitalization (35 ± 20 months of follow-up). For the analysis of 1 month PA, 359 patients were removed due to death prior to 1 month (n = 28) or insufficient device data (n = 334) and for 6 month data, 350 patients were removed due to death prior to 6 months (n = 70) or insufficient device data (n = 285). Results are shown in the table. The 1 month PA, 6 month PA and the change in PA were 5 minutes higher per day in patients randomized to CRT, after adjustment for 1 month PA levels (P = 0.36).

Conclusions: Physical activity assessed at either 1 or 6 months after ICD +/- CRT implantation predicted death or HF hospitalization as well as mortality and improvement in NYHA class in patients with chronic HF.

<table>
<thead>
<tr>
<th>Activity variable a</th>
<th>Death or HF hospitalization</th>
<th>P-value</th>
<th>Death</th>
<th>Improvement in NYHA class at 12 months</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One month PA</td>
<td>1890 (0.96 [0.94-0.98])</td>
<td>P &lt; 0.0001</td>
<td>0.94 [0.92-0.95]</td>
<td>1.02 (1.01-1.04)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Six month PA</td>
<td>1896 (0.96 [0.94-0.98])</td>
<td>P &lt; 0.0001</td>
<td>0.93 [0.91-0.95]</td>
<td>1.03 (1.02-1.05)</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>Change in PA from 1 to 6 months</td>
<td>1880 (0.98 [0.96-1.01])</td>
<td>P = 0.24</td>
<td>0.97 [0.94-1.00]</td>
<td>1.03 (1.00-1.06)</td>
<td>P = 0.03</td>
</tr>
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</table>

Adjusted for baseline variables

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Clinical and prognostic value of spot urinary creatinine in chronic heart failure

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Background: Twenty-four hour urinary creatinine excretion is an established marker of muscle mass in heart failure and other populations. Spot urine creatinine might be an easy obtainable, cheap marker of muscle wasting and prognosis in heart failure (HF) patients.

Purpose: This study aimed to identify patient characteristics associated with low urinary creatinine in morning spot urine and investigate its association with clinical outcome.

Methods: Spot urinary creatinine concentration was measured in 2130 patients included in the GISSI-HF trial. We evaluated the prognostic value of urinary creatinine and its relation with clinical variables.

Results: Median spot urinary creatinine was 0.80 (IQR 0.50 to 1.10) g/L. Lower spot urinary creatinine was associated with older age, smaller height and weight, higher NYHA class, worse renal function and more frequent spironolactone and diuretic use (all P < 0.05). During a median follow-up of 2.8 years, 855 patients (31%) experienced the combined endpoint of all-cause mortality or HF hospitalization. Lower urinary creatinine was independently associated with an increased risk of all-cause mortality or HF hospitalization (Hazard ratio (HR): 1.59 [1.21-2.08] per log decrease, P=0.001), and all-cause mortality (HR: 1.75 [1.25-2.45] per log decrease, P=0.001).

Conclusion: Lower urinary creatinine, measured in morning spot urine in patients with chronic HF, is associated with worse renal function, smaller body size, more severe HF and is independently associated with an increased risk of all-cause death and HF hospitalization. Urinary creatinine might therefore be a valuable marker to assess muscle wasting and heart failure severity.

**Figure 1**

Creatine excretion and outcome

1386

Heart failure with mid-range ejection fraction in patients admitted to internal medicine departments: findings the RICA registry.

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On behalf of: RICA investigators group

Introduction: In the recently published European guidelines, a new term has been defined for patients with heart failure (HF) and ejection fraction (EF) between 40-49%: HF with mid-range EF (HFrEF). Limited data exist on the epidemiology, treatment and short or long-term prognosis of these patients.

Purpose: To describe clinical characteristics, treatment and prognosis in patients with heart failure and mid-range ejection fraction (HFrEF) discharged after admission for decompensation.

Method: We prospectively included and followed 2753 patients admitted with acute heart failure to Internal Medicine units. They were classified according to ejection fraction into three strata: reduced, EF <40% (HFrEF); mid-range EF 40-49% (HFrEF); and preserved EF ≥50% (HFpEF). Clinical, echocardiographic and laboratory data, and treatment at discharge were collected, and the three groups were compared. A multivariable analysis was performed to assess the relationship between EF and outcomes at 30 days and one year.

Results: A total of 10.2% of patients had HFrEF. They were more likely to be men and to have a history of chronic kidney disease and higher levels of NT-proBNP than those with HFpEF. Compared to patients with HFpEF, they had less ischaemic aetiology and chronic obstructive pulmonary disease, and a higher proportion of atrial fibrillation and hypertension. In HFrEF, the use of beta-blockers, aldosterone antagonists and antplatelet drugs was lower than in HFpEF, but the use of calcium channel blockers and anticoagulants was higher. There were no differences between groups in 30-day and 1-year readmission rates. However, patients with HFrEF had significantly higher 1-year mortality (28%) than patients with HFpEF and HFrEF (20% and 22%, respectively, p < 0.001, Figure 1).

Conclusion: Clinical characteristics and treatment among patients with heart failure admitted to Internal Medicine departments differ depending on EF. Prognosis of patients with HFrEF is closer to that of HFpEF, and survival is better than in HFrEF.

**Figure 1**

Impact of CHA2DS2-VASc and HAS-BLED on oral anticoagulant use and outcomes in patients with atrial fibrillation and concomitant heart failure: an analysis of 22,055 patients from the SwedenHF

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Background. Atrial fibrillation (AF) is common in patients with heart failure (HF). HF is a risk factor for both thromboembolic and bleeding events in patients with AF.

Purpose: To assess the impact of CHA2DS2-VASc and HAS-BLED scores on oral anticoagulant (OAC) use and outcomes in AF patients with concomitant HF.

Methods: We included patients with AF, HF and no previous valve replacement enrolled in the Swedish Heart Failure Registry. High and low CHA2DS2-VASc and HAS-BLED scores were defined as above/below median. Multivariable logistic regression analysis was performed to assess the association between CHA2DS2-VASc and HAS-BLED scores and OAC use. Kaplan Meier curves and adjusted Cox regression models including 28 baseline variables including OAC use were fitted to evaluate the association between CHA2DS2-VASc (adjusted also for
HAS-BLED and HAS-BLED adjusted also for CHA2DS2-VASc scores and two composite outcomes: all-cause death and stroke; and all-cause death and major bleeding. Results: Of 22,055 included patients, 37% were female, 48% had ejection fraction (EF) ≤40%, 26% EF 40-49% and 26% EF>50%. Mean age was 76 ± 10 years. In total, 12,756 (58%) patients were receiving OACs. The use of OACs was significantly predicted by CHA2DS2-VASc and HAS-BLED scores. In particular, the likelihood of OAC use was 1.43-fold increased for each 1-unit increase in CHA2DS2-VASc and 2.4-fold decreased (odds ratio 0.36) for each 1-unit increase in HAS-BLED (Fig Panel A). The risk of death/stroke increased progressively from low CHA2DS2-VASc / low HAS-BLED, to low/high, high/low and high/high. The risk of death/major bleeding increased progressively from low/low, to low/high, low/high and high/high. Additionally, 1-unit increase in HAS-BLED and CHA2DS2-VASc determined the same increase in risk of death/major bleeding and death/stroke, respectively (Fig Panel A).

Conclusions. In this nation-wide HF registry, only 58% of patients with AF received OAC. Thrombotic and bleeding risk affected both OAC use and outcomes in the expected directions. However, bleeding risk inappropriately affected decision making more than stroke risk.

1389 Multicentre trial of a transfemoral mitral valve replacement system
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Background/Objective: The Cardioband system enables percutaneous implantation of an adjustable "surgical-like" mitral annuloplasty ring using a transseptal approach. The aim of this multicentre study was to evaluate the feasibility, safety and outcomes up to 24 months of Cardioband implantation in patients with secondary mitral regurgitation (MR).

Methods: Between February 2013 and June 2016, 61 high-risk patients with significant secondary MR were enrolled at 11 European sites. All patients were screened by a heart team using echocardiography and cardiac CT.

Results: Mean patient age was 72 ± 7 years, 44 were males (72%). Mean EuroSCORE II was 7.1%. At baseline, 53 patients (86%) were in NYHA functional class III-IV, with a mean left ventricular ejection fraction of 33 ± 11%. Device implantation was achieved in all patients but one. At discharge, 51 patients (80%) had MR ≤2+. After device cinching, an average 30% reduction in septal mitral annular diameter was observed (from 37 ± 4 mm to 26.2 ± 4 mm, p < 0.01). Thirty-day mortality was 3.3% (2 patients; death adjudicated as unrelated to the device). MR c =+ was measured in 28/31 (93%) and 11/12 (92%) patients at 12 and 24 months of follow-up, respectively (Figure). NYHA functional class II-III was present in 26/33 (79%) and 11/15 (77%) at 12 and 24 months, respectively. A significant improvement was observed at 12 months in the mean quality of life score (Minnesota Living with Heart Failure Questionnaire) from 41 to 23 (p < 0.001) and mean six-minute walk distance improved from 299 m to 372 m (p < 0.01).

Conclusions: Transseptal mitral repair with the Cardioband device resulted in significant MR reduction by reconstruction of the mitral annulus. Thirty-day mortality is comparable to other transcatheter mitral procedures. MR severity reduction and clinical benefit remain stable up to 24 months.

1390 Hypoxic-hyperoxic preconditioning: a novel technique for myocardial protection against ischemia-reperfusion injury
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Introduction: Preconditioning by moderate hypoxia, as well as hypoxia, constitutes an effective drug-free method to amplify adaptive response to various negative influences of cardiopulmonary bypass (CPB) during cardiac surgery.

Purpose: The study aimed to assess the mechanisms and impact of hypoxic-hyperoxic preconditioning (HHP) on functional state of myocardium in patients with coronary artery disease (CAD) undergoing cardiac surgery with CPB.

Methods: The study included 120 patients randomly assigned to two groups: 61 patients received hypoxic-hyperoxic preconditioning before the CPB (HHP group) and 59 patients were not preconditioned (control group). Coronary artery bypass grafting with CPB for multivessel coronary artery disease was performed in all cases (2014-2016). Safety control of the preconditioning procedure included ECG monitoring, invasive blood pressure control, cardiac output, pulse oximetry, capnography, cerebral oximetry, measurement of anaerobic threshold. To monitor acid-base status and metabolic state we measured saturation of arterial and mixed venous blood, lactate and glucose level, plasma pH every 10 min during the HHP procedure; calculated oxygen consumption and delivery indices, ratio between venous-to-arterial carbon dioxide difference to arterovenous oxygen content difference (APCDO2/CaO2).

Results and Conclusion: Spontaneous sinus rhythm recovery after CPB was registered more often in HHP group - 34 (55.7%) compared to controls - 19 (32.2 %), X²=8.38, p=0.015. The length of inotropic support in early postoperative period was significantly lower in HHP group comparing to control group (12 [9; 15] vs 28 [24; 32] hours, U=98.1, p=0.001). Mechanical ventilation time in HHP group was 10 [7; 15] hours compared to 16 [10; 24] hours in control group, (U=34.2, p=0.023). Thus, hypoxic-hyperoxic preconditioning with individual parameters selection based on anaerobic threshold in patients with CAD before the main stage of cardiac surgery enhances adaptive response to the surgical stress, facilitates sinus rhythm recovery and provides a faster recovery after surgery.
Effect of ivabradine in patients with heart failure with preserved ejection fraction: the EDIFY randomised placebo-controlled trial

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On behalf of: for the PreserveD left ventricular ejection fraction chronic heart Failure with ivabradine study (EDIFY) Investigators.

Background. Heart failure with preserved ejection fraction (HFpEF) is prevalent, but no treatment has yet shown to reduce morbidity or mortality in these patients. Elevated heart rate is a predictive factor of worse outcomes and increased mortality in patients with heart failure, including in HFpEF.

Purpose: In this proof of concept, randomised, double-blind placebo-controlled trial, we assessed whether heart rate (HR) reduction with ivabradine improves diastolic function, exercise capacity and reduces NT-proBNP in patients with HFpEF.

Methods: EDIFY (prEserveD left ventricular ejection fraction chronic heart Failure with ivabradine study) included chronic HFpEF patients in NYHA class II-III, in sinus rhythm, with a HR ≥ 70 bpm, plasma NT-proBNP ≥ 220 pg/mL (BNP ≥ 80 pg/mL), LVEF ≥ 45% and echocardiographic evidence of diastolic dysfunction. Ivabradine (or matching placebo) was titrated to a target dose of 7.5 mg twice daily. Patients were followed for 8 months on the change in three co-primary endpoints: E/e’ on Doppler echocardiography, 6 minutes walking distance and plasma level of NT-proBNP.

Results: A total of 179 patients were randomised to ivabradine (n = 95) or placebo (n = 84). One hundred and seventy one patients (87 versus 84) were evaluated for the three co-primary endpoints. Ivabradine reduced HR (-12.1 bpm, SD 8.9) more than placebo (-4.3 bpm, SD 9.8) with a mean between group difference at 7.7 bpm (90% CI -10 to -5.4, p < 0.0001). No statistically significant changes were observed in any of the co-primary endpoints. Mean E/e’ increased from 13.1 (SD 4.7) to 14.0 (SD 4.9) with ivabradine and decreased from 13.9 (SD 6.9) to 13.0 (SD 5.4) with placebo (mean between group difference 1.4, 90% CI 0.3 to 2.5, p = 0.135); the mean distance on 6MWT (m) changed with ivabradine vs placebo from 305.4 (SD 92.2) to 309.7 (SD 102.8) and from 308.7 (SD 83.3) to 316.6 (SD 100.8), respectively (mean between group difference -3.8, 90% CI -19.1 to 11.6, p = 0.882) and geometric mean plasma NT-proBNP (pg/mL) increased marginally in both groups (from 447.7 to 483.4 with ivabradine and from 390.1 to 420.9 with placebo (geometric mean ratio 1.09 90% CI 0.9 to 1.2, p = 0.882). Ivabradine was well tolerated with no significant safety concern.

Conclusion: In patients with HFpEF, HR reduction with ivabradine did not improve E/e’, exercise capacity and did not reduce NT-proBNP plasma levels. These findings do not support the use of ivabradine in HFpEF.
1392  
stem cells improve kidney function and remodelling in CRS type II  
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Background: we investigate the effects of human amniotic fluid stem cells (hAFS) and rat adipose tissue stromal vascular fraction (GFP-positive cell (rSVC-GFP)) therapy in a monocrotaline rat model of cardio-renal syndrome type II (CRSII).  
Methods: Thirty-six male Sprague-Dawley rats were divided into six groups: sham group, the control group, the experimental group [(17.90 ± 1.37) μm²], the model group [(37.66 ± 2.21) μm²]. We observed a substantial number of SC engrafted in the medulla and differentiated in tubular cells. Apoptosis was significantly decreased (hAFS 10.29 ± 10.81 and rSVC-GFP 24.82 ± 25.19 cells/mm², p < 0.05 vs CHF) and similar to controls (9.85 ± 7.2 cell/mm²). TUNEL-positive cells were mainly located in the kidney medulla.  
Conclusions: SC treatment produced improvement in kidney function and remodelling. We observed a reduced number of SC engrafted in the medulla and differentiated in tubular cells. Apoptosis was significantly decreased (hAFS 10.29 ± 10.81 and rSVC-GFP 24.82 ± 25.19 cells/mm², p < 0.05 vs CHF) and similar to controls (9.85 ± 7.2 cell/mm²). TUNEL-positive cells were mainly located in the kidney medulla.  

1393  
The cross-talk of Salidroside on TGF-beta/Smads and Wnt/β-catenin signaling pathway in the myocardial fibrosis after AMI in rats and its correlation with Galectin3  
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On behalf of: Department of TCM, Fuwai Hospital  
Funding Acknowledgements: Beijing Administration of Traditional Chinese Medicine “3 + 3” Fundation  
Background: TGF-β/Smads pathway is currently recognized as the most important myocardial fibrosis signaling pathway. As another signaling pathway, Wnt/β-catenin also involves the proliferation and fibrosis. Recent experimental studies reported the role of salidroside on the angiogenesis and apoptosis in liver fibrosis, while there was no evidence of salidroside on preventing or reversing myocardial fibrosis, and the underlying mechanism remain unclear.  
Methods: The myocardial infarction model of male Sprague-Dawley rats were made by ligation of the left anterior descending coronary artery. Rats were randomly divided into Salidroside low dose (12mg/kg-128 days or 56 days group), Salidroside high dose (36mg/kg-128 days or 56 days group), Carvedilol group, the sham group and the control group. The cardiac function was evaluated by M-mode Doppler echocardiography. HE staining, Masson staining and Sirius red staining analysis were performed and observed for myocardial pathophysiological changes. Expression of TGF-β/Smads and Wnt/β-catenin signaling pathway was detected by Immunohistochemistry and Western blot. The level of Galectin-3 (a novel biomarker of myocardial fibrosis) in peripheral blood was detected by ELISA.  
Results: The degree of myocardial fibrosis of the experimental group was attenuated significantly (P < 0.05). Sirius red staining showed that the ratio of collagen I/I
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Identification and isolation of cycling cardiomyocytes for single cell analysis
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Funding Acknowledgements: Karolinska Institutet, the Swedish Research Council, the Ragnar Söderberg Foundation, Åke Wiberg Foundation, and Jeansons Foundations

Purpose: One of the major goals in cardiac regeneration research is to replace lost ventricular tissue with new cardiomyocytes. However, the rate of cycling cardiomyocytes in adult hearts is too low to efficiently compensate for the loss of functional myocardium in heart disease. We hypothesize that cardiomyocyte proliferation is tightly controlled by regulatory mechanisms that can be reactivated to promote endogenous repair after heart injuries. Unequivocal identification of cycling cardiomyocytes is a fundamental requirement for the investigation of these mechanisms.

Methods: We used preexisting as well as novel transgenic mouse models based on the Fucci (Fluorescent Ubiquitination-based Cell Cycle Indicator) system to discriminate cycling cardiomyocytes (G2/M phases, green fluorescent nucleolus) from non-cycling ones (G0/G1 phases, red fluorescent nucleolus). In mice ubiquitously expressing Fucci constructs, we used the myocyte-specific perinuclear marker Pericentriolar Material 1 (PCM-1) to distinguish cardiomyocyte from non-mycocyte cells in the heart tissue.

Results: The presented transgenic strategy proved to be efficient for the identification of cycling cardiomyocytes in neonate, juvenile and adult mouse hearts in vitro and in vivo. The validity of transgenes expression was verified in both systems with immunohistochemistry by co-localization of cardiomyocytes and cell cycle markers with Fucci fluorescence. The Fucci system allowed us to confirm previous observations of a gradual decrease in the number of cycling CM during the neonatal period. By combining CM isolation from Fucci mouse neonatal hearts and FACs sorting, we were able to separate cycling from non-cycling CM populations, while preserving total RNA integrity, therefore providing a suitable source for downstream analysis such as bulk RNA-seq and single cell RNA-seq.

Conclusion: Strategies that allow to unambiguously identify cycling cardiomyocytes in vitro and in vivo provide important tools to study the regulation of cardiomyocyte proliferation. With the FLCCI system we seek to identify novel molecular targets that could promote cardiomyocyte proliferation, by using transcriptome profiling (RNA-seq) of isolated cycling cardiomyocytes.

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Gemfibrozil, a potential preconditioning agent to reduce ischemia/reperfusion injury after heart transplantation
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Background: The incidence of terminal heart failure is continuously growing, thereby increasing the clinical importance of its definitive treatment, heart transplantation (HTX). Pharmacological activation of soluble guanylate cyclase (sGC) and increased cGMP-signaling have been reported to have cardioprotective effects, however, potent sGC activator compounds are still under development. Gemfibrozil, a widely used lipid-lowering fibrate has recently been shown to exert sGC activator properties in vitro.

Purpose: The aim of the present study was to investigate whether pharmacological preconditioning of donor hearts with gemfibrozil could protect against ischemia/reperfusion injury and preserve myocardial function in a heterotopic rat heart transplantation model.

Methods: Donor Lewis rats received p.o. gemfibrozil (150mg/kg BW) or vehicle for 2 days. The hearts were explanted, stored for 1h in cold preservation solution, and heterotopically transplanted. In after starting reperfusion, left ventricular (LV) pressure-volume relations and coronary blood flow were assessed to evaluate early post-transplant graft function. Additional histological and molecular biological measurements were performed.

Results: After 1h reperfusion, LV contractility (at 140µl LV volume: LV systolic pressure: 125 ± 14 vs. 77 ± 8mmHg, p < 0.05; dP/dtmax: 3260 ± 398 vs. 2116 ± 246mmHg, p < 0.05; active relaxation (dP/dtmin: -2233 ± 283 vs. -1184 ± 151mmHg, p < 0.05) and coronary blood flow (2.7 ± 0.2 vs. 2.1 ± 0.2ml/min, p = 0.03) were significantly improved in the gemfibrozil preconditioned hearts when compared to controls. Additionally, gemfibrozil treatment effectively reduced nitro-oxidative stress and apoptosis and improved the cGMP-signaling

Conculation: Pharmacological preconditioning with gemfibrozil reduces ischemia/reperfusion injury and preserves graft function in a rat HTX model, which could be the consequence of enhanced myocardial cGMP-signalling. Gemfibrozil might represent a useful tool for cardioprotection in the clinical setting of HTX surgery in the future.
1397 Cardiosphere-derived cells exert anti-inflammatory effects and confer structural and functional benefits in rat hearts with autoimmune myocarditis
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Background: Cardiosphere-derived cells (CDCs) exert cardioprotective, regenerative, immunomodulatory and anti-fibrotic effects in hearts with ischemic and non-ischemic cardiomyopathy. The effect of CDC therapy in the setting of myocarditis (a potentially lethal inflammatory cardiomyopathy without effective treatment options) is unknown.

Purpose: To investigate the effects of global intracoronary infusion of CDCs in rats with autoimmune myocarditis.

Methods: CDCs were grown from hearts explanted from healthy Lewis rats using established protocols. Autoimmune myocarditis was induced in Lewis rats by subcutaneous footpad injection of purified porcine cardiac myosin mixed with complete Freund's adjuvant on days 1 and 7. On day 10, rats underwent lateral thoracotomy and pericardiotomy. Rats were followed for 3 weeks post-infusion and underwent echocardiography on day 1, day 10 (prior to infusion) and day 28 (3 weeks post-infusion). Afterwards, rats were euthanized, hearts were explanted and underwent histology. Myocardial lymphocytic mononuclear infiltration and intestinal fibrosis were assessed by whole-field microscopy. Myocardial T cell infiltration was assessed by immunohistochemistry.

Results: Histologically-confirmed autoimmune myocarditis was induced in 14/14 rats. Left ventricular ejection fraction was comparable on day 1 (83 ± 2% vs 83 ± 4%, p = 0.96) and on day 10 (81 ± 6% vs 79 ± 6%, p = 0.57) between the 2 groups. Intracoronary CDC infusion prevented myocarditis-induced functional depression and resulted in significantly higher left ventricular ejection fraction at 3 weeks post-infusion compared to controls (85 ± 1% vs 61 ± 8%, p = 0.02). Infusion of CDCs resulted in attenuated lymphomononuclear infiltration (8 ± 3% vs 22 ± 4% of the myocardium, p = 0.03). There was a profound reduction of intestinal fibrosis (17 ± 3% vs 38 ± 2%, of the myocardium, p = 0.01) and significant reduction of T cell infiltration (50.4 ± 29 vs 125.8 ± 49 per high power field, p < 0.01) at 3 weeks post-infusion compared to controls.

Conclusions: Global intracoronary infusion of CDCs dramatically attenuates myocardial inflammation, fibrosis and T cell infiltration, while preserving systolic function in rats with autoimmune myocarditis.

1398 ERK1/2 autophosphorylation at threonine 188 in cardiac fibroblasts participates to the maladaptive remodelling of the heart in response to chronic-pressure-overload
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Introduction. The phosphorylation of the extracellular signal-regulated kinases 1 and 2 (ERK1/2) at threonine 188 (pERKT188) was identified as a trigger for pathogenic cardiac hypertrophy. Upon activation, ERK1/2 can dimerize and autophosphorylate at threonine 188, which leads to nuclear translocation and activation of nuclear ERK1/2 targets known to cause cardiac hypertrophy. The “gain-of-function” ERK1/2 T188D mutant, mimics autophosphorylation and has been shown to induce pathological cardiac growth.

Purpose: So far, the effect of ERK1/2 was analysed in cardiomyocytes. However, a human heart is mostly composed by non-cardiomyocytes, in particular cardiac fibroblasts, which are known to contribute to cardiac remodelling. For this reason, the impact of cardiomyocyte-specific expression of ERKT188D in an eMHC promoter driven mouse model (eMHC-ERKT188D-tg) and ubiquitously expression through the CAG promoter (CAG-ERKT188D-tg) was analyzed in an in vivo model.

Methods: Transverse aortic constriction (TAC) was used as a model for pressure overload-induced cardiac hypertrophy and heart failure, which was analysed by echocardiography. The mRNA levels of heart failure markers as e.g. atrial natriuretic factor (ANF) and brain natriuretic peptide (BNP) were quantified by real-time PCR. The concentration of NRG-1 was significantly dropped following IR (2.1 ± 0.5 vs. 1.6 ± 0.5 µg/g heart in SOP, P = 0.09) as well as NRG-1 and CO positively correlated (R²=0.51, P = 0.001, slope 2.0 ± 0.7). NRG-1 levels were stimulated in the presence of IL-1β (500 ng/ml), which was reversed by SB 203580 (32.4 ± 20 vs 18.9 ± 10, P = 0.05). This was in line with the reduction in CO (20.9 ± 1.6 ml/min/g heart vs. 43.7 ± 2 ml/min/g heart, P < 0.01) which was reversed by IL-1β (12.8 ± 0.3 ml/min/g heart vs. 21.1 ± 0.7 ml/min/g heart). The concentration of NRG-1 was significantly dropped following IR (21.1 ± 0.5 vs. 6.1 ± 0.5 µg/g heart in SOP, P = 0.09) as well as NRG-1 and CO positively correlated (R²=0.51, P = 0.001, slope 2.0 ± 0.7). NRG-1 levels were stimulated in the presence of IL-1β (500 ng/ml), which was reversed by SB 203580 (32.4 ± 20 vs 18.9 ± 10, P = 0.05). This was in line with the reduction in CO (20.9 ± 1.6 ml/min/g heart vs. 43.7 ± 2 ml/min/g heart, P < 0.01) which was reversed by SB 203580 (32.4 ± 20 vs 18.9 ± 10, P = 0.05). This was in line with the reduction in CO (20.9 ± 1.6 ml/min/g heart vs. 43.7 ± 2 ml/min/g heart, P < 0.01) which was reversed by IL-1β (12.8 ± 0.3 ml/min/g heart vs. 21.1 ± 0.7 ml/min/g heart).

1400 Circulating miRNAs and BAG3-related Dilated Cardiomyopathy
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BACKGROUND: A new familial dilated cardiomyopathy (DCM) was recently found related to mutations in the antiapoptotic BAG3 gene. MicroRNAs (miRNAs) are detected in CAG-ERKT188D-tg compared to eMHC-ERKT188D-tg or wild-type mice. In addition, echocardiographic analyses revealed a reduced ejection fraction and impaired fractional shortening, increased miRNA expression levels of ANF and BNP as well as an increase in cardiomyocyte size and fibrosis after TAC in eMHC-ERKT188D-tg in comparison to the control mice. As these experiments suggest that pERKT188 impacts on cardiac integrity in fibroblasts, we analysed its effect on the proliferation of isolated neonatal rat cardiac fibroblasts by overexpressing ERKT188D: indeed, by measuring 3H-thymidine incorporation, an increase of proliferation in ERKT188D transduced cells was detected compared to controls. This result suggests that pERKT188 is a trigger for fibroblast proliferation. We could confirm the involvement of pERKT188 in fibroblast proliferation by the use of a peptide that interferes with pERKT188 by preventing ERK dimerization.

Conclusion: These preliminary results show that pERKT188 has – also via non-cardiomyocyte cells – an important impact on cardiac hypertrophy and heart function. Further experiments are needed to elucidate the exact role of pERKT188 in fibroblasts and cardiac remodelling.
Heart rate reduction opposes acute decompensation of chronic heart failure

Conclusions: containing the BAG3 mutation.

The expression profiles showed significant differences between controls and BAG3 mutation carriers: miRNAs 3191-3p, 6769b-3p, 1249-ep, 154-5p, 6855-5p, and 182-5p were at least 2-fold downregulated in patients compared to healthy sub-

Results: To determine the miRNA profile in BAG3-associated DCM, the analysis of 1759 circulating miRNA was performed in symptomatic and asymptomatic patients with BAG3 mutation, and compared to healthy age-matched subjects. The expression profiles showed significant differences between controls and BAG3 mutation carriers: miRNAs 3191-3p, 6769b-3p, 1249-ep, 154-5p, 6855-5p, and 182-5p were at least 2-fold downregulated in patients compared to healthy sub-

Conclusions: miRNAs emerge as a novel tool to differentiate healthy subjects and patients with BAG3-related DCM. Of particular interest is the downstream analysis of endogenous miRNA targets, the Ankyrin G gene. Inhibition of Ankyrin G is related to sinus node dysfunction, atrial fibrillation, conductional abnormalities, and ven-

Background: Exacerbation of heart failure (HF), better known as acute decompen-

Results: In rats with HF, salt-loading provokes acute decompensation. Indeed, the HF-related reductions of CO, MBF as well as LVEDPVR were further reduced at D1, while LVEDPVR was increased. Moreover, the HF-related impaired coronary relaxation was aggravated. Thirteen days after salt-loading, only CO partially recov-

Methods: Three months after coronary artery ligation, HF rats received water (control) or 1.8 g/kg NaCl (dissolved in 2.5 ml tap water PO) provoking acute decompensation. Left ventricular (LV) end-systolic pressure-volume (LVESPVVR) and LV end-diastolic pressure-volume relation (LVEDPVR; Millar), cardiac output (CO, echocardiography), LV tissue perfusion (MBF; MRI) and coronary endothelial func-

Conclusion: In chronic HF rats, salt-loading provokes immediately a further aggra-

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Recherche International SERVIER, Department of Cardiovascular Translational and Clinical Research, Suresnes, France

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Left ventricular hemodynamics

<table>
<thead>
<tr>
<th>Group</th>
<th>HF Control (D1)</th>
<th>HF + Salt (D1)</th>
<th>HF + Salt (D13)</th>
<th>HF + S38 (D1)</th>
<th>HF + S38 (D13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO (ml/min)</td>
<td>123±3</td>
<td>105±3</td>
<td>112±5</td>
<td>125±3</td>
<td>132±5</td>
</tr>
<tr>
<td>MBF (ml/min/g)</td>
<td>6.01±0.19</td>
<td>4.41±0.23</td>
<td>4.51±0.23</td>
<td>7.00±0.31</td>
<td>6.46±0.42</td>
</tr>
<tr>
<td>LVEDPVR (mmHg/RVU)</td>
<td>15.4±0.4</td>
<td>11.3±0.9</td>
<td>12.5±0.7</td>
<td>16.7±1.3</td>
<td>17.0±0.4</td>
</tr>
<tr>
<td>LVEDPVR (mmHg/RVU)</td>
<td>1.78±0.12</td>
<td>3.19±0.18</td>
<td>2.77±0.23</td>
<td>1.99±0.34</td>
<td>1.70±0.15</td>
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<tr>
<td>Coroyny</td>
<td>55±1</td>
<td>27±5</td>
<td>28±1</td>
<td>79±2</td>
<td>71±4</td>
</tr>
</tbody>
</table>

*p < 0.05 vs HF control; †: p < 0.05 vs HF + Salt (D1)

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Clinical Case Corner 4 - CAD and heart failure: a liaison dangereuse

1402
Acute heart failure and cardiogenic shock induced by ruptured coronary arteriovenous fistula
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Case Summary: A 72-year-old woman was referred to emergency department from outside hospital with a diagnosis of septic shock. Her chief complaint was right upper quadrant abdominal pain for a day. Her BP was 84/64 mmHg and HR was 105/min. Physical examination revealed hepatomegaly and tenderness at right upper quadrant abdomen. Laboratory tests were as follows: leukocytes 18390/μL; high-sensitivity C-reactive protein 5.14 mg/dL; AST/ALT 483/212 IU/L; total bilirubin 0.34 mg/dL. Abdomen CT revealed diffuse wall thickening of gallbladder and perivascular low attenuation in liver. She had admitted infection department with IV meropenem and noradrenaline support under the diagnosis of cholecystitis. At 3rd hospital day, the patient was consulted cardiology department because she complained progressive dyspnea and chest X-ray revealed worsening pulmonary congestion. At that time, ECG showed T wave inversion on anterior leads and cardiac enzymes were slightly elevated: CPK 334 IU/L, CK-MB 18.0 ng/mL, troponin T 0.110 ng/mL. Echocardiography (Fig. 1) showed normal LV systolic function and no regional wall motion abnormality. But we can detect dilated abnormal vasculatures with continuous Doppler flow which is suggesting coronary arteriovenous fistula (CAVF). There was a small amount of pericardial effusion (PE) without hemodynamic significance, and it was reckoned decreased amount compared with previous abdomen CT. Chest CT revealed tortuous vasculature in intrapericardial space and aneurysmal dilatation of the abnormal vessels with thrombus (Fig. 2).

Questions: 1. What is your next plan? 2. What was the cause of elevated cardiac enzymes and changes on ECG and chest X-ray? 3. What caused her abdominal pain and shock? Was there real bacterial infection?

Clinical Course: Our impressions were as follows: 1) High cardiac output heart failure (HF) d/t CAVF; 2) Liver congestion d/t HF; 3) Incidentally detected PE, and we started medical therapy for HF because of stable vital sign and decreased amount of pericardial effusion on the follow up echocardiogram. At 9th hospital day, the patient experienced sudden collapse and refractory hypotension despite full-dose of inotropics. The patient received CPR and transferred to ICU. On bedside echocardiography, LV systolic function was normal and the amount of pericardial effusion was similar compared with previous day. At that time, we obtained 7cc of bloody pericardial effusion by echo-guided pericardiocentesis. Her vital signs were stabilized immediately, and 250cc of bloody fluid was drained during 24 hours. Our final diagnoses were: 1) Pericardial tamponade d/t ruptured CAVF; 2) High cardiac output HF d/t CAVF; 3) Liver congestion d/t HF. The patient underwent surgical closure of CAVF, and we detected ruptured aneurysmal vessel wall with blood clot.

Discussion: Although most of the patients who have small communications may be asymptomatic, myocardial ischemia or heart failure can be occurred depends on the amount of shunt flow. Although rupture of aneurysmal vessel is very rare complication of CAVF, it should be remembered that shock or cardiac arrest can be caused by small amount of blood.

1403
A life-saving plug: spontaneous closure of ventricular rupture by a coincident thrombus after stemi
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A 47 year old previously healthy male complained of pain in the left shoulder after physical strain. Four days later, the consulted general practitioner referred him to cathlab because of anterolateral ST segment elevation. Subsequently a verified proximal thrombotic occlusion of the LAD (panel 1A) was distalised and treated by bare metal stent implantation. Ventriculography showed a moderately reduced ejection fraction with all apical segments being hypokinetic. Images were characteristic for an apical left ventricular thrombus (panel 1B). A few hours after this angiography, the patient rapidly developed cardiogenic shock. Echocardiography revealed a hemodynamically relevant pericardial tamponade. The patient was immediately transferred back to cathlab to perform a pericardiocentesis evacuating 500 ml of blood. The subsequent coronary angiography revealed no leakage of contrast agent. After the initial pericardiocentesis no further pericardial effusion occurred and the patient stabilized quickly. Myocardial contrast echocardiography suggested the ventricular thrombus to be plugged in a free wall rupture of the apex (arrow in panel 1C) and septal microvascular occlusions (MVO, small arrows). Contrast enhanced cardiac magnetic resonance imaging confirmed this perception (panel 1D). For further therapeutic purposes the patient was immediately sent to cardiac surgery where the thrombus was being removed and an epicardial patch plastic of the LV apex was successfully performed. The patient was able to return to working life with only a mildly reduced ejection fraction.
Clinical Case Corner 4 - CAD and heart failure: a liaison dangereuse

1406 Non-compact cardiomyopathy in elderly patient with acute primary anterior STEMI
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A 70-year-old man was hospitalized with primary anterior STEMI to 4h 30 min from the onset pain. Fibriolysis was held through 2h 20min from the symptoms onset, but ECIG did not reveal features of the repertusion. Rescue PCI (through 4h 20min after the symptoms onset) revealed the occlusion in proximal third of left anterior descending artery and the drug-eluting stent was implanted. Then on the 6-th day of STEMI the recurrent acute pulmonary embolism was occurred. It was confirmed by the increasing of D-dimer to 426 ng/mL, appearance of orthopnea and the hemoptysis, bilateral hydrothorax, subfebrile condition. Simultaneously, the disease was complicated by the following arrhythmias: auricular fibrillation and subventricular extrasystoles, paroxysms of ventricular tachycardia and atrial fibrillation. Implantable cardioverter-defibrillator was recommended and it was implanted. Transhoracic echocardiography revealed hypokinetic basal inferolateral segment and apex, EF was about 51%. It was not extended the left ventricular thrombus. The patient was discharged on dual antplatelet therapy, β-blockers, statins, angiotension-converting enzyme, iveroxaban and antiarriod. Through 6 months echocardiography was repeated. Two-layered myocardial structure and a thin compact layer and non-compact endomyocardial layer with deep myocardial trabeculae were revealed, EF decreased to 45%, akinetic of apex, septal and anterior wall. The ratio between the trabeculated and normal myocardium was more in 2 times. The data of multi-spiral computed tomography confirmed of non-compact myocardium. Decrease of global systolic function and blayer structure of the left ventricular wall with a presence of lots of trabeculae is revealed. This form of cardiomyopathy is rare and usually associated with the failure of the myocardial compaction process at the embryogenesis, which leads to the persistence of numerous trabeculae at the left ventricular cavity. The main clinical manifestations are heart failure, arrhythmias and thromboembolism. The differential diagnosis included other cardiomyopathies (hypertrophic, dilatation), acute myocarditis, fibroelastosis, pericarditis, thrombosis of LV, hypothyrophy of LV, tumor, pulmonary atresia, Bland-White-Garland syndrome, additional trabeculae. The case is unique, because this heart pathology has been detected in the elderly man. It is known, that non-compact myocardium associated with the high frequency of sudden cardiac death at the youth. The specialty of this case was acute the single-vessel coronary artery lesion with probably thromboembolic genesis. It is important, that multi-spiral computed tomography was used in this case to confirm and demonstrate non-compact myocardium, as long as MRI could not performed due to implanted cardioverter-defibrillator. Thus, non-compact myocardium could be diagnosed in elderly patients, differential diagnosis of non-compacted myocardium included using of imaging technologies. In cases with contraindication to MRI, the multi-spiral computed tomography would be useful for confirmed echo findings

1407 Post-infarction mechanical complications: a successful case
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Introduction: Post-infarction mechanical complications are rare in the era of coronary revascularization but they should be suspected in the appropriate clinical context. Case Report: 62 year-old man with previous history of hypertension and smoking. He came to attention in June of 2016 due to progressive heart failure symptoms (at admission in NYHA class III). The previous history was unremarkable except for a sudden and prolonged episode of severe epigastric pain in the previous month. At admission he presented hypertensive profile, a 1:1 atrial fibrillation muraum audible in all auscultatory areas and bilateral basal crackles. He was admitted for further study. The analysis were normal besides the T Troponin elevation: 129 ng/L in the first analysis and 136 ng/L in the next evaluation. The electrocardiogram showed sinus rhythm,100 bpm, slow R wave progression. STE-segment elevation and T-wave inversion in preordial leads. The thorax x-ray revealed bilateral interstitial infiltrate and mild bilateral pleural effusion. The transthoracic echocardiographic showed mildly dilated left ventricle, thin ventricular septum, dyskinesis of apical segments, medium segments of septum, anterior and inferior walls, hypokinesia of the basal segments of the same walls, severe systolic left ventricular dysfunction (LVEF of 23%), a huge sessile thrombus adjacent to the ventricular septum and anterior wall and a restrictive apical ventricular septum defect with a left-to-right shunt (Figures A and B). The patient was submitted to cardiac magnetic resonance which confirmed the echocardiographic findings: desverbated wall motion abnormalities, a ventricular septal defect (VSD) surrounded by thrombus, lying

most cases in coronary arteries not supplying the myocardial segments affected by TS, and the majority of stenoses did not require immediate intervention. Here, we present 3 cases with the rare combination of ST-segment-elevation myocardial infarction (STEMI) with acute coronary artery occlusion and coexisting TS. Case 1: A 52-year-old woman was admitted after out-of-hospital resuscitation for ven- tricular fibrillation for 35 minutes. After 8 electrical shocks and amiodarone spon- taneous circulation returned. ECG showed ST-segment elevation in leads II, III and aVF. Coronary angiography demonstrated thrombotic occlusion of the distal RCA with coexisting apical TS. RCA was treated with angioplasty without stenting. An IABP was inserted and neuroprotective hypothermia was started. The patient was extubated after 2 days, and after 5 days LV function had returned to normal. Case 2: A 62-year-old woman was admitted with acute chest pain and suspected STEMI. Before arrival at the hospital defibrillation for ventricular fibrillation and very short cardiopulmonary resuscitation (< 1 minute) had been necessary. ECG showed ST-segment elevation in leads II, III and aVF. Coronary angiography demonstrated thrombotic occlusion of the proximal RCA with coexisting apical TS. LVEF was 20%. RCA was successfully treated with angioplasty with a drug-coated balloon. CKmax was 1030 UI. 3 days after PCI acute decompensation developed, which was treated with diuresis and non-invasive ventilation. The patient gradually recov- ered, and LV EF after 10 days was 51% without regional wall motion abnormalities. Case 3: A 75-year-old woman was admitted with acute chest pain and suspected STEMI. ECG showed ST-segment elevation in leads V5 and V6. Coronary angiogra- phy demonstrated thrombotic occlusion of a posteroateral branch of the RCA and coexisting midventricular TS. LVEF was 43%. RCA was treated with angioplasty. 7 days later LVEF had returned to normal, with residual hypokinesia of the postero- lateral wall. In summary, i) CAD may be present in TS cases as in other cases of acute heart failure, ii) ST-segment elevation myocardial infarction with coronary artery occlusion is a potential finding in TS patients. This finding is essential to consider for diagnosis and treatment of STEMI as well as of TS patients, who have ST-segment elevation in 50% of cases. In patients with suspected TS coronary angiography is mandatory in most cases, to uncover coexisting coronary lesions. In patients with STEMI, ventriculography is highly recommended to match the angigram with wall motion abnormalities, in order to make the correct diagnosis.
the septum and reaching the right ventricle hinge points (confirmed in the early gadolinium enhancement study) and also a small pseudoaneurysm in the anterior wall previously unnoted (Figures C and D). The late gadolinium enhancement study showed transmural necrosis in the dyskinetic segments. The pre-surgery coronaryography revealed an occluded median left anterior descending artery. During hospitalization he remained clinically stable, without electrical complications or need of hemodynamic support. He was submitted to successful surgical repair of the VSD and a single left mammary artery to left anterior descending artery bypass. He was discharged on the 4th post-surgery day and has remained in NYHA class II, under medical therapy. Discussion: Imaging techniques are essential for diagnosis of mechanical complications. Cardiac magnetic resonance is particularly helpful in anatomic diagnosis and functional evaluation, adding prognostic information and guiding patient’s management. Conclusion: Although rare, multiple post-infarction complications can occur. Late surgical approach is beneficial in clinical stable patients.

1409 ECMO as bridge to surgery in post-infarct ventricular septal defect

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A 72-year-old patient arrived to the emergency department in cardiogenic shock with a three-days history of chest pain and dyspnea. On physical examination blood pressure of 55/34 mmHg, sinus tachycardia, hypoperfusion and a V/V pansystolic murmur panfocal were remarkable. EKG showed established an inferior myocardial infarction. Echocardiogram revealed a large ventricular septal defect (2.2 cm) in the basal inferior septum (Image 1, Panel A and B) with bidirectional shunt, moderately depressed left ventricular function and very dilated and dysfunctional right ventricle. Cardiac catheterization showed triple vessel disease, severe distal left coronary artery stenosis, occluded left anterior descending artery from the ostium, severe circumflex stenosis and dominant right coronary artery with subtotal distal lesion with diffuse disease of posterior descending artery. Despite of increasing doses of inotropes and vasopressors and circulatory support with intra-aortic balloon pump patient remained in refractory cardiogenic shock. Therefore peripheral veno-arterial extracorporeal membrane oxygenation (VA-ECMO) was implanted without complications achieving hemodynamic stability. Hypoxemia was corrected and hepatic and renal function improved. After ten days under ECMO support surgical repair was planned. Double coronary artery bypass (saphenous vein graft to left anterior descending artery, and saphenous vein graft to ramus intermedius artery) without
extracorporeal circulation was performed. Afterwards, the patient was cannulated for cardiopulmonary bypass, and the aorta was cross-clamped. Myocardial protection was achieved with intermittent cold blood cardioplegia. Through a posterior left ventriculotomy, ventricular septal rupture was completely closed with a large bovine pericardium patch (Image 1, Panel C). ECMO could be removed and trans-esophageal echocardiogram confirmed no residual defect. Post-infarct ventricular septal defect after primary angioplasty development is an infrequent (0.2-0.3%) but usually lethal complication whose mortality reaches up to 80%. Timing of the surgical approach remains controversial due to the difficult balance between maintaining hemodynamic stability and waiting for infarcted necrotic tissue to organised. Usually rapid hemodynamic deterioration limits surgical delay and leads to early repair, frequently unsuccessful, and directly related to mortality rate. VA-ECMO offers circulatory support as bridge to ensure appropriate maturation and fibrosis of infarcted tissue, allowing the deferral of surgery. When compared to other assist device, ECMO could be quickly and easily implanted in a crash and burn patient and additionally contribute to improve oxygenation in cardiogenic shock and allows to renal and hepatic recover.
Conclusions and implications for clinical practice: showing thrombus resolution at follow up. NOACs (mainly rivaroxaban), most of them after anterior myocardial infarction, several case reports published, describing patients with LV thrombus treated and not recommended by guidelines in this setting. However, there have been NOACs have not been studied in LV thrombosis and remain off-label.

Discussion: daughter was screened, but showed no features of LVNC. We offered echocardiography screening to other family members. Her 30-year old typical features of LVNC, so this was now considered a case of familial LVNC and embolism. The echocardiography of her son was reviewed and was showing same stable and her LV thrombus was fully resolved and there were no signs of systemic up transthoracicechocardiogram. On followup at 3, 6, 12 months she was clinically bisoprolol5mg, perindopril2.5mg, furosemide40mg and rivaroxaban20mg all once nine clearance was 83ml/min estimated by Cockroft-Gault. She was discharged on creati- malatrialfibrillation with 3 episodes of about 30 second duration. Her CHADSVASC2 was 3 and her HASBLED score was 1. We offered novel oral anticoagulant (NOAC) treatment as alternative and explained that although appropriate for her atrial fib- rillation, NOACs have not been studied in LV thrombosis setting and are off-label. She decided to go for NOAC despite the lack of clinical data explained. Her creati- rillation, NOACs have not been studied in LV thrombosis setting and are off-label. However, there have been several case reports published, describing patients with LV thrombus treated with NOACs (mainly rivaroxaban), most of them after anterior myocardial infarction, showing thrombus resolution at follow up.

Conclusions and implications for clinical practice: In patients with LV thrombus and LVNC, who refuse VKA or when it is not possible to monitor INR, NOACs may prove as valuable alternative. Off-label NOAC therapy could and probably should be considered in cases of LV thrombosis when there is no possibility of VKA treatment and indications for long term anticoagulation. Of note, we suggest that echocardi- ographic screening in LVNC may identify other affected family members.

Introduction. 58-year old female was referred to our department due to shortness of breath and paroxysmal nocturnal dyspnea in the last 2 weeks. Her history was remarkable of total right mastectomy followed by chemo- and radiotherapy 2 years ago. She was considered to be cancer-free at present and recently treated for pneu- monia. Her 38-year old son was diagnosed with dilatative cardiomyopathy with left ventricle (LV) apical thrombus few years back.

Diagnosis and treatment: Physical examination was unremarkable except for bilat- eral basal crackles and lower limb pitting oedema. EKG showed normal sinus rhythm and precordial T-wave inversion. Echocardiography revealed severely depressed LV systolic function with ejection fraction of 28% and global longitudinal strain of -7.8. The LV showed typical morphological features of left ventricular non-compaction (LVNC) with multiple trabeculations and deep intrabecular recesses and prominent apical thrombus. We commenced guideline based treatment with iv heparin, ACE, beta-blocker and iv furosemide with rapid improvement. She was offered long term treatment with Vitamin K antagonist (VKA), which she refused, despite all the risks explained, as she did not want to be INR monitored. EKG telemetry revealed paroxis- mal atrial fibrillation with 3 episodes of about 30 second duration. Her CHADSVASC2 was 3 and her HASBLED score was 1. We offered novel oral anticoagulant (NOAC) treatment as alternative and explained that although appropriate for her atrial fib- rillation, NOACs have not been studied in LV thrombosis setting and are off-label. She decided to go for NOAC despite the lack of clinical data explained. Her creati- nina clearance was 83ml/min estimated by Cockroft-Gault. She was discharged on bisoprolol5mg, perindopril2.5mg, furosemide40mg and rivaroxaban20mg all once daily. The LV thrombus was in place and unchanged at the time of discharge of follow up transthoracicechocardiogram. On follow up at 3, 6, 12 months she was clinically stable and her LV thrombus was fully resolved and there were no signs of systemic embolism. The echocardiography of her son was reviewed and was showing same typical features of LVNC, so this was now considered a case of familial LVNC and we offered echocardiography screening to other family members. Her 30-year old daughter was screened, but showed no features of LVNC.

Discussion: NOACs have not been studied in LV thrombosis and remain off-label and not recommended by guidelines in this setting. However, there have been several case reports published, describing patients with LV thrombus treated with NOACs (mainly rivaroxaban), most of them after anterior myocardial infarction, showing thrombus resolution at follow up.

Conclusions and implications for clinical practice: In patients with LV thrombus and LVNC, who refuse VKA or when it is not possible to monitor INR, NOACs may prove as valuable alternative. Off-label NOAC therapy could and probably should be considered in cases of LV thrombosis when there is no possibility of VKA treatment and indications for long term anticoagulation. Of note, we suggest that echocardi- ographic screening in LVNC may identify other affected family members.
left atrial appendage and two cystic parts (Fig. 4). Complete excision of the mass and partial enucleotomy was performed. In pathologic examination, the tumor consisted of proliferating pleomorphic spindle shaped cells suggested sarcoma and there were massive osteoid and chondroid materials produced by tumor cells (Fig. 5A and 5B). High mitotic activity and moderate cytologic atypia were detected and there were scattered hemorrhagic and necrotic foci. The tumor cells invades resection margin. Finally, the tumor was diagnosed as primary cardiac osteosarcoma, chondroblastic type. She received six cycles of systemic chemotherapy with doxorubicin and cisplatin. During 9 months of follow up, the patient remains healthy with no evidence of tumor recurrence.

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Pulmonary artery hypertension (PH) frequently affects woman of childbearing age. Due to the very high maternal mortality risk, with most of the deaths occurring in the 3rd trimester and within the first 10 post-delivery days, pregnancy should generally be avoided in PH. We describe the case of a 39-year-old woman who was transferred to our department at the 25th week of pregnancy with a severe right heart failure. Since the 14th week she experienced increasing dyspnea, palpitations and generalized edema. She declined termination of the pregnancy after thorough counselling. The echocardiogram showed a dilated, hypertrophic and hypokinetic right ventricle, with a pulmonary artery (PA) systolic pressure 85 mmHg. The clinical status improved with diuretics. A team including cardiologists, obstetricians, anaesthesiologists, neonatologists and staff coordinators was made up. A complete diagnostic work-up for PH was performed: CT scan excluded pulmonary thromboembolism, no evidence of an intracardiac shunt, and blood tests were negative for vasculitis, thyroid disorder, connective tissue disease and thrombophilia. A right heart catheterization demonstrated a PA pressure of 60/42 mmHg, PCW pressure 11 mmHg, a severely elevated PVR at 16.9 WU, and significant reduction of the cardiac output, without any fall in the PA pressure or PVR after inhaled nitric oxide. A complete obstetrical and fetal evaluation excluded other relevant diagnoses. LMWH heparin was prescribed. In the following days a step treatment with continuous infusion Epoprostenol and oral Sildenafil was initiated. The PDE-inhibitor was not tolerated after few weeks for flushing and hypotension. An elective caesarean section was successfully performed at the 31st week, under epidural anaesthesia. The baby demonstrated normal growth, development, and birth apgar scores. The patient was discharged from the ICU on day four. The postdelivery course was uneventful and the mother was discharged on day 30. At 6-month follow up, she was a WHO FC-II. This patient was diagnosed with severe PH in an advanced stage of pregnancy. Critical decisions, rapid escalation of the prostacyclin therapy, and the use of an experienced multidisciplinary team led to a successful delivery, with no complications for the mother or baby. The management of these infrequent, but critical situations, should be strictly handled by experienced tertiary referral centers.

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1451 Primary cardiac osteosarcoma
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Case Summary: A 44-year-old woman presented in June, 2013 with a 2-week his-
tory of chest tightness and shortness of breath to our cardiology outpatient clinic. She denied having hypertension, diabetes mellitus, dyspepsia, tobacco use, or any family history of atherosclerotic disease. Her vital signs were as follows: blood pressure 124/80 mmHg, heart rate 64/minute, respiratory rate 24/minute, and body temperature 36.5. Physical examination revealed diastolic murmurs at the cardiac apex with grade 2/6. An electrocardiogram was normal and chest radiography showed no active lesion in lung. Transthoracic echocardiography (Fig. 1) showed a broad based mass filling the left atrium, which was attached to the posterior wall of left atrium nearby G tr. The mass was composed of three different parts; thin-walled cystic portion (2.3 x 2.1 cm), solid portion with lobulating contours and heterogenic echogenicity (2.8 x 2.4 cm), and thick-walled mixed portion (3.7 x 2.9 cm). The mixed portion of the mass was protruding into the LV cavity during diastole and causing severe functional mitral stenosis. Trans-mitral mean diastolic pres-
ture gradient was 5 mmHg and right ventricular systolic pressure was 38 mmHg. Transesophageal echocardiography (Fig. 2A and 2B) showed the heterogeneous feature of the mass more clearly. There was no evidence of invasion to pulmonary vein on transesophageal echocardiography. Thoracoabdominal computed tomog-
phy (Fig. 3) revealed an intracardiac mass occupying the left atrium without local invasion and there was no evidence of distant metastasis. X-ray studies did not identify any lesions in the skeletal system. The presumptive diagnosis was a benign cardiac tumor, such as an unusual type of left atrial myxoma and she was referred to cardiac surgeon for surgical removal of the mass. During the operation, we found a 7 x 5 x 4 cm sized huge mass, which have a hard part originated from nearby

1452 A successful multidisciplinary approach to pregnancy and delivery in pulmonary artery hypertension.
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Koh., 42 perfusion imaging

Primary cardiac osteosarcoma

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Rapidly progressive, undifferentiated ventricular failure requiring urgent extra-corporeal membrane oxygenation

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A normally healthy 57-year-old male presented with increasing headache, abdominal pain, chest pain and rapidly worsening dyspnoea. His background included long-standing systemic hypertension, well controlled with an angiotensin II receptor antagonist. On arrival he was tachycardic, hypertensive, tachypneic and hypoxic requiring oxygen supplementation. Physical examination was consistent with acute pulmonary oedema, with chest X-ray demonstrating bilateral, diffuse a airspace changes. The ECG showed sinus tachycardia with 2mm up-sloping ST depression in the anterior leads. An urgent CT aortogram showed no aortic dissection and bedside transthoracic echocardiography revealed severe global left ventricular impairment with no valvular or pericardial abnormalities. Coronary angiography showed an anomalous right coronary artery origin arising from the left coronary cusp. Left coronary system did not show any significant disease. He was initially managed with intravenous diuretic, glyceryl trinitrate infusion and non-invasive ventilation. Within an hour of presentation he developed respiratory failure requiring intubation for ventilatory support. Progressive haemodynamic collapse followed despite escalating vasopressor support and intra-aortic balloon pump insertion. Veno-arterial extra-corporeal membrane oxygenation (VA-ECMO) was commenced, maintaining adequate perfusion and oxygenation. Transoesophageal echocardiogram showed persisting left ventricular impairment with substantial spontaneous echo contrast and early thrombus formation in the left ventricle and aortic root (Figure). Differential diagnoses at this point included fulminant myocarditis, hypertensive crisis, illicit drug use or stress-induced cardiomyopathy. Over the next 24-hours the patient remained haemodynamically stable, left ventricular function normalised on repeat echocardiography and VA-ECMO and inotropes were weaned. Within 48 hours the patient was extubated with no neurological deficit. A subsequent cardiac MRI showed no myocardial abnormality, normal perfusion and a left ventricular ejection fraction of 66%. The initial CT aortogram was reviewed in further detail, demonstrating a 23 x 20mm left-sided adrenal lesion, intensely active on Iodine-123 meta-iodobenzylguanidine (MIBG) scan. Plasma and urine catecholamine levels were consistent with a pheochromocytoma. The patient was started on phenoxybenzamine prior to an uncomplicated adrenalectomy with histo-pathology showing no signs of malignancy. At 6-month review he was normotensive and remained well. Phaeochromocytoma classically presents with paroxysmal headaches, sweating, and tachycardia with intermittent or sustained hypertension. On rare occasions, presentation can be acute cardiogenic shock and pulmonary oedema. The precipitating episode can be life-threatening how-ever ventricular dysfunction in catecholamine induced cardiomyopathy is typically resolves upon resection of the tumour. The exact mechanism is unknown; proposed causes include direct catecholamine myocardial toxicity, catecholamine-induced oxygen-derived free radical production or myocardial ischaemia from coronary artereal spasm. This case demonstrates the abrupt deterioration and rapid improvement in catecholamine induced cardiomyopathy secondary to pheochromocytoma and highlights the importance of prompt escalation of resuscitation measures, including VA-ECMO, for patients with undifferentiated cardiogenic shock.

Constrictive pericarditis due to rheumatoid arthritis 6 years follow up

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Pericarditis is one of the most common cardiac complications of rheumatoid arthritis (RA), it’s present in 30-50% patients on post-mortem examination. However, in most cases it remains without hemodynamic consequences. Pericarditis occurs more often in male patients with active, seropositive RA. The constrictive is thought to be chronic process persisting for years. A 59-year-old man with a 14-years history of seropositive RA was admitted to the cardiology department for evaluation of clinical status in stable state with well-controlled symptoms, RA was diagnosed in 2001. His past medical history include interstitial pulmonary fibrosis (2001), neoplastic process and tuberculosi were excluded. Additionally cholelithiasis, gastritis with H. pylori infection, osteoporosis with pathological, multi-level compression fracture and hip osteoarthritis, depressive syndromes, impaired fasting glucose and permanent AF. In Nov-2009, patient with decompensated congestive HF was admitted to the cardiology clinic. He was referred because of fatigue, increasing shortness of breath (NYHA IV) and chest pain. Examination revealed aspites and pitting edema of lower extremities, elevated pressure in jugular veins, the irregular heart rate about 80-bpm, BP-120/70mmHg. The electrocardiogram (ECG) showed atrial fibrillation (AF), chest x-ray - compaction at the base of the lungs and enlarged heart. Echocardiography revealed enlarged left atrium (LA), elevated right ventricular systolic pressure (RVSP) and thickness of the pericardium. Patient underwent coronary angiography, which showed no severe stenosisis in coronary arteries and calcification in the pericardium. To confirm constrictive pericarditis magnetic resonance imaging (MRI) was taken (Figure 1). Hemodynamic instability lead to partial pericardiectomy thru the median sternotomy in urgent. Pericardial effusion and diastolic restriction of LV were noted in the control echocardiography. After 55-days patient was discharged. In Apr-2013 increasing signs of respiratory failure occurred. Patients was qualified for home oxygen therapy. Three months later (28.2013) reduced global contractility and contraction asynchrony have been noticed in echocardiography, with 45%-LVF. To evaluate the clinical condition patient was admitted in March-2015. He was stable, with no hospitalization because of worsening HF since 2years. The examination revealed with dry crepitation at the bases of lung bilaterally and irregular heart rate. Laboratory parameters were in norm, except an elevation of NT-proBNP > 3050 pg/mL. ECG showed AF, BP-110/90mmHg. MRI revealed thickness of pericardium behind posterior and inferior LV-wall with the features of fibrosis and calcification, enlargement of LA-50mm, flattening of the interventricular septum (IVS) in diastole with shift into the left site during breathing and apical akinesia (Figure 2). Clinical relevant pericarditis is a rare but serious complication of RA. It might be life-threatening condition. This kind of extra-articular disease manifestation should be considered in patients with unexpected cardiac insufficiency. Timely diagnosis and adequate intervention, as highlighted in presented case, can lead to favorable clinical outcomes. Development of MRI technology dramatically improved the visualization of the pericardium, the diagnosis of constrictive pericarditis remains a challenge in many cases.

Panel A of the Figure 1 shows chest X-ray, Panel B shows Electrocardiogram.
1518 Predicators of left ventricular hypertrophy in hypertensive patients. Data from SEPHAR III study.  
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Methods: Patients with HF were identified via electronic medical records to primary and secondary care in Vasterbotten, linked via unique identifiers to data from the National Patient Register and Swedish Prescribed Drug Register. Local echocardiography data were used to identify patients with HF (HFpEF ≥50%) and reduced (HFrEF, <50%) ejection fraction. Patients aged ≥18 years with ≥2 diagnoses of HF between 01/01/2010 and 31/03/2013 and an ICD-10 diagnostic code of I50 (inclusive of all granular codes), I42.0, I42.6, I42.7, I42.9, I110, I130 or I132 in any position were included. The date of the first diagnosis was the index date. ICD-10 codes were also used to identify comorbidities. A 10-year look-back period was used to exclude prevalent HF cases. Patient characteristics were assessed at index, except comorbidities (in the 5 years before index) and pre-diagnosis comedications (in the first year before index).

Results: In total, 8702 patients with HF were identified; 27.7% were aged ≥85 years. Compared with patients <85 years, more patients ≥85 years were female (60.2% vs 40.6%) and fewer were overweight (BMI ≥25 kg/m2, 42.3% vs 65.6%). In both groups, HF was more commonly diagnosed in secondary than in primary care, but patients ≥85 years were more often diagnosed in primary care than those <85 years (31.2% vs 20.9%). Fewer patients ≥85 years than those <85 years received an echocardiogram at diagnosis (19.3% vs 42.9%); of those who did, more patients ≥85 years than <85 years had HFrEF (46.8% vs 33.4%). Patients ≥85 years had a comorbidity burden similar to those <85 years (mean number of comorbidities/patient, 2.4 ± 2.3); prevalence of atrial fibrillation (32.0% vs 30.4%), hypertension (53.2% vs 53.0%) and ischemic heart disease (20.5% vs 22.5%) were also similar in both age groups. N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels and systolic blood pressure (SBP) increased with age, and diastolic BP and estimated glomerular filtration rate decreased. Potassium and sodium levels did not differ between age groups (Table). The most common pre-diagnosis comedications were β-blockers, antithrombotic agents and diuretics; β-blockers were less frequently prescribed in patients ≥85 years (59.6% vs 64.4%), and antihypertensive agents and diuretics were more frequently prescribed in those ≥85 years (antithrombotic agents, 57.0% vs 54.3%; diuretics, 50.1% vs 43.1%).

Conclusions: Very elderly patients with HF in Sweden are clinically different from younger patients, with a higher prevalence of HFrEF and higher NT-proBNP levels (as expected). Most importantly, very elderly patients seldom receive an echocardiogram at diagnosis.
Phase 2 clinical trials for heart failure. In vitro and animal studies demonstrate improvements in mitochondrial ROS with elamipretide treatment independent of improvements in CL content.

**Purpose:** To determine whether acute elamipretide treatment of the failing human heart improves supercomplex function and lowers reactive oxygen species.

**Methods:** Human ventricular tissue was rapidly harvested in the operating room at the time of cardiac transplantation for end-stage heart failure with left ventricular dysfunction (LVD) or from age-matched donor hearts (HF) not implanted for technical reasons. Tissue was rapidly divided for elamipretide treatment or vehicle control. Immediately following treatment high-resolution respirometry was performed with simultaneous measurement of mitochondrial ROS. Tissue from each treatment arm was rapidly frozen at −80°C for MS/MS analysis of CL content.

**Results:** In vehicle treated samples the supercomplex coupling factor (SC CCF), a measure of the integrity of the mitochondrial supercomplex, was 35% lower in the F-ventricles than HF tissue (1.11 ± 0.14 vs. 1.79 ± 0.25, p = 0.03). Treatment with elamipretide improved SC CCF in the F human heart (1.58 ± 0.12, P = 0.007) with a significant change in the HF heart (1.90 ± 0.19). Total mitochondrial ROS (mitochondrial supercomplex, in the absence of changes in CL content, can reduce mitochondrial ROS in the failing human heart in the absence of changes in total CL content.

**Conclusion:** Elamipretide treatment improves supercomplex integrity and reduces mitochondrial ROS in the failing human heart in the absence of changes in total CL or expression of critical CL isoforms. These findings suggest that stabilizing the mitochondrial supercomplex, in the absence of changes in CL content, can reduce oxidative stress and represents a novel treatment for improving mitochondrial function in human heart failure.

**1521 Sex, reverse remodeling and prognosis in chronic systolic heart failure**

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**Background:** Both female sex and reverse remodeling (RR, i.e. the reversal of ventricular dilation and dysfunction in response to treatment) are associated with better prognosis in heart failure (HF).

**Purpose:** To determine the relationship between sex and RR and to evaluate the prognostic impact of RR.

**Methods:** Data from stable systolic HF patients (left ventricular ejection fraction (LVEF) <40%), undergoing two large-scale echocardiograms (TTE) within 12 ±2 months, were analyzed. RR was defined as indexed LV end-systolic volume reduction ≥15%. The follow-up started with the second TTE. The primary endpoint was a composite of all-cause death or heart transplantation (HT), and the secondary endpoint was a composite of cardiovascular death or HT.

**Results:** Out of 927 patients (age 68 ±12 years, LVEF 34 ±9%, 250 were females (27%), Ischemic aetiology was less represented among females (33% vs. 65%; P = 0.001), while most other clinical and pharmacological characteristics did not differ significantly. Across the two TTE examinations, females had a higher incidence of RR in the whole population (41% vs. 27%; P < 0.001), among patients with either ischemic or non-ischemic aetiology, and in the subgroups with either LVEF <40% or ≥40% (Figure). In the whole population, female sex was an independent predictor of RR (odds ratio - OR 1.542 [95% confidence interval - CI 1.114-2.133], P = 0.011) in a model including the univariate predictors of RR (non-ischemic HF aetiology), lower disease duration, no left bundle branch block - LBBB, Over a 33-month (IQR 15-59) follow-up, females showed a better prognosis for both endpoints (P = 0.002 and 0.005, respectively), achieved in 188 (20%) and 126 (14%) patients, respectively. In a model including age, sex, LVEF, and N-terminal fraction of pro-brain natriuretic peptide, female sex and RR were both independent predictors of all-cause death or HT (OR 0.580 [95% CI 0.356-0.944], P=0.028 and OR 0.649 [95% CI 0.415-0.992], P=0.048). Only RR independently predicted cardiac death or HT (OR 0.573 [95% CI 0.333-0.987]; P=0.045).

**Conclusions:** In systolic HF, RR is more frequent among female patients. Female sex is an independent predictor of RR and all-cause death or HT.

**1522 The clinical meaning of selected single nucleotide polymorphisms in patients with hypertension and heart failure with preserved and mid-range ejection fraction**

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**Aim:** This study aimed to assess the clinical meaning of the single nucleotide polymorphisms (SNPs) reflecting different pathophysiological pathways in hypertensive patients with diastolic heart failure: inflammation (-174 G/C IL-6 rs1800795, TNF-308 G/A rs1800629, diabetes [Arg235Pro TGF-B1 rs1800471], endothelial function (-768 T/C NOIs rs2070744), glucose and lipid metabolism (Pro12Ala PPARγ rs1125064), vitamin D metabolism (CYP27B1 C-1264A).

**Methods:** 110 patients (mean age 63 years, 69% males) with heart failure (HF) with preserved and mid-range heart failure (HFpEF and HFrEF) were recruited. Functional polymorphisms were selected from six candidate genes: IL-6, TNF alpha, TGF beta, NOIs, PPAR gamma, CYP27B1. We also assessed the levels of selected HF biomarkers and performed echocardiographic examinations.

**Results:** Homozygotes GG in 174 G/C of IL6 polymorphism are characterized by higher values of GFR MDRD and systolic mitral annular velocity (p = 0.01, p = 0.03). HF patients with A allele in TNF-308 G/A rs1800629 polymorphism had lower systolic blood pressure and higher incidence of paroxysmal atrial fibrillation (p = 0.006). Patients with HF and CC profile of TGF beta polymorphism had higher LV mass and higher level of TNF alpha in plasma (p = 0.04, p = 0.04). Patients with C allele in NOIs polymorphism had higher class according NYHA classification, lower blood pressure, higher level of cystatin C and lower GFR, lower LV EF compared to patients without C allele (p = 0.04, p = 0.03, p = 0.02, p = 0.02, p = 0.02, p = 0.08). Patients with AA profile in C-1264A of CYP27B1 polymorphism had lower values of eGFR (MDRD) and higher levels of uric acid compared to CA and CC profile (p = 0.03, p = 0.02). In multivariate analysis CG genotype for 174 G/C of IL6 (odds ratio OR=7.5; 95% CI 1.1-50; p = 0.03), A allele in C-1260A of CYP27B1 (OR=4.3; 95%CI 1.3-13; p = 0.01), higher GFR (MDRD) (OR=0.36; 95%CI 0.32-1.0; p = 0.05), lower level of cystatin C (OR=6.6; 95%CI 1.2-35; p = 0.02) and higher level of TGF beta 1 (OR=0.96; 95%CI 0.57-0.84; p = 0.001) were independent risk factors of worse course of heart failure.

**Conclusions:** These data confirm the importance of the selected SNPs in aggravation and complications of hypertension. The CG genotype for 174 G/C of IL-6 and A allele in C-1260A of CYP27B1 are SNPs independently associated with worse course of HFrEF and HfMVF.
1523  
Association between troponin I and left ventricular global longitudinal strain in outpatients with heart failure  

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Background: Troponin I (TnI) is an established prognostic marker in heart failure (HF). However, the pathophysiological mechanisms of TnI elevations in compensated HF are poorly understood. Hence, it is unknown whether TnI elevations are associated with an impaired left ventricular function evaluated by echocardiography or only reflect frequently present comorbidities.

Purpose: To test the hypotheses that TnI is associated with an impaired left ventricular function estimated by left ventricular (LV) global longitudinal strain (GLS) in outpatients with compensated HF.

Methods: We prospectively enrolled 112 patients with reduced left ventricular ejection fraction (LVEF) referred to an outpatient HF clinic. LV GLS was assessed by two-dimensional speckle tracking, plasma concentrations of TnI were analyzed on frozen plasma with a standard contemporary TnI assay. The cut-off value at the 99th percentile of concentrations obtained among healthy individuals was 45 ng/mL. Baseline data were collected. The association between plasma concentrations of TnI and LV GLS was evaluated in logistic regression models before and after adjustment for important confounders (age, sex, renal function, anemia, atrial fibrillation, NT-proBNP, diabetes and ischemic heart disease).

Results: The patients had a median age of 70 years (interquartile range: 64-75), 26.5% were female, median LVEF was 33% (27-39%) and 29% were in New York Heart Association (NYHA) class III-IV. TnI was detectable in 36%. Of the patients with detectable plasma concentrations of TnI, 63% had a markedly impaired LV GLS (< -11%) and this was only the case for 31% of the patients with undetectable TnI (< P = 0.001). In univariate analyses, LV GLS and TnI were closely associated (Odds ratio (OR): 3.86 (95% Confidence Interval (CI): 1.71-8.68, P < 0.001), and the association remained significant in a multivariate adjusted analysis (OR: 3.45 (95% CI: 1.24-9.62, P < 0.018). Detectable TnI was not associated with any comorbidity (renal function, anemia, atrial fibrillation, diabetes and ischemic heart disease) in an adjusted statistical model (P > 0.05 for all).

Conclusions: Detectable TnI is independently associated with impaired LV GLS and may, therefore, reflect impaired left ventricular function rather than comorbidities. Future trials should use TnI to identify high risk patients since detectable TnI is both associated with a poor outcome and impaired left ventricular function in compensated HF.

1525  
Epidemiology of heart failure in Sweden: a retrospective population-based cohort study  

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Background and purpose: Considering the limited and conflicting data on temporal trends in the incidence, prevalence and mortality of heart failure (HF) in Sweden, we aimed to provide an update on the epidemiology of HF in Sweden.

Methods: Patients with HF were identified using data from secondary care from the National Patient Register (NPR, primary care was not covered), linked via unique identifiers to primary and secondary care data from the Cause of Death Register. Patients aged ≥18 years with ≥2 diagnoses of HF between 01/01/1997 and 31/12/2014 (for incidence and prevalence) or between 01/01/2005 and 31/12/2013 (for mortality) and an ICD-10 diagnostic code of 10 (inclusive of all granular codes), ICD C42, ICD 42, ICD 42, ICD 42, ICD 42, ICD 42, ICD 42, ICD 42 in any position were included. The date of the second HF diagnosis was the index date for incidence and prevalence; the date of the first HF diagnosis was the index date for mortality. ICD-10 codes also identified comorbidities occurring in the 5 years prior to index. Annual incidence and prevalence estimates were assessed for the years 2010-2014 using a look-back period of 2000 onwards. Estimates were age-standardized to the Swedish population in 2015. Age-adjusted hazard ratios (HRs) for all-cause and cardiovascular disease (CVD)-related mortality was estimated using a Cox proportional hazards model.

Results: Data from 845 276 patients with HF were extracted from the NPR. Of these, 174 537 patients (20.6%) did not have a diagnosis of HF in the look-back period and were considered to be newly diagnosed (median age: 79.8 years; 46.9% women). The most common comorbidities were hypertension (36.3%), atrial fibrillation (26.1%) and ischaemic heart disease (22.9%). Overall annual incidence (95% confidence interval [CI]) of HF decreased over the 5 years from 3.20 (3.16–3.24) to 2.91 (2.87–2.95) per 1000 inhabitants, and prevalence increased over the 5 years from 1.61 (1.60–1.62%) to 1.72 (1.71–1.72%). Incidence and prevalence estimates were higher in men than in women (Figure). All-cause mortality over 1 and 3 years (95% CI) was 19.7 (19.5–19.9%) and 40.5 (40.2–40.7%), respectively; 1- and 3-year CVD-related mortality was 11.8 (11.6–11.9%) and 29.5 (29.7–29.6%), respectively. All-cause mortality was higher in men than in women (1-year mortality, 21.1 (20.8–21.4%) vs 18.4 (18.2–18.7%); 3-year mortality, 43.3 (42.9–43.6%) vs 38.0 (37.6–38.3%), as was CVD-related mortality (1-year mortality, 12.9 (12.6–13.1%) vs 10.8 (10.5–11.0%); 3-year mortality, 28.3 (27.9–28.6%) vs 23.8 (23.5–24.1%). However, age-adjusted HRs (95% CI) suggested mortality was higher in men than in women (all-cause, 1.1 [1.0–1.3] CVD-related, 1.1 [1.0–1.3]).

Conclusions: Increasing prevalence of HF with decreasing incidence indicates improved survival. Incidence, prevalence and age-adjusted mortality of HF were higher in men than in women.

Annual incidence and prevalence of HF in men and women in Sweden from 2010 to 2014

1526  
Clinical characteristics and outcomes of patients with chronic heart failure and ‘mid-range’ ejection fraction: data from the IN-HF Outcome Italian Registry  

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On behalf of: IN-HF Outcome Investigators

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Background. ESC guidelines identify patients (pts) with heart failure (HF) and ejection fraction (EF) between 40 and 49%, defined HF ‘mid-range’ (HFrEF), confirming the values for HF with preserved EF (≥50% HFrEF) and HF with reduced EF (<40% HFrEF).

Aims: To compare in outpts with chronic heart failure (CHF) clinical characteristics and outcomes of HFrEF pts with those of HFrEF or HFrEF.

Methods: Data derived from the Italian Network on Heart Failure (IN-HF) Outcome Registry which collected data of pts with HF and any level of EF. Results: 2135 HF pts had EF data: pts with HFrEF were 23.9%, 59.7% had HFrEF and 16.4% HFrEF. Mean age was 69 ± 12 years, 68 ± 12 years and 72 ± 12 respectively (p < 0.0001), prevalence of females in HFrEF was 26.1% compared to 18.5% and 39.9% in HFrEF and HFrEF respectively (p < 0.0001). Ischaemic aetiology was more frequent in HFrEF (49.8%) and HFrEF pts (46.1%) than in HFrEF pts (26.8%), p < 0.0001, which had a higher rate of hypertensive etiology. Pts with
HFpEF also had a higher prevalence of history of atrial fibrillation (59.1% vs 26.5% of HFrEF and 26.4 of HFmrEF, p < 0.001). There were no differences in the rates of HF hospitalizations and in the previous year among the three groups. NYHA III and IV were less frequent in HFpEF (9.4%) compared to HFrEF (23.6%) and HFpEF 21.9, p < 0.0001. Drug treatments are reported in the table. Pts with HFpEF were treated similarly with respect to ACE-IVARs or IBPs while they were less treated with diuretics and digoxin compared to the other two groups of HF pts. MRAs were more frequently prescribed in HFrEF while in HFpEF the prescription is similar to HFpEF pts. At 12 months follow-up, HFpEF pts were more frequently hospitalized (25.9%) compared to HFrEF (14.5%) and HFpEF (19.7%), p < 0.0001. All-cause mortality was reported in 6.7% in HFpEF pts versus 3.3% of HFrEF versus 3.7% of HFmrEF, p = 0.006.

Conclusions: Pts with HFpEF represent a significant portion of HF outputs, they are currently treated similarly to those with HFrEF. One year mortality of HFpEF pts seems to be better than that of HFrEF and particularly HFmrEF pts.

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</table>

Treatment in the three CHF groups

1527 Prognostic value of calculated plasma volume status in patients with heart failure and preserved ejection fraction insights from the PARADIGM-HF trial

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Diuretics, % 86.0 91.2 77.3 80.1

Funding Acknowledgements: The PARADIGM-HF study was funded by Novartis

On behalf of: PARADIGM-HF investigators

Background: Estimated plasma volume (ePV) derived from haematocrit and body weight correlates well with PV measured using 125Iodine labelled human serum albumin. We calculated ePV and relative PV (rPV), which is ePV as a fraction of ideal PV (IP), in patients with HFpEF enrolled in PARADIGM-HF and examined the association between IPV and outcomes, as well as the effect of randomized treatment on IPV.

Methods: IPV was calculated as: IPV = (1 – haematocrit) × [体重 (重量 in kg)], where haematocrit is a fraction, weight in kg, and weight in kg.

Results: Median follow-up in both cohorts (log-rank test: p < 0.001) and p = 0.01, respectively. The associations of MR-proADM with CHF remained significant in Cox regression analyses when adjusted for other risk factors for CHF, such as a history of coronary heart disease, proteinuria and decline of renal function (HR in pooled cohorts: 1.99 (1.58-2.5); p < 0.0001). MR-proADM also contributed significant supplemental information to the prediction of CHF when we considered the clinical risk factors of CHF identified in the UKPDS study (OR 0.013, 0.006, p = 0.02).

Conclusions: PARADIGM-HF concentration was measured in baseline samples of two cohorts of type 2 diabetes patients recruited in France: SURDAGENE (n = 1348, median follow-up 5.3 years) and DIABHYCAR (n = 2682, median follow-up 4.7 years).

Results: The incidence rate of CHF was 2.5 (95% CI 2.2-2.9) for SURDAGENE and 1.0 (95% CI 0.8-1.1) per 100 person-year for DIABHYCAR, respectively, corresponding to 206 and 127 events, respectively.

Conclusions/interpretation: MR-proADM is a predictive biomarker for occurrence of severe heart failure in people with type 2 diabetes.

Aims/hypothesis: – Prognostic value of calculated plasma volume status in patients with heart failure and preserved ejection fraction insights from the PARADIGM-HF trial

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mass index (BMI), worse symptoms and renal function; more likely to have atrial fibrillation, anemia and reduced mobility. Worsening malnutrition correlated with increasing NTProBNP levels regardless of diagnosis (R2=0.36-0.45 conditional, 0.28-0.43 GNRI, 0.37-0.43 PNI), all p < 0.001. During a median follow-up of 1573 days (IQR: 702-2799 days), 1723 (50.9%) patients died. We created 24 prognostic Cox regression models using X-fold cross validation (k=25). CONUT and GNRI category (worst outcome with worsening malnutrition categories) were independently associated with outcome in 100% of the models while PNI category was an independent predictor in 19 models (76%). A base model for predicting mortality including variables with an inclusion frequency > 18 of 25 (>70%) models: age, sex, diastolic BP, heart rate, NYHA class III/IV vs. I/II, urea, logNTProBNP, stroke and peripheral vascular disease had a C statistic of 0.72. Amongst the malnutrition indices, GNRI improved model performance most compared with base model. Patients who were severely malnourished according to GNRI had over 6 times greater mortality risk than normal patients. (Figure)

Conclusion: Malnutrition is common amongst patients with CHF and is strongly related to mortality. Screening for malnutrition using GNRI should be routine adopted during assessment of HF patients to guide management.

1530
One-year change in ejection fraction and long-term outcomes in patients with heart failure with mid-range ejection fraction

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Background: In patients with heart failure (HF) and reduced ejection fraction (HFrEF), an improvement in ejection fraction (EF) is often associated with better outcomes. Whether this is true in patients with mid-range EF (HFmrEF) is unknown.

Purpose: To analyze the effect of 1-year change in EF in outcome of patients with HFmrEF (defined as EF 40-49%).

Methods: Prospective observational study of HF patients followed up at 4 university hospitals with a dedicated Heart Failure Unit. Baseline characteristics, 1-year EF and outcomes were collected.

Results: Fourteen percent (n = 504) of the 3580 patients included in the study had HFmrEF. Mean age was 68 ± 13 years (compared with 66.5 ± 13 in HFrEF (defined as EF < 40%) and 74 ± 11 in HFrEF, defined as EF 50-59%), 49% were female (29% in HFrEF and 57% in HFmrEF), both p < 0.001. As expected, among 1-year survivors only 40% of patients with HFmrEF had EF measured at 1 year follow-up, and the majority (86%) had EF < 50%. The majority of patients with HFmrEF (82%) still had EF < 50% at 1-year follow-up. Interestingly, EF of patients with HFmrEF had the greatest variation: 24% had reduced EF, 43% maintained EF 40-49% and 33% had EF > 50%. Figure 1 shows Kaplan-Meier curves for long-term outcome. Of the 2409 patients with EF < 50% that survived 1 year, 1561 (65%) had an echocardiogram performed. In this group, after adjustment for age, sex and baseline EF, hazard ratios for survival for change in EF was 0.97 (95% CI 0.96-0.98, p < 0.001).

Conclusions: At 1-year follow-up patients with HFmrEF had the greatest variability (up and down) in EF and this change was associated with survival.
organs dysfunction (M2-3) presented the most accurate prognostic power. This means that a wider and systemic approach should be used in HF patients, giving up the “cardiocentric” methodology of NYHA. Those preliminary data need to be confirmed in a greater population with a longer follow up.

ROC curves at 6 and 12 months follow up.

1532
Prevalence and clinical consequences of dysglycaemia in nondiabetic patients with chronic heart failure
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On behalf of: BIOSTAT-CHF Investigators
Funding Acknowledgements: European commission Seventh Framework Programme (FP-7)

Background & Aim: Chronic heart failure (CHF) and diabetes mellitus (DM) frequently co-exist and its clinical consequences has been undoubtly established in the past. CHF is a state of insulin resistance and it is believed that glucose abnormalities are very common in CHF patients even in the absence of DM, exposing them to a higher risk of developing DM. This study sought to establish the prevalence and risk related to prediabetes among nondiabetic CHF patients.

Methods: 1803 CHF patients (age 74 ± 11, 34% females, 64% IHD aetiology; 57% in NYHA III/IV; BMI 29 ± 6 kg/m², 42% all-cause deaths) were evaluated prospectively from the BIOSTAT-CHF Scotland study. Pre-diabetes was defined using the new glycosylated haemoglobin A1C (HbA1c) criteria (6.0-6.4%) proposed by the International Diabetes Expert Committee (IEC). Patients with a diagnosis of DM (33%) or undiagnosed DM (5%, baseline HbA1c ≥ 6.5 %) and patients with no baseline HbA1c (14%) were excluded from the study. Cox regression models were used to assess all-cause mortality rates, adjusting for significant covariates.

Results: After exclusion, prevalence of prediabetes was 33% by IEC criteria in our cohort of CHF patients (n = 876). During a median follow-up period of 4.7 years (IQR 4.5, 4.9), there were 39% all-cause deaths. A Kaplan- Meier analysis showed that mortality rates were significantly higher (46% vs 35%; p = 0.006) in prediabetic CHF patients as compared to normoglycemic (NG) CHF patients. Prediabetic CHF patients had more symptomatic CHF (% of patients in NYHA III–IV, 62% vs 52%, p = 0.009) as compared with NG-CHF patients. A Cox regression model, adjusted for significant covariates showed that prediabetic CHF patients were at higher risk of deaths (HR 1.3 [1.02 – 1.7]; p < 0.05) compared to NG-CHF patients.

Conclusion: In patients with CHF, high-normal baseline HbA1c levels in the absence of DM have a significantly increased risk of all-cause mortality. Targeted therapeutic strategies to prevent or delay the onset of DM is urgently needed in these CHF patients identified to have pre-diabetes.
INTERLEUKIN-1 BLOCKADE IN RECENTLY DECOMPENSATED SYSTOLIC HEART FAILURE: THE REDHART TRIAL

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2Hillel Yaffe Medical Center, Heart Institute, Hadera, Israel

Background. An enhanced systemic inflammatory response (i.e., elevated plasma levels of C reactive protein [CRP]) in patients with decompensated heart failure (HF) predicts worse outcomes. We hypothesized that inhibiting interleukin-1 (IL-1) activity with recombinant human IL-1 receptor antagonist (anakinra) would improve aerobic exercise capacity in patients with recently decompensated systolic HF and systemic inflammation.

Methods: We randomly assigned 60 patients with recently hospitalized HF who had been discharged in the prior 14 days, had reduced left ventricular ejection fraction (LVEF < 35%), and had CRP levels (≥2 mg/l) to daily subcutaneous injections with anakinra 100 mg for 12 weeks, anakinra for 2 weeks followed by placebo for 10 weeks. Fifty-two patients (87%) completed the first 14 days of treatment and repeated CPX allowing to measure the interval change in peak oxygen consumption (pVO2 [mL/kg/min]) and ventilator efficiency (VE/VCO2 slope, co-primary endpoints). Treatment with anakinra significantly reduced CRP by >80% (P < 0.01) but did not affect pVO2 or VE/VCO2 slope (all P > 0.20) at 2 weeks. At 12 weeks, a significant improvement in pVO2 (from 14.5 [9.5-16.6] to 16.1 [13.2-18.6], P = 0.006) and VE/VCO2 slope (from 34.9 [29.4-41.4] to 31.7 [27.3-34.2], P = 0.038), and not in the placebo nor in the anakinra in 2-week groups (all P > 0.15). The incidence of death and HF hospitalization was 30% (placebo), 31% (anakinra 2-week), and 6% (anakinra 12-week, Log-Rank test P = 0.104). An analysis measuring events while on-treatment showed lower events while on anakinra [combined] versus on placebo (1 [3%] vs 7 [21%], P = 0.24). Anakinra treatment was also associated with improvements in E/E’ ratio, LVEF, and quality of life measures at 12 weeks. Non-invasive hemodynamic testing revealed significant improvements with anakinra in ventriculo-arterial coupling and stroke work efficiency at 12 weeks.

Conclusion: IL-1 blockade with anakinra in patients with recently decompensated HF failed to improve peak aerobic capacity measured at 2 weeks. Treatment with anakinra for 12 weeks was associated with a clinical improvement at 12 weeks and a signal for reduced hospital readmission for HF. Further studies are needed to confirm these findings and explore the therapeutic value of IL-1 blockade on clinical outcomes.

Correlation between degree of pulmonary congestion and rate of heart failure hospitalization in heart failure patients with reduced left ventricle ejection fraction: results from extended impedance-HF

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2Saroka Medical Center, Cardiology, Beer Sheva, Israel

Results of the IMPEDANCE-HF trial have shown that lung impedance (LIR) guided treatment reduces hospitalizations for heart failure (HF) and decreases HF-related mortality. The main trial was extended for an additional year to accrue more data on predictors of hospitalizations due to HF. The main aim of the study was to prove that HF patients with higher degree of long-standing pulmonary congestion are hospitalized more often.

Methods: Study population included 266 patients, with HF and LVEF ≤ 35% in New York Heart Association class II-IV. Patients were randomized (1:1) to a control group treated by clinical assessment and a monitored group whose therapy was also assisted by LI. Patients were examined and LI measured monthly in our outpatient clinics. Noninvasive LI measurements were performed with the high-sensitive device. Assessment of the degree of pulmonary congestion was by the new index LIR, measured at each visit and calculated as LIR = [currently measured LI] normal baseline (calculated for each patient) – 1 × 100 expressed as percentage. The annual average LIR for each patient was calculated as the mean of all LIR measurements at each consecutive year of follow-up (FU).

Results: The cumulative FU period was 634 patient-years in the monitored group and 483 patient-years in the control group (P = 0.001). Groups were similar with respect to baseline characteristics. There were 228 HF hospitalizations in the monitored group (mean 0.45 per year) and 431 HF hospitalizations in the control group (1.29 per year, P < 0.001). Rate of HF hospitalization was divided into 5 categories as follows: Q0: no HF hospitalizations during FU period, Q1: 0.01-0.3, Q2: 0.3-1.7, Q3: 1.7-4.1, Q4 > 4.1. The incidence of patients in Q0/Q1/Q2/Q3/Q4 were 53 (40%), 29 (22%), 25 (19%), 16 (12%) and 10 (8%) in the monitored group and 41 (31%), 17 (13%), 21 (16%), 21 (16%) and 33 (25%) in the control group, respectively (P < 0.001, Figure 1). Results show that the level of congestion according to LIR during FU period was low in subgroup Q0 while increasing progressively from Q1 to Q4 in both groups (P < 0.001). On the other hand, no difference in the level of congestion between the same quartile groups was measured. Conclusions: (1) LI-guided treatment of HF patients significantly reduces the incidence of HF hospitalizations. (2) Preemptive LI-guided treatment cases a shift of patients from Q3-4 to Q0-1-2 in the monitored group in comparison with the control group. (3) There were no significant differences in the degree of pulmonary congestion between monitored and control patients of the same quartile. (4) As a result of the above, the main predictor for HF hospitalizations is the degree of pulmonary congestion during the FU period.

Correlation between degree of pulmonary congestion and rate of heart failure hospitalization in heart failure patients with reduced left ventricle ejection fraction: results from extended impedance-HF

M Michael Kleiner Shochat1; A Shotan1; M Kazatski1; N Klein1; JM Weinstein1; D Blandha11; A Assf1; Dahan1; S Meisel1
1Hillel Yaffe Medical Center, Heart Institute, Hadera, Israel
2Saroka Medical Center, Cardiology, Beer Sheva, Israel

Results of the IMPEDANCE-HF trial have shown that lung impedance (LIR) guided treatment reduces hospitalizations for heart failure (HF) and decreases HF-related mortality. The main trial was extended for an additional year to accrue more data on predictors of hospitalizations due to HF. The main aim of the study was to prove that HF patients with higher degree of long-standing pulmonary congestion are hospitalized more often.

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Usefulness of a discharge check-list in acute heart failure

L Chaufoeur1; K Blanchart1; D Legafois1; JJ Parent1; A Belin2; P Milliez2; R Sabatier3
1University Hospital of Caen, Cardiology, Caen, France
2University Hospital of Caen, Department of biostatistics and clinical research, Caen, France

Background: Besides significant in-hospital mortality reduction in acute heart failure (AHF), rehospitalization rate remains a powerful predictor of mortality. AHF ESC guidelines recommend pre-discharge and long-term management to prevent early readmissions. Purpose: We hypothesized that the systematic use of a discharge checklist (CL) after an AHF could have an impact on cardiovascular mortality and readmission rates.
**Methods:** Our checklist was designed according to ESC recommendations in order to promote treatment optimization and the development of a careplan after discharge [9 fig 1]. We included 240 patients hospitalized for AHF in our center: 137 patients from June to December 2014 before introduction of the CL, and 103 patients from July 2015 to January 2016 after introduction of the CL. The primary endpoint was cardiovascular death at 6-month. Propensity score matching was performed using a logistic regression model.

**Results:** Mean age was 77 ± 12 years, 56% were male, and 57% were HFrEF patients. There was a significant reduction in cardiovascular death at 6 months in the CL group (OR 2.1, IC 95 [1.1 to 3.9], p = 0.02). There was a non-significant decrease in the 6-month AHF re-admissions rate in the CL group (29.1 vs. 32.1%, p = 0.57), but the increased death rate in the control group may have reduced this impact. Disease management program was more often used in the CL group (36.3% vs 15.4%, p = 0.0002). At discharge, 82% of patients among CL group had a medical appointment within a month, compared to 33% of patients in the control group (p < 0.0001). Therapeutic optimization was better in the CL group, especially for patients with HFrEF, ARB/ACE-I and beta-blockers were more often prescribed or up-titrated according to ESC guidelines (p = 0.016 and p = 0.03).

**Conclusion:** In selected patients hospitalized for AHF, the use of a standardized checklist reduced cardiovascular mortality at 6 months. It also improved therapeutic optimization at discharge and increased systematic follow-up plan utilization. Larger studies are needed to demonstrate a significant reduction in re-admission rates.

**1537**

**Serum chloride and sodium interplay in patients with acute myocardial infarction and heart failure with reduced ejection fraction: an analysis from the high-risk myocardial infarction database initiat**

B Bastian Wobbe1; L Czopf1; KF a r k a s2

1University of Pécs, 1st Department of Medicine, Division of Angiology and Cardiology, Pécs, Hungary; 2University of Pécs, Institute of Bioanalysis, Pécs, Hungary

**Background:** Serum chloride levels were recently found to be independently associated with mortality in heart failure (HF).

**Methods:** and **Results:** We investigated the relationship between serum chloride and clinical outcomes in 7195 subjects with acute myocardial infarction (MI) complicated by reduced left ventricular function and heart failure (HF). The studied outcomes were all-cause mortality (ACM), cardiovascular mortality (CVM), and hospitalization for HF (HHF). Both chloride and sodium had a non-linear association with the studied outcomes (p < 0.05 for linearity). Patients in the lowest chloride tertile (chloride ≤ 100 mEq/L) were older, had more comorbidities, and lower sodium levels (p < 0.05 for all). Serum chloride showed a significant interaction with sodium with regard to all studied outcomes (p for interaction ≤ 0.05 for all). The lowest chloride tertile (≤ 100 mEq/L) was associated with increased mortality rates in the context of lower sodium (≤ 138 mEq/L) [adjusted HR (95%CI) for ACM = 1.42 (1.14-1.77), p = 0.002], whereas in the context of higher sodium (> 141 mEq/L), the association with mortality was lost. Spline-transformed chloride and its interaction with sodium did not add significant prognostic information on top of other well established prognostic variables (p > 0.05 for all outcomes).

**Conclusions:** In post-MI with systolic dysfunction and/or HF, low serum chloride was associated with mortality (but not HHF) in the setting of lower sodium. Overall, chloride and its interaction with sodium did not add clinically relevant prognostic information on top of other well established prognostic variables. Taken together, these data support an integrated and critical consideration of chloride and sodium interplay.

**Check-List**

**1536**

**Comparison of ultrafiltration versus diuretic treatment in patients with acute decompensated heart failure - A meta-analysis**

B Bastian Wobbe1; L Czopf1; KF a r k a s2

1University of Pécs, 1st Department of Medicine, Division of Angiology and Cardiology, Pécs, Hungary; 2University of Pécs, Institute of Bioanalysis, Pécs, Hungary

**Background:** Diuretics are the number one treatment choice for patients hospitalized with acute decompensated heart failure (ADHF) presenting with signs and symptoms of volume overload. Inconsistent responsiveness to diuretic treatment and treatment-related side-effects have led to the development of new and potentially safer treatment options. Several studies investigated the effectiveness and safety of the use of ultrafiltration (UF) on decongestion in patients with ADHF so far. But, due to the heterogenic study outcomes, uncertainty remains, whether UF is a safe and valid alternative to the standard diuretic treatment.

**Purpose:** We conducted a systematic meta-analysis with the primary goal of assessing the impact of extracorporeal UF compared to the standard diuretic treatment using diuretic agents.

**Methods:** We searched EMBASE, the Cochrane Registry and PubMed to identify studies comparing UF with the usual care therapy using diuretic agents in patients hospitalized for ADHF. We used the search terms “acute heart failure”, “ultrafiltration”, “diuretic agent” (for EMBASE and Cochrane) or “diuretics” (for PubMed) and filtered for “randomized controlled trials”. The date of the search was the 17.10.2016.

**Results:** We identified 9 randomized controlled trials enrolling 820 participants, of whom 402 (49%) were randomized to UF and 418 (51%) to control. Overall, UF treatment lead to significantly larger amount of fluid removal (Difference in means: 1325 ml, 95% CI: 817 to 1833 ml, p < 0.001) and weight loss (Difference in means: 1.52 kg, 95% CI: 0.27 to 0.99 kg, p < 0.001). Furthermore, we found significant lower incidences of worsening heart failure in patients treated with UF (OR: 0.63, 95% CI: 0.43 to 0.94, p = 0.022). However, further analysis of adverse events showed no difference between groups concerning incidences of renal impairment (OR: 1.44, 95% CI: 0.91 to 2.28, p = 0.17), cardiovascular disorders except heart failure (OR: 1.57, 95% CI: 0.92 to 2.68, p = 0.097) and potentially treatment-related adverse events (including hypotension, syncope and electrolyte disorders) (OR: 1.17, 95% CI: 0.64 to 2.14, p = 0.614). No differences were observed in the analysis of all-cause mortality (OR: 1.13, 95% CI: 0.75 to 1.71, p = 0.546). The treatment with UF was associated with a significant reduction in heart failure related re-hospitalizations compared to diuretic treatment (OR: 0.543, 95% CI: 0.362 to 0.815, p = 0.003).

**Conclusion:** Compared to diuretic therapy, UF induces larger weight loss and fluid removal, reduces the number of heart-failure related re-hospitalizations and the risk of worsening heart failure in congestive patients. The available evidence suggests that ultrafiltration is a safe and effective treatment option for volume overloaded heart failure patients.

**DISCHARGE CHECK LIST of patients hospitalized for acute heart failure**

<table>
<thead>
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1538
Prognostic impact of glucose in acute myocardial infarction complicated by cardiogenic shock - A substudy of the IABP-SHOCK II trial

A Abdin1; J Poesel2; G Fuerma3; S Desch4; T Ouzanian5; S De Waha1; E Eitel1; U Zeymer6; M Boeheim1; H Treible1
1University Hospital Freiburg, Cardiology, Freiburg, Germany; 2Heart Institute Heart Munich, Munich, Germany; 3Heart Center Ludwigshafen, Ludwigshafen, Germany; 4Staaland University Hospital, Homburg, Germany

Background: In the setting of acute illness and as a stress response, glucose levels have been shown to be significantly increased. Data from observational studies suggest an association between glucose levels and prognosis of patients with cardiac shock (CS). Aim of the present study was to investigate the prognostic role of glucose at admission with respect to 30-day mortality in patients with CS complicating acute myocardial infarction (AMI) included in the large, randomized Intraaortic Balloon Pump in Cardiogenic Shock (IABP-SHOCK II) trial.

Methods: In IABP-SHOCK II, 600 patients with CS complicating AMI undergoing early revascularization were randomized to therapy with either IABP or no IABP. There were no differences between the groups with respect to the primary and secondary endpoints. Glucose levels at admission were available in 513 patients. The investigated endpoint was 30-day mortality.

Results: Of the 513 patients, 213 (41.6%) died. Compared to survivors, non-survivors had higher glucose levels at admission (median [interquartile range (IQR)]: 13.0 mmol/L [9.2; 18.2] vs. 10.5 mmol/L [7.8; 15.9]; p < 0.004). Patients with glucose concentrations above the median (11.5 mmol/L) had higher 30-day mortality compared to those below the median (47.7% vs. 36.5%; p = 0.005). This negative prognostic impact of increased glucose remained significant in a multivariate analysis adjusted for several factors which were associated with mortality in univariate analysis, such as age, renal function, Thrombosis in acute Myocardial Infarction (TIMI) flow after percutaneous coronary intervention (PCI), and arterial lactate concentrations (Hazard ratio for each 10 mmol/L increase of glucose 1.2; 95% confidence interval: 1.01-1.46, p = 0.039). In total, 33.7% of the patients had diabetes. Patients with diabetes had higher glucose levels compared to those without diabetes (median [IQR]: 13.1 [9.5-18.3] vs. 10.7 [8.1-15.4]; p = 0.003). Notably, the adjusted prognostic impact of increased glucose levels at admission was not influenced by presence or absence of a diabetes mellitus (p for interaction=0.41).

Conclusions: In patients with CS complicating AMI included in IABP-SHOCK II, increased glucose concentrations at admission were independent predictors for 30-day mortality, independently of the diabetic state.

1539
The application of ratios urea/creatinine and BUN/creatinine in acute heart failure

M L Goncalves1; JULIO GI1; LUIS Abreu3; HUGO Antunes1; BRUNO Marmelo1; A Abdin1; M Kazatsker1; IK Klein2; J Michael Kleiner Shochat1; A Shochat1; M Michael Kleiner Shochat1; A Shochat1; M Kazatsker1; IK Klein2; J MS Weinstein2; A Asfit1; D Blondheim1; IA Dahan1; S Meisel1
1Saarland Heart Center Ludwigshafen, Ludwigshafen, Germany; 2Heart Center Viseu, Viseu, Portugal

Introduction: Worsening renal function (WRF) is an important comorbidity that is not completely understood, and is defined by an increase in creatinine (Cr) and BUN have been classically used as proxies for RF assessment with low sensitivity and specificity. Hence, ratios such as BUN/Cr and U/Cr have been used in clinical practice as markers of renal function. The application of ratios urea/creatinine and BUN/creatinine in acute heart failure is controversial, as there is no evidence to support its use. The purpose of this study is to assess the usefulness and prognostic implications of U/Cr and BUN/Cr ratios in patients with AHF.

Methods: Included 1006 patients hospitalized for AHF in a Cardiology ward between 2009-2015. Excluded P undergoing renal replacement therapy or eGFR ≤ 60 and normal BUN/Cr ratio. The study population was divided into groups according to ratios (increased vs. normal) and eGFR (<60 vs >60). Follow-up of 24 months. The groups were compared in relation to in-hospital death (IH) and long-term survival.

Results: Sample of 950. 93% male, age range 70±9.8 years, mean U 69±35.5 mg/dL, mean Cr 1.3±0.5 mg/dL, mean BUN 32±16.6 mg/dL, mean BUN/Cr 25.8±9.4, mean U/Cr 65.2±20.1, eGFR 55.3±22.7 mL/min/1.73m2, WRF in 17% ≥ 4.4% IH, 16.3% death at 24 months. There was no statistically significant association between the elevated U/Cr and BUN/Cr ratios and the development of WRF throughout hospitalization. The BUN/Cr and U/Cr ratios alone were not associated with IH. There was no difference between P-eGFR ≤ 60 and >60 in relation to IH, although there was a trend in favor of the higher number of IH in P-eGFR ≤ 60 (X2=2.7, p < 0.09). When subgroup analysis was performed, P-eGFR ≤ 60 and elevated BUN/Cr ratio had a statistically significant association with IH (X2=4.3, p = 0.04) when compared with P-eGFR >60 and normal ratio. For the same population the high U/Cr ratio also had a statistically significant association with IH (X2=4.07, p = 0.04). In the survival analysis, it was found that: high BUN/Cr ratio was associated with lower survival at 24 months (Kaplan-Meier X2=6.8, p < 0.09), whereas high U/Cr ratio was not. When eGFR was stratified (graphic), P-eGFR ≤ 60 and increased BUN/Cr had lower survival than P-eGFR > 60 without increased BUN/Cr ratio, and these had a lower survival than P-eGFR > 60 and increased BUN/Cr, and that P-eGFR ≤ 60 and normal BUN/Cr ratio had the best survival rate at 24 months (Kaplan-Meier X2=36.9, p < 0.001). In relation to the U/Cr ratio, there was no difference in survival in subgroup analysis.

Conclusion: It has been shown that high BUN/Cr and U/Cr ratios are associated with IHD. In the long term, the BUN/Cr, but not the U/Cr, has an additive value to the isolated eGFR evaluation and can be used to improve the prognostic stratification in AHF.
1541

Exercise cardiac MRI with pulmonary artery catheter monitoring in early manifestation of carcinoid heart disease: a first in men case report

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1University Hospitals (UZ) Leuven, Cardiology; heart failure and transplantation, Leuven, Belgium; 2University Hospitals (UZ) Leuven, Cardiology, Leuven, Belgium; 3University Hospitals (UZ) Leuven, Radiology, Leuven, Belgium; 4University Hospitals (UZ) Leuven, Cardiac surgery, Leuven, Belgium

INTRODUCTION A first report about the use of an exercise cardiac MRI with pulmonary artery catheter measurements to investigate carcinoid heart disease. CASE REPORT A 58 years old woman was referred from the oncology department to the heart failure clinic because of progressive dyspnea on exertion. She was diagnosed with a neuro-endocrine tumor and liver metastases 4 years earlier. After several treatment cycli, she had a stable disease at the time of presentation. The dyspnea was present since a few weeks. There were no signs of heart failure on clinical examination. ECHO showed only minor alterations. Echocardiography revealed a structurally normal left heart, but severe tricuspid regurgitation (TR) with retraction of the leaflets. RV function was normal, there was no RV dilatation but a clear diastolic D-shaping of the interventricular septum – indicative of volume overload. CMRI showed a VO2 max of 27.7 ml/min/kg (86% of pred. max). Invasive investigations were started to evaluate the patient for valve surgery. Coronary angiography did not show any significant stenoses, and right heart pressures were within normal range. However, we were still convinced that the severe tricuspid insufficiency should have an hemodynamic impact on the heart, given the complaints of the patient. Moreover, we recently analysed the results of carcinoid valve surgery executed in our centre the last 16 years (cf separate abstract submitted to Heart Failure 2017) and concluded that late referral for valve surgery could lead to high perioperative mortality. We organized an exercise test in the cardiac MRI with measurements of the intracavitary pressures using a MRI-compatible pulmonary artery catheter. Results are shown in figure 1. Apparently, early manifestation of severe isolated TR without RV dysfunction leads to a decrease in RV ESV but an increase in RV EDV during exercise, resulting in an absence of stroke volume increase – clearly an abnormal finding - without left or right sided systolic dysfunction or congestion. Left sided volumes and pressures hardly changed during exercise; this is likely caused by a lack of LV preload increase. Based on the symptoms of our patients and the results of the CMR, our patient was referred for surgery. She underwent a tricuspid valve replacement with a bioprothesis size 29. The postoperative period was uneventful, with extubation on day 1 and discharge from the ICU on day 3 after surgery. Further hospital stay was without complications. Symptoms of dyspnea on exertion improved after cardiac rehabilitation. She is currently in ambulatory FU more than 2 years after surgery. There are no signs of prosthetic valve dysfunction on TTE. Her exercise capacity on CMRI has recently dropped (VO2 max 23.6 ml/min/kg, 75% of pred max) because of both chronicotropic incompetence (she is now on a low dose of b-blocker) and, unfortunately, a progressive malignancy for which SIRS (selective intrahepatic radiation with chronotropic incompetence) was performed (no serious stenosis). For the improvement of systolic function infusion of levosimendan (LV) was started. In 3 days after LV infusion and concomitant treatment, HR 70, BP 125/75mmHg, SpO2 96% Penodipril was added 5mg od.

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Neurological treatment included vitamin B, phosphates, α lipolic acid, anticholinergic drugs, anticonvulsants.

**Answers:** In 8 days, the patient was discharged and directed to the oncologist, with regression of neurological and cardiac symptoms, improvement of systolic function and synus rhythm.

**Conclusions:** Only close cooperation of different specialists may lead to success story. Unfortunately, database of this patients is not significant and all the concomitant treatment should be studied. Moreover, toxic effects of ChT may be observed for a long time after finishing the cancer treatment and needs for follow-up monitoring. Post hoc examination of the patient (1.5 year later) showed an stable remission of Lymphoma, no signs of heart failure, regress of neurogical symptoms.

### Echo and labs data

<table>
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<th>EF, %</th>
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<th>D1</th>
<th>D5</th>
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<td>58</td>
<td>42</td>
<td>43</td>
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<tr>
<td>Serum creatinine, mmol/l</td>
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<td>2,76</td>
<td>1,19</td>
<td>0,12</td>
</tr>
</tbody>
</table>

D0 - before chemotherapy course, D1 - first day in cardiac ICU, D5 - before LV infusation, M18 - post hoc visit in 18 mo

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**Clinical Case Corner 5 - Cancer and cancer therapy: a double edged sword**

**Acute right ventricular failure in an oncological patient**

A Andreea Rachieru1; B Zamfirescu1; R Altori1; D Rednic1; A Linte1; D Dimulescu1; A-O Popescu1

1 Elias Emergency University Hospital, Cardiology, Bucharest, Romania

We present the case of a 63 year old woman, hypertensive, diabetic, with radical hysterectomy, admitted for shortness of breath and extreme fatigue, also dry cough and fever, denying chest pain or syncope. The patient was on chemotherapy for clear cell endometrial cancer, a rare and aggressive type of neoplasm. She was in a severe state, hypoxic (oxygen saturation of 86%), diminished breath sounds bilaterally, low BP (85/50 mmHg), tachycardia (100 bpm), oliguric and without valuclar murmurs or signs of deep vein thrombosis (DVT). ECG showed sinus tachycardia, incomplete RBBB, Q wave in DII and T wave inversion in the precordial and inferior leads. At that moment (based on findings and also 7 points on Wells score), pulmonary embolism (PE) was taken into consideration. Transthoracic echocardiography showed dilated right heart cavities, indirect signs of pulmonary hypertension, normal LVEF but severe dysfunction of the right ventricle [hypokinesia, TAPSE = 11 mm], and also a mobile structure (4,5/3 cm) extending from the RA to the RV through the tricuspid valve. CT angiogram confirmed bilateral massive pulmonary embolism with right heart thrombus, thrombosis of portal and superior mesenteric veins and also hepatic secondary tumors. Biologically – there is moderate iron deficiency anemia, high ESR, positive α 2 tirsch, high NT pro-BNP, mild renal dysfunction and dyslipidemia. Even though the diagnostic was bilateral massive pulmonary embolism with high risk, due to patient’s comorbidities (active cancer, moderate anemia), the management was anticoagulant therapy with unfractioned heparin, dabutamine and doxapine for acute right heart failure, oxygenotherapy, red blood cell transfusion in order to correct anemia. Ultrasonography of the lower limb veins showed no signs of DVT. Despite all of the mentioned predictors of poor prognosis, the evolution was good, with improvement of dyspnea and progressively decreased doses of inotropic agents. Follow-up showed better RV function and the disappearance of intracardiac thrombus, possibly by embolisation of the fragmented thrombus into the pulmonary circulation without additional clinical impact. After 2 weeks, a whole-body CT scan was made, confirming regression of endoluminal thrombi, but with infarction in the left superior pulmonary lobe, and also advanced peritoneal carcinomatosis. The patient was transferred to the Oncology Department for palliative care with the recommendation for indefinite anticoagulation with LMWH. The particularity of this case is that even though mortality rate is high in patients with PE and right heart thrombus in-transit, this patient survived and improved clinically under anticoagulant therapy.
Primary pericardial mesothelioma presenting as infective pericarditis

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Introduction: Primary pericardial mesothelioma (PPM) is a rare disease (the prevalence 0.0022%), with only 350 patients reported in the literature to date. We describe a case of a woman who presented with infective pericarditis and was diagnosed with PPM.

Case report description: 37 year old woman was referred to emergency department because of nausea, epigastric pain and fever up to 39.5°C. These symptoms started suddenly and had been lasting for 4 days. She denied any previous diseases. The laboratory tests showed inflammation (C-reactive protein 248 mg/l). Echocardiography exam revealed a large accumulation of pericardial fluid - up to 3.4 cm at left ventricle (LV) with echocardiographic signs of cardiac tamponade (Fig. 1).

Additional investigations were performed in order to determine the source of infection. The chest computed tomography (CT) revealed left pleural effusion up to 3.5 cm and pericardial effusion up to 1.6 cm at LV and up to 0.5 cm at right ventricle (RV) (Fig. 1). Diagnostic pleural puncture with biochemical, microbiological and cytological analyses showed non-specific characteristic of exudate without atypical cells or microorganisms. While differentiating from other pericardial diseases, additional investigations were performed in order to determine the source of infection. The chest computed tomography (CT) revealed left pleural effusion up to 3.5 cm and pericardial effusion up to 1.6 cm at LV and up to 0.5 cm at right ventricle (RV) (Fig. 1). Diagnostic pleural puncture with biochemical, microbiological and cytological analyses showed non-specific characteristic of exudate without atypical cells or microorganisms.

Moreover a pseudonodular mass with irregular margins and size of 2x2.8 cm was inside the right atrium (Figure 1). The right ventricle was hypokinetic (TAPSE 12 mm, Fractional Area Change (FAC) 30%). The left ventricle ejection fraction (LVEF) was 48%. Mild tricuspid valve regurgitation was noted with systolic pulmonary arterial pressure (PAPs) of 38 mmHg. Transesophageal echocardiography (TEE), computed tomography (CT) scan (Figure 2) and magnetic resonance imaging (MRI) confirmed our findings. Case 2: 55 year-old man with diabetes mellitus. He was admitted in our intensive care unit with signs of cardiac tamponade. The patient underwent urgent pericardiotensis. On admission, ECG revealed a sinus tachycardia and low voltage QRS complex. TTE revealed a solid extra- and intracardiac mass (4.5x3.2 cm) on the atrioventricular groove near the lateral part of the tricuspid annulus (Figure 3). A slightly dilated and hypokinetic right ventricle was also observed (TAPSE 8 mm, FAC 28%). The LVEF was 49%. Mild tricuspid valve regurgitation with PAPs of 45 mmHg was also present. The findings were confirmed by a TEE.

A position emission tomography (PET-CT) scan revealed in the mass an intense hypercapitation extending to the mediastinum (Figure 4). Both patients underwent an uncomplicated ultrasound-guided endovascular biopsy. Pathology report revealed a diffuse tumour proliferation of large lymphatic B cells. Intense mitotic activity was noted with areas of apoptosis. The diagnosis in both cases was Burkitt lymphoma with primary cardiac localization. The immunohistochemical essays confirmed the diagnosis too. Chemotherapy was immediately started next to the support cardiological therapy (fluids, diuretic, dopamine and dobutamine in the second one). The patient is has been stable for 21 months since the diagnosis of PPM.

Introduction: the intracardiac masses represent a rare clinical disease. They are usually due to infectious, thrombi or tumour metastasis and less frequently to primary tumours. A correct differential diagnosis is crucial to establish the appropriate therapy. We report two cases of intracardiac masses recently presented to our attention. Case 1: 57-year-old man, infected with human immunodeficiency virus (HIV) from 8 years. His previous history revealed two episodes of pericarditis in the last two months. On admission, he referred worsening dyspnoea on exertion in the last week and presented signs and symptoms of superior vena cava syndrome. ECG revealed no specific alterations. Transthoracic echocardiography (TTE) showed a slight pericardial effusion and an abundant solid tissue in the pericardial space with “ab-estrinsic” infiltration of heart wall chambers, origin of aorta and both vena cava. Moreover a pseudonodular mass with irregular margins and size of 2x2.8 cm was located inside the right atrium (Figure 1). The right ventricle was hypokinetic (TAPSE 12 mm, Fractional Area Change (FAC) 30%). The left ventricle ejection fraction (LVEF) was 48%. Mild tricuspid valve regurgitation was noted with systolic pulmonary arterial pressure (PAPs) of 38 mmHg. Transesophageal echocardiography (TEE), computed tomography (CT) scan (Figure 2) and magnetic resonance imaging (MRI) confirmed our findings. Case 2: 55-year-old man with diabetes mellitus. He was admitted in our intensive care unit with signs of cardiac tamponade. The patient underwent urgent pericardiotensis. On admission, ECG revealed a sinus tachycardia and low voltage QRS complex. TTE revealed a solid extra- and intracardiac mass (4.5x3.2 cm) on the atrioventricular groove near the lateral part of the tricuspid annulus (Figure 3). A slightly dilated and hypokinetic right ventricle was also observed (TAPSE 8 mm, FAC 28%). The LVEF was 49%. Mild tricuspid valve regurgitation with PAPs of 45 mmHg was also present. The findings were confirmed by a TEE. A position emission tomography (PET-CT) scan revealed in the mass an intense hypercapitation extending to the mediastinum (Figure 4). Both patients underwent an uncomplicated ultrasound-guided endovascular biopsy. Pathology report revealed a diffuse tumour proliferation of large lymphatic B cells. Intense mitotic activity was noted with areas of apoptosis. The diagnosis in both cases was Burkitt lymphoma with primary cardiac localization. The immunohistochemical essays confirmed the diagnosis too. Chemotherapy was immediately started next to the support cardiological therapy (fluids, diuretic, dopamine and dobutamine in the second one). The patient is has been stable for 21 months since the diagnosis of PPM.

1545
Primary pericardial mesothelioma presenting as infective pericarditis

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Introduction: Primary pericardial mesothelioma (PPM) is a rare disease (the prevalence 0.0022%), with only 350 patients reported in the literature to date. We describe a case of a woman who presented with infective pericarditis and was diagnosed with PPM.

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Discussion: Burkitt lymphoma is infrequent accounting for less than 1% of all non-Hodgkin lymphomas and 25-30% of the lymphomas in HIV-affected population. Primary cardiac lymphoma localization is extremely rare with non-specific signs and symptoms and can often be overlooked or underrated. Due to the very rapid growth of Burkitt lymphoma, a prompt diagnosis and treatment are crucial to get good prognostic outcomes. A multidisciplinary involvement (oncologist, radiologist and cardiologist) is essential to achieve optimal outcomes.
A rare case of cardiac malignant fibrous histiocytoma

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Introduction: Primary cardiac tumors are rare entities with a reported incidence of 0.4% to 0.7% of all cardiac tumors. 25% of primary cardiac tumors are malignant, and of these, 75% are sarcomas and have a poor prognosis. Malignant fibrous histiocytoma is a sarcoma that constitutes less than 3% of primary cardiac tumors. Case report description: A 37-year-old female presented with increasing dyspnea on exertion, cough and fever for 1 month. She received treatment with antibiotics but developed one episode of syncope two weeks prior. She was admitted with HF symptoms and work-up revealed NT proBNP of 123,699 pg/ml, BNP of 716 pg/ml, EKG with signs of RV strain and chest x-ray showed cardiomegaly. Transthoracic echocardiography revealed preserved left ventricular systolic function with LV ejection fraction of 64% but right ventricle (RV) was severely dilated and had severely reduced function (RV mid 3.9 cm, RV base 4.5 cm, RVs' 0.12 m/sec). LA was also moderately dilated with 4x4 cm mass protruding through mitral valve into the LV, the appearance of which was consistent with myxoma. There was severe tricuspid regurgitation (velocity 4.19 m/sec) and severe pulmonary hypertension. Patient was started on intravenous diuresis with furosemide and was planned to undergo resection of the LA mass due to symptoms of syncope and RV failure. Coronary angiogram revealed no stenosis. Resection of the LA mass was done under cardiopulmonary bypass. Pathology revealed irregular lobulated soft mass with a glistening tan-pink outer surface measuring 6.5x3.8x cm and weighing 57 grams. Postoperative course was uneventful and during 2 months follow up, she had no HF symptoms and did not require any diuretics. Follow up echocardiogram did not show any regrowth of myxoma.

Answers and Discussion: Cardiac myxomas can occur in all age groups, but present most frequently between the third and sixth decades of life. Myxoma usually occur the LA and less commonly in the right atrium, LV and RV or multiple sites. The clinical features depend upon the location of myxoma, size, and mobility. Patients may have only constitutional symptoms such as fever, weight loss, fatigue, myalgia, arthralgia and muscle weakness. They may present with signs of tumor embolism or intracardiac obstruction causing dyspnea, palpitations, chest pain, pulmonary oedema, syncope or even sudden death. Our patients had near syncope episodes for many years which could be due to progressively enlargement of the myxoma causing obstruction of the mitral valve during diastole. Severe pulmonary hypertension and RV enlargement suggested prolonged subclinical stage in our patient which necessitated urgent surgery. This case suggests that RV failure and syncope can be the complication of LA myxoma. Follow up echocardiogram is necessary to document complete resection and to rule out any recurrence particularly in suspected familial form and those with multiple myxomas. We are planning to get another follow up echo in our patient to see if RV failure improved after surgery.
Left Atrial Myxoma

Progressive heart failure and accelerated myocardial ischemia with repeated in-stent restenosis in a case of multiple myeloma

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1University of Medicine and Pharmacy Victor Babes Timisoara, Timisoara, Romania

A 70 year-old man with IgG kappa stage IIIB multiple myeloma, diagnosed after onset of acute renal failure, presented with dyspnea and severe chest pain, two days after concluding the second cycle of triple association: bortezomib 1.3 mg/m² + melphalan 8mg/m²/d + prednisone 60mg/m²/d. His ECG demonstrated sinus tachycardia, left atrial enlargement and ST-T elevation in V2-V4. Troponine I hs was 29.5 ng/ml. Acute anterior STEMI was diagnosed. Coronary angiography revealed 85% occlusion of proximal LAD, followed by PTCA with BM Integrity stent 3.0/18mm. His echocardiogram revealed diastolic dysfunction type I, moderate left atrial enlargement, anterior wall and septal motion abnormality, no valvular abnormalities, a moderately enlarged LV (VTD=149ml) with a borderline low ejection fraction (EF) of 42%. A prior echocardiogram at initiation of MM treatment revealed normal LV volume and EF. The patient was put on beta blocker, ACE inhibitor, statin and double antiplatelet therapy and after one month the treatment of MM was resumed. During the 5th cycle the patient again presented chest pain with extensive subendocardial ischemia. Troponine I hs was 0.019 ng/ml and unstable angina IIIB was diagnosed. Coronary angiography revealed early in-stent 90% restenosis in the proximal LAD and multiple non-significant 30-50% stenoses in the RCA and in the CXA. PTCA in the proximal LAD was performed with an Xiience stent. His echocardiogram at this stage revealed further increase of LV volume and decrease of EF (170ml and 40% respectively), while renal function and platelet count continued to deteriorate. A skeletal survey performed after discharge revealed multiple lytic lesions in the pelvis and skull. It was decided to add bisphosphonate 4mg/cure to his therapy. However, the condition of the patient allowed only three more cycles, due to the severe side-effects, including two upper digestive tract hematomas, anemia and low platelet count. During the 8th cycle the patient again presented severe anginal pain with subsequent subendocardial ischemia. Coronary angiography revealed late in-stent 85% restenosis in the proximal LAD and PTCA was performed again with an Xiience stent. At echocardiography LV volume was 180 ml and EF continued to decrease to 38%. The markers of bone turnover osteoprotegerin (OPG) and receptor activator of nuclear factor-kappa B ligand (RANKL) were increased to 3.9 pg/ml, respectively decreased to 0.67 pg/ml. One week after discharge the patient developed massive anterior myocardial infarction followed by cardiac arrest and death.

Discussion: The natural history of multiple myeloma (MM) is one of progressive bone destruction, refractory cytopenias, and renal end-organ damage. This patient had disease-, treatment- and age-related increased risk for cardiac events. His disease was refractory to treatment and presented frequent relapses with intense bone destruction. The increase of biomarker of bone turnover OPG has been linked to increased cardiovascular risk in several studies. It may contribute to increased vascular rigidity and accelerate the atherosclerotic process. Collagen fragments released from the bone matrix during extensive resorption may also explain early and late in-stent restenosis. Proteasome inhibitors increase risk of ischemic heart disease and congestive heart failure and alkylating agents increase the risk of cardiomyopathy and reduce left ventricular EF. In this patient, acute anterior STEMI occurred early after initiation of treatment for MM and EF was decreased at onset of myocardial ischemia and continued to deteriorate throughout the progression of disease. OPG is a marker of both bone turnover and vascular rigidity and may be useful as predictor of ischemic events in patients with MM.
Clinical outcomes of temporary mechanical circulatory support as a bridge to heart transplantation in Spain: a nationwide registry.

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1Hospital Universitario A Coruña, A Coruña, Spain; 2Hospital La Fe, Valencia, Spain; 3University Hospital Marques de Valdecilla, Santander, Spain; 4University Hospital Central de Asturias, Oviedo, Spain; 5Hospital de Bellvitge, Hospitalet de Llobregat, Spain; 6Hospital Puerta de Hierro, Majadahonda, Spain; 7Hospital Clinic de Barcelona, Barcelona, Spain; 8University 12 de Octubre, Madrid, Spain; 9Hospital Clinico Universitat, Pamplona, Spain; 10University Hospital Miguel Servet, Zaragoza, Spain; 11Hospital Santa Creu i Sant Pau, Barcelona, Spain

On behalf of: ASIS-TC STUDY INVESTIGATORS
Funding Acknowledgements: FUNDACIÓN MUTUA MADRILEÑA

Background: In Spain, high-urgency listing for heart transplantation (HT), the so-called ONT status 0 protocol, is allowed for candidates dependent on temporary mechanical circulatory support (T-MCS). We sought to analyze the clinical outcomes of this strategy.

Methods: We conducted a nationwide, retrospective, case-by-case review of clinical records of 291 patients listed for first, single-organ high-urgent HT while on T-MCS during the period 2010–2015 in 16 Spanish institutions. Pre- and post-transplant survival was analyzed.

Results: At the time of listing, 169 (60%) patients were supported on veno-arterial ECMO, 70 (24%) on temporary left ventricular assist devices (T-LVADs) and 52 (18%) on temporary biventricular assist devices (T-BIVADs). Seven patients transitioned from ECMO to T-LVADs while on the waiting list. Mean time on T-MCS was 13.1 ± 12.6 days. Mean time from listing to HT was 7.6 ± 8.5 days. Overall, 230 (79%) patients were transplanted, 54 (18.5%) died during MCS and 72 (24.1%) were weaned. Competing outcomes over 28-day follow-up are shown in the Figure. In-hospital postoperative mortality after HT was 33%, 12% and 26% for patients bridged on ECMO, T-LVADs and T-BIVADs, respectively (p = 0.008). Overall survival from listing to hospital discharge was 54%, 79%, and 58%, respectively (p = 0.022). By means of backward stepwise Cox’s regression analysis, T-LVAD support at the time of listing was identified as an independent predictor of 1-year survival after listing (HR 0.52, 95% CI 0.30–0.92).

Conclusions: In a setting of short waiting list times, the use of T-LVADs as a direct bridge to high-urgent HT is a feasible strategy. In our experience, listing under T-LVADs is associated with better outcomes than listing under T-BIVADs or VA-ECMO.

Competing outcomes after listing

Heart transplantation in patients with high immunological risk is safe when performed with a specific desensitization program.

G Coutance1; Y D’or1; S Dulama2; S Sahed3; P Pouvier3; C Vidal4; N Brecho5; G Labreton1; C Gautreau1; A Combes1; P Lemort1; S Vamou2
1Hospital Pitié-Salpêtrière, Cardiovascular and Thoracic surgery, Paris, France; 2Hospital Pitié-Salpêtrière, Hematooncologiques, Paris, France; 3Hospital Pitié-Salpêtrière, Pathology, Paris, France; 4Hospital Pitié-Salpêtrière, Anesthesiology and cardiovascular reanimation, Paris, France; 5Hospital Pitié-Salpêtrière, Medical reanimation, Paris, France; 6Hospital Saint-Louis, Laboratory of Immunology and histocompatibility, Paris, France; 7Hôpital de la Côte Réunie, Department of cardiology and cardiac rehabilitation, Clichy, France

Background: In France, emergency access to heart transplantation is limited to 4 days (“high emergency 1”). To limit waiting time on list and increase the chances of transplantation, we accept grafts with high immunological risk (pre-formed donor anti-HLA specific antibodies -DSA). Our purpose is to analyze the efficiency of a prospective desensitization program in patients transplanted with DSA.

Methods: Patients transplanted with low titer DSA (mean fluorescence intensity - MFI – 500 to 1000) received intravenous immunoglobulins (IVIg, 2 g/kg) and patients transplanted with high titer DSA (MFI > 1000) were treated with plasmapheresis (1 before transplantation, 4 after) and IVIg (2 g/kg) on top of standard immunosuppression regimen. We included all patients with a first isolated heart transplantation from 01/01/2009 to 31/12/2015. The primary endpoint was survival after heart transplantation.

Results: From 2009 to 2015, 523 first isolated heart transplantations were performed at our centre. Patients were mostly males (n = 404, 77%). Mean age was 50 ± 12 years. 241 patients (46 %) were transplanted without DSA, 88 patients (17 %) with low titer DSA and 194 patients (37 %) with high titer DSA. Compared to other groups, patients transplanted with high titer DSA were younger, female sex and long-term assist devices were more common. Mean follow-up was 3.7 ± 2.1 years. Survival was similar between groups even after adjustment on age, sex and assist device before transplantation (survival at one year and at the end of follow-up respectively for no DSA group: 79 and 73 %, DSA score 4 group: 80 and 72 %, DSA score 6/8 group: 84 and 79 %, p = 0.85).

Conclusion: Heart transplantation in patients with low or high titer pre-formed DSA is safe when performed with a specific desensitization program. Such a protocol might increase the chances of transplantation during the short period of high emergency 1.
Incidence and prognostic impact of adverse clinical events associated to mechanical circulatory support in patients bridged to transplantation on temporary devices: a nationwide Spanish registry.

Methods: We sought to analyze the incidence and prognostic impact of adverse clinical events (ACE) associated to T-MCS in this setting.

Results: At the time of listing, 169 (61%) patients were supported on veno-arterial ECMO, 70 (24%) on temporary left ventricular assist devices (T-LVADs) and 52 (18%) on temporary biventricular assist devices (T-BIVADs). Seven patients transitioned from ECMO to T-LVADs while on the waiting list. Mean time on T-MCS was 13.1 ± 13.6 days. The overall incidence rate of T-MCS associated ACE was 59 (95% CI 42–67) per 1000 devices-day, being significantly higher among VA-ECMO supported candidates than among T-LVAD ones (71 vs. 47 events per 1000 devices-day, p = 0.008) but not significantly different than among T-BIVAD ones (71 vs. 57 events per 1000 devices-day, p = 0.199). The incidence rate of T-MCS associated major ACE –device dysfunction, stroke, bleeding or infection– was 50 (95% CI 43–58) (25.2% vs. 6.7%, p < 0.001). Survival from listing to hospital discharge (55.1% vs. 70.2%, p = 0.019) and lower 1-year survival after listing (52.5% vs. 66.5%, log rank p = 0.007). Survival free of major ACE after T-MCS initiation is represented in the Figure.

Conclusions: In patients bridged to high-urgent HT on T-MCS, associated ACE events are frequent, impacting the chance of getting and organ survival.

Hypochloremia in advanced heart failure: association with hemodynamics and prognosis

Background: Low chloride (Cl) levels are associated with poor outcomes in heart failure (HF). We hypothesized that low Cl is associated with greater hemodynamic abnormalities, which may explain the prognostic implication of low Cl in advanced HF.

Methods: 306 consecutive patients with advanced HF were included. Cl levels were measured at the time of catheter study. Cardiac power output index (CPOI)= (mean blood pressure x cardiac index)/451. Primary outcome was survival free from transplantation/ mechanical support (MCS).

Results: The patients were divided into 3 groups based on Cl tertiles: T1: <94.3 (90.1-94.2), T2: 94.3-98.6 and T3: >98.6 (98.7-105) mmol/l (TABLE). T1 patients had lower ejection fraction, lower use of medical therapy, higher furosemide dose, lower CPOI and higher right atrial pressure (RAP). Cl level is associated with the primary outcome but only CPOI (HR 0.025, 95%CI 0.004-0.172) and RAP (HR = 0.014, 95%CI 1.025-1.085) were significant on multivariable proportional hazards model. By ROC analysis, a CPOI <0.341 and RAP <15 were associated with survival (C-statistic about 0.6). Patients with both CPOI <0.341 and RAP <15 had the worst survival (Group 1). Survival was intermediate when 1 of 2 criteria was present (Group 2) and best in patients with both CPOI<0.341 and RAP >15 (Group 3) (FIGURE). Cl <94mmol/l identified patients with CPOI <0.341 and RAP <15 (C-statistic 0.8).

Conclusion: Low Cl is associated with worse survival free from transplantation/ MCS in advanced HF due to the association with low CPOI and high RAP.

1590

Hypochloremia in advanced heart failure: association with hemodynamics and prognosis

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Conclusion: Low Cl is associated with worse survival free from transplantation/ MCS in advanced HF due to the association with low CPOI and high RAP.
1991

What is the best hemodynamic predictor of survival in patients with advanced systolic heart failure?

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Background: In patients with advanced systolic heart failure (SHF), right heart cathereterization (RHC) is mandatory before possible listing for cardiac transplantation. It is admitted that a reactivity test must be performed either with inotropes or vasodilators in patients with elevated pulmonary vascular resistance (PVR) > 3 Wood units (WU). An increase in PVR is a predictor of mortality in SHF but also in the post-operative period after heart transplantation. Few studies have analyzed the prognostic impact of hemodynamic parameters including both patients on the waiting list for heart transplantation and patients in the post-operative period of heart transplantation.

Methods: We included all the consecutive stable patients with optimal medical therapy admitted for RHC before possible either cardiac transplantation or ventricular assist device (VAD) implantation. An inotropic challenge was performed (dobutamine or milrinone) in patients with a baseline PVR > 3 WU.

Results: We included 425 patients with a mean age of 53 ± 11 years old, 43% had ischemic cardiopathy and LVEF was 29.4 ± 12.2%. 120 patients had an inotropic challenge because baseline PVR was > 3 WU, of whom 75 had a decrease of PVR ≤ 3 WU. During a follow-up period of 1.58 years [0.49 - 4.41], there were 107 cardio-vascular deaths, 122 cardiac transplantations and 11 VAD implantation. Major events were the combination of cardio-vascular deaths (n = 107) or deaths during the hospitalization for VAD implantation (n = 3) or for cardiac transplantation (n = 24). Patients with a baseline PVR > 3 WU had a worse prognosis whatever the results of the inotropic challenge on PVR (Figure). At baseline, independent predictors of survival were right atrial pressure (with a cut-off value of 9 mmHg) and PVR. After inotropic challenge, the best hemodynamic predictor of survival was mean pulmonary artery pressure (PAPm), with a cut-off value of 30 mmHg (Figure). Independent predictors are presented in the Table. In conclusion, for the selection of the most severe patients with stable advanced systolic heart failure, we propose to use a two steps hemodynamic algorithm using PVR at baseline (< or > 3 WU) and PAPm after inotropic challenge (< or > 30 mmHg). This algorithm must be prospectively validated in an independent population.

Independent predictors of survival

<table>
<thead>
<tr>
<th>HR [95% CI]</th>
<th>HR [95% CI]</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>Baseline right atrial pressure (9 mmHg)</td>
<td>2.44 [1.64 - 3.62]</td>
<td>&lt; 0.0001</td>
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<tr>
<td>Baseline PVR &gt; 3 WU (reference)</td>
<td>1</td>
<td>&lt; 0.0001</td>
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<tr>
<td>InotropesPVR &gt; 3 WU and PAPm &lt; 30 mmHg</td>
<td>2.14 [1.21 - 3.77]</td>
<td>0.009</td>
</tr>
<tr>
<td>InotropesPVR &gt; 3 WU and PAPm &gt; 30 mmHg</td>
<td>2.44 [1.61 - 3.71]</td>
<td>&lt; 0.0001</td>
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1992

Intermittent scheduled low-dose levosimendan infusions improves event-free survival in advanced chronic heart failure: a propensity score matching analysis.

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Introduction: Advanced chronic heart failure (ACHF) is characterized by poor quality of life (QOL) and high mortality. Improved QOL can be obtained with usual inotropes like Dobutamine, but at the price of increased myocardial O2 demand and finally lower survival. By contrast, Levosimendan (Levo) doesn’t increase myocardial O2 consumption. Nevertheless, neither single 24-hours nor short intervals (2 weeks) repeated 6 hours infusions of high dose Levo (0.1-0.2 μg/kg/min) showed any survival benefit in randomized-controlled trials (RCT), possibly because of dose-related side effects.

Purpose: In this study, we sought to assess the efficacy of long intervals repeated 24-h low dose Levo (0.05 μg/kg/min) infusions on 1 year event-free survival.

Methods: We conducted a retrospective case control study based on our institutional HF database. Cases (n = 42) were eligible if they had their 1st Levo infusion at the time of decompensated HF in addition to standard of care (SOC) with at least 1 further infusion scheduled, and if they had ACHF, defined as LVEF < 40% not responding to > 3 months optimal therapy. They received 4.37 μg/kg/min Levo infusions at 4 weeks intervals after initial hospitalization. They were compared 1 to 1 in a propensity score matching analysis with ACHF controls matched for age, sex, ischemic heart disease, LVEF, sinus rhythm and creatinine but who received only SOC without levo. A composite endpoint of mortality, unscheduled HF-related hospitalization and LVAD implantation 1 year after 1st Levo infusion was defined for outcome.

Results: demographic and biological variables were not different between the 42 SOC + levo cases and the matched 42 SOC controls (Table). The composite endpoint was reached by 14 SOC + levo patients (33.3%) as compared to 27 SOC controls (84.3%) (HR=0.49; 95% CI: 0.26-0.93) (Figure). Conclusion: low dose 24-hours Levo (0.05 μg/kg/min) during hospitalisation for decompensated HF and regularly repeated on a scheduled basis thereafter may improve outcome as compared to SOC in ACHF patients. These data must be confirmed by larger RCTs.

1993

Differentiated approach to the treatment of patients with end-stage heart failure

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Background: The life expectancy of patients with end-stage heart failure is determined by the possibility of using different bridges to heart transplantation (HT). Pharmaceutical and mechanical bridges to HT are widely used nowadays. Surgical valve repair as the bridge to transplantation is still not good investigated.

Purpose: to access the efficiency of surgical valve repair as the bridge to HT.

Methods: Our study includes 199 patients with end-stage heart failure in the clinical status UNOS 2 during the period 2009-2015 years with the mean data end diastolic volume = 251 ± 15.8 ml, end systolic volume = 188 ± 10.2 ml, ejection fraction = 25.6 ± 3.1%, proBNP level = 1307 ± 112 pg/ml, VO2peak = 12.8 ± 3.11 ml/min. All patients were included in the waiting list and had medical unneccessity in surgical revascularization. Patients were randomized into 2 groups: 77 patients from the 1 group underwent surgical valve repair, 82 patients were on optimal medical treatment (2 group). In the 1 group surgical valve correction was used as the bridge.
The occurrence event function

1594
Clinical outcomes and right ventricular function in patients with persistent pulmonary hypertension after heart transplantation
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Background: Pulmonary hypertension in heart transplant recipients is associated with worse prognosis after transplant. This study evaluated clinical outcomes and right ventricular function in patients with pulmonary hypertension after heart transplantation (HT).

Methods: We included patients with severe pulmonary hypertension that were treated with oral pulmonary vasodilators ( agents or ) before heart transplant. For the aim of this study, invasive pulmonary hemodynamics were recorded at two time points: the most recent pre-transplant right heart catheterization and invasive monitoring parameters 24h post-transplant. Post-transplant echocardiographic right ventricular failure and clinical outcomes were compared between patients with and without PPHT.

Results: Twenty-five patients were included. Although 20 patients (80%) required post-transplant pulmonary vasodilators for days post-transplant, only 10 patients (40%) showed PPHT and required therapy after a month post-transplant. The remaining 15 patients were considered to be a no-PPHT control group. Baseline pulmonary vascular resistances (PVR) were different in patients with and without PPHT (4.0 ± 1.6 vs. 3.7 ± 1.1 Wood units, respectively, p = 0.553). After HT, right ventricular dysfunction prevalence was different between patients with PPHT or without PPHT at one month and one year (50% vs. 40%, p = 0.622 and 30% vs. 27%, p = 0.856, respectively).

Although glomerular filtration rate (difference between baseline and at the time of end-point glomerular filtration rate) at one month was significantly different between groups (−13 ± 24 ml/min in PPHT vs. +5 ± 19 ml/min in no PPHT, p = 0.035), there was no significant difference between the groups at one year follow-up (−18 ± 14 ml/min in PPHT vs. −8 ± 20 ml/min in no PPHT, p = 0.162).

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1996

Adjusting preoperative risk models of post heart transplant survival to a European cohort in the age of a new cardiac allocation score in Europe

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Purpose:
Organ allocation for heart transplantation is one of the most difficult procedures in modern cardiology. Several risk models target this issue to predict post transplant survival, but none of these scoring systems have been validated in a large homogeneous European cohort in a long-term approach. This aspect seems of utmost importance in a time of planned switch of the Eurotransplant allocation system from a binary system (high urgent versus transplantable status) to a scoring system similar to the Lung Allocation Score (LAS) for lung transplantation.

Methods:
Our institutional transplant registry provided the patient data. Analysis included data of 761 heart transplant recipients aged 18 years or older during the time period 01/1996 to 02/2015. The primary outcome was graft failure, which was defined as death or retransplantation. In a first step we assessed 30-day, 1-year, 5-year and 10-year survival and compared different risk models including the Index for Mortality Prediction After Cardiac Transplantation (IMPACT) and Columbia Risk Stratification Score (RSS).

In a second step we adjusted the risk models with different variables using a multivariable logistic regression model to achieve a better predictive value.

Results:
Thirty-day, 1-year, 5-year and 10-year survival rates were 78.3 ± 1.5, 67.7 ± 1.11, 58.1 ± 1.8% and 44.1 ± 5.9, respectively. The 1-year incidence of graft failure in accordance with the five Columbia score risk strata was 14.1%, 25.2%, 37.4%, 28.3% and 50%. The 1-year survival stratified by three-point increments of the IMPACT score showed incidence rates varying from 22.9% (0-2 points) to 57.1% (>15 points). Area under the curve for the IMPACT was 0.59 (95% CI 0.54–0.64) and 0.62 (95% CI 0.57–0.66) for the RSS. Our adjusted risk score showed an AUC of 0.69 (95% CI 0.64–0.72) with the following variables: coronary artery disease, use of IRAD, diabetes mellitus, eGFR, sex, donor age.

Conclusion:
IMPACT and Columbia risk score were suitable to predict post transplant survival but ROC curve showed only intermediate prediction accuracy. Use of the above risk factors showed improved accuracy in predicting graft failure in our cohort.

1997

Prognostic accuracy comparison of the IMPACT risk score, MELD XI score and INTERMACS profiles in candidates for heart transplantation: argentinian single centre analysis

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Introduction:
In the last decade there has been an increased risk in the clinical profile of orthotopic heart transplant (HTx) recipients. Risk Predictors scores can be a useful tool to optimize the timing in waiting list registration and a strategy in allocation due the disparity between available heart donors and recipients.

Purpose:
We aimed to evaluate the prognostic accuracy of the Index for Mortality Prediction after Transplantation (IMPACT), Model for End-stage Liver Disease excluding international normalized ratio (MELD XI) and Interagency Registry for Mechanical Circulatory Support (INTERMACS) profiles in the estimation of mortality risk after HTx at 1 year. Secondary outcome included 30-day mortality.

Methods:
We retrospectively analysed HTx adult recipients, between December, 2005 and December, 2015. The risk scores were calculated for each patient with advanced heart failure according to different clinical variables. Patients were stratified into categories: IMPACT <5; 5-10 y 10; MELD XI in interquartile range and INTERMACS profiles 1, 2-3 y 4. Logistic regression was performed to assess the predictive accuracy of these scores. Afterwards we compared the scores using a receiver operating characteristic (ROC) curve thus obtaining the area under the curve (AUC) and the respective 95%CI. The AUC of risk models were compared using the non-parametric test of DeLong et al.

Results:
In our cohort of 227 HTx adult recipients, mean age (± SD) was 50 ± 13 years, 73% were men. The cumulative mortality rate was 19% at 1-year and 8% at 30-days. The overall cohort had a mean IMPACT risk score of 6.4 ± 4.5 and mean MELD XI score of 12.5 ± 3.4 (Interquartile range 9.4 to 14.21). The models had in predicting mortality similar outcomes at 1-year, the AUC obtained from the ROC curves of IMPACT, INTERMACS and MELD XI were 0.83 (95% CI: 0.57–0.70); 0.61 (95% CI: 0.54-0.67) and 0.61 (95% CI: 0.54-0.67), respectively (p=NS). The area under the ROC curve demonstrated that IMPACT, INTERMACS and MELD were no significantly different in predicting 30-day mortality. 0.68 (95% CI: 0.62-0.74) and 0.67 (95% CI: 0.60-0.72) and 0.58 (95% CI: 0.51-0.64), respectively.

In the logistic regression analysis mechanical ventilation pre-transplant was significantly associated with 30-day and 1-year mortality after HTx (OR: 3.35; 95%CI: 1.86–5.36; p = 0.02) OR: 2.87; 95%CI: 1.04–7.90; p = 0.04).

Conclusion:
In our analysis, IMPACT risk score, INTERMACS profiles and MELD XI score, were similar in predicting 30-day and 1-year mortality risk after HTx. There is scarce data comparing the prognostic accuracy of these models.

1998

Toxoplasma gondii serostatus is not an independent predictor of survival in heart transplant recipients: analysis of the Spanish Heart Transplant Registry

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Hospital Universitario A Coruña, A Coruña, Spain; 2Hospital La Fe, Valencia, Spain; 3Hospital Sant Pau, Barcelona, Spain; 4Hospital Virgen del Rocio, Sevilla, Spain; 5Hospital Puerta de Hierro, Majadahonda, Spain; 6University Hospital Marques de Valdecilla, Santander, Spain; 7Hospital Clinico de Barcelona, Barcelona, Spain; 8University Hospital Central de Asturias, Oviedo, Spain; 9University Hospital 12 de Octubre, Madrid, Spain; 10University General Hospital Gregorio Maranon, Madrid, Spain; 11University Hospital Reina Sofia, Cordoba, Spain; 12University Hospital Clinico de Valladolid, Valladolid, Spain; 13Hospital de Bellvitge, Hospital de Llobregat, Spain; 14Hospital Clinico Universidad Virgen de Almavisa, Murscia, Spain; 15University Hospital Miguel Servet, Zaragoza, Spain
On behalf of: Spanish Heart Transplant Registry Investigators

Funding Acknowledgements: Working Group in Heart Failure of the Spanish Society of Cardiology

Background:
A long-standing controversy exists about a potential negative impact of pre-transplant Toxoplasma Gondii (TG) seropositivity on long-term survival of patients undergoing heart transplantation (HT). We sought to test this hypothesis in a large, multi-institutional registry.

Methods:
We retrospectively analyzed 4048 patients aged > 16 years who underwent first, single-organ HT in 17 Spanish institutions from 1984 to 2014 were analyzed. Long-term post-transplant survival and long-term survival free of cardiac death or cardiac retransplantation of 2434 (60%) TG seropositive recipients and 1614 (40%) TG seronegative recipients were compared by means of univariable and multivariable Cox’s regression.

Results:
Before HT, TG seropositive recipients were older, had higher body mass index, and presented higher prevalence of hypertension, hypercholesterolemia, COPD and CMV seropositivity. In univariable analysis, pre-transplant TG seropositivity was associated with increased post-transplant all-cause mortality (non-adjusted HR 1.15; 95% CI 1.04–1.26; p = 0.004). Kaplan-Meier non-adjusted survival curves of TG seropositive (blue line) and TG seronegative (red line) recipients are represented in the Figure. However, this effect was not statistically significant after multivariable adjustment by age and sex (adjusted HR 1.01, 95% CI 0.92–1.11, p = 0.842). Extended multivariable adjustment by other potential confounders did not change significantly the result (adjusted HR 0.99, 95% CI 0.89–1.11, p = 0.930). Neither a statistically significant effect of TG seropositivity on the composite outcome cardiac death or retransplantation was observed (non-adjusted HR 1.08, 95% CI 0.95–1.24, p = 0.231). The distribution of the causes of death was comparable in TG seropositive and TG seronegative recipients.

Conclusions:
This analysis of a large, multi-institutional registry did not show an independent effect of pre-transplant TG serostatus on long-term post-cardiac transplant survival.

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Rapid Fire 6 - Advanced heart failure
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Background: It remains unknown whether there is an association between pulmonary hypertension (PHT) and functional mitral regurgitation (FMR). The aim of the present study is to determine the association between significant functional FMR (sFMR) and PHT, and to evaluate the effect of FMR on other right heart catheterization (RHC) findings in patients with end-stage heart failure. Methods and Results: A total of 155 patients with end-stage heart failure undergoing evaluation for heart transplantation were stratified into two groups; namely, those with and without FMR, and all of the patients underwent RHC. Fifty-one patients had significant FMR (sFMR) and 102 patients (83%) had non-significant or no FMR (nFMR). There was no statistical difference between the two groups respectively. Among the 83 patients with PVR lower than 3, 23 patients had significantly higher pulmonary gradients compared to those with non-significant FMR (p = 0.003), 25.7 ± 9.2 vs. 21.9 ± 6.9 p = 0.02, 26.7 ± 11.7 vs. 21.9 ± 7.9 (p = 0.001). The means of PVR, right atrial pressures, transpulmonary gradients and diastolic pulmonary gradients were similar in both groups (5.8 ± 2.4 vs 3.2 ± 2.5 p = 0.11, 12.9 ± 10 vs. 12.8 ± 10.6 p = 0.003, 11.3 ± 7.6 vs 10.4 ± 7.7 p = 0.125, 5.7 ± 1.9 vs 5.5 ± 2.3 p = 0.87, respectively). Among the 83 patients with PVR lower than 3, 32 patients had significant FMR and among the 70 patients with PVR equal to or higher than 3, 28 patients had significant FMR, and there was no statistical difference between the two groups (p = 0.128). Conclusion: The presence of significant functional mitral regurgitation appears to increase pulmonary artery pressures in patients with end-stage heart failure without any effect on PVR. Therefore, the presence or absence of mitral regurgitation does not seem to be unfavorable factor for PVR in pre-transplantation patients.

1600 Managing critical cardiogenic shock with long term mechanical circulatory support: where is the limit? P. Piergiovanni, T. Di X. C. Bai, K. Ahmadov, R. Huller, F. H. May, R. H. May, R. H. May, M. Kirsch
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2University of Geneva, Cardiocardiovascular Surgery, Geneva, Switzerland
3University Hospital Centre Vaudois (CHUV), Cardiology, Lausanne, Switzerland;
4University of Geneva, Cardiology, Geneva, Switzerland

Background: The INTERMACS registry stratifies patients in end-stage heart failure (HF) according to the severity of the clinical conditions: from profile 1 (critical cardiogenic shock) to profile 7 (ambulatory advanced HF). Patients implanted in profile 1 met the criteria to be enrolled in the heart transplant/destination therapy programs. Before 2010, 29% of LVAD recipients were in profile 1, but since 2012, that proportion has diminished to 15%, reflecting the reluctance to implant a durable device for pump flow, selected laboratory parameters, major adverse events and device malfunctions. Results: Out of 57 patients that received LVAD, 10 were in INTERMACS profile 1 to 2 (3) were under V-A ECMO. The indication was bridge-to-transplant in 7 patients, and destination therapy in 3. All had last generation of fully magnetically suspended centrifugal LVAD implanted under CFPB, on beating heart. Two patients (20%) received concurrent aortic valve surgery. Five patients (50%) required temporary right ventricular support (iRVAD) for a mean of 8 ± 1.5 days. Bleeding requiring surgical revision occurred in 5 (50%) patients, 3 during the iRVAD support. At the 90-day endpoint survival was 90%, one (10%) died due to respiratory failure. Three (30%) experienced critical illness polyneuropathy. Two (20%) had late driveline infec.

Conclusions. Mortality rate was high. However, the 90% survival rate at 90 days endorses the assumption that, with the appropriate strategy and last generation centrifugal LVAD, even the crash-and-burn patients have excellent possibility to benefit from long term MCS.

1601 Reversibility of fried’s frailty domains post-intervention among patients with advanced heart failure S R Sunita Jha1; MK Hannu1; PJ Newton2; K. Wilhel1; CS Hayward2; E Kotlyar2; A. Keough3; K. Bhath3; M. Connell3; E. Montgomery3; B. Smith2; M. Harkness1; P. Tursic1; PM Davidson3; PS Macdonald3; S1; St Vincent’s Hospital, Heart and Lung Transplant Unit, Sydney, Australia; 2University of Technology, Sydney, Sydney, Australia; 3St Vincent’s Hospital, Psychiatry, Sydney, Sydney, Australia; 4Johns Hopkins University of Baltimore, Faculty of Nursing, Baltimore, United States of America

Aim: The aim of this study was to evaluate the reversibility of frailty in AHF patients undergoing bridge-to-transplant ventilricular-assist-device (BTT-VAD) implantation or heart transplantation (HTx). Method: Since 2013, all AHF patients referred to our centre were assessed for frailty pre- and post- BTT-VAD/HTx. Fried’s five physical domains: exhaustion, grip-strength, mobility, appetite and physical inactivity (frail ≥ 3), as well as cognitive impairment (MoCA ≤ 26) and depression (DMI > 9) were assessed. Results: 24 frail pre-intervention patients were followed-up post-intervention for reversibility: 12 VAD (124 ± 77 days post-VAD) and 12 HTx (177 ± 135 days post-HTx). Among the VAD patients there was a significant improvement in frailty score (4.2 ± 0.8 to 1.7 ± 1.1, p < 0.003) with significant improvements across all frailty domains except grip-strength after pump implant. Among the HTx patients, there was also a significant improvement in frailty score (3.3 ± 0.5 to 0.8 ± 0.1, p < 0.002) with significant improvements seen in exhaustion, appetite and physical activity after HTx. A non-significant improvement was seen in depression, and less so cognitive impairment in both the frail pre-VAD-HTx groups. Conclusion: Frailty associated with AHF is amenable to improvement post-intervention. Improvements in appetite and physical activity were the major contributors to improved frailty score. In contrast, improvement in HGS was small and non-significant.

Reversibility of frailty post-intervention

<table>
<thead>
<tr>
<th>Reversibility of frailty post-intervention</th>
<th>Baseline</th>
<th>Follow-up</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Frail Pre-VAD (n = 12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frailty score</td>
<td>4.2 ± 0.8</td>
<td>1.7 ± 1.1</td>
<td>0.003</td>
</tr>
<tr>
<td>Exhaustion</td>
<td>10 (83%)</td>
<td>4 (33%)</td>
<td>0.031</td>
</tr>
<tr>
<td>HGS/Mobility</td>
<td>9 (75%)</td>
<td>6 (67%)</td>
<td>0.016</td>
</tr>
<tr>
<td>Appetite/Physical</td>
<td>10 (83%)</td>
<td>3 (25%)</td>
<td>0.008</td>
</tr>
<tr>
<td>Activity</td>
<td>12 (100%)</td>
<td>4 (33%)</td>
<td>0.002</td>
</tr>
<tr>
<td>HGS score (kg)</td>
<td>22.6 ± 11.5</td>
<td>26.9 ± 10.0</td>
<td>0.099</td>
</tr>
<tr>
<td>MoCA score</td>
<td>24 ± 5</td>
<td>25 ± 3</td>
<td>0.306</td>
</tr>
<tr>
<td>DMI score</td>
<td>10 ± 7</td>
<td>5 ± 5</td>
<td>0.066</td>
</tr>
<tr>
<td>Frail Pre-HTx (n = 12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frailty score</td>
<td>3.3 ± 0.5</td>
<td>0.8 ± 0.1</td>
<td>0.002</td>
</tr>
<tr>
<td>Exhaustion/HGS*</td>
<td>8 (87%)</td>
<td>2 (17%)</td>
<td>0.031</td>
</tr>
<tr>
<td>Mobility</td>
<td>42 (11%)</td>
<td>8 (2%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Activity</td>
<td>8 (87%)</td>
<td>1 (9%)</td>
<td>0.054</td>
</tr>
<tr>
<td>HGS score (kg)</td>
<td>26.0 ± 8</td>
<td>28.4 ± 8</td>
<td>0.170</td>
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<tr>
<td>MoCA score</td>
<td>25 ± 2.4</td>
<td>26 ± 3.2</td>
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<tr>
<td>DMI score</td>
<td>8 ± 8</td>
<td>3 ± 4</td>
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<td>Categorical data</td>
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</table>
ACUTE HEART FAILURE

P1602 ultrasound of the lungs for acute heart failure diagnosis in the early phase of ST-elevation myocardial infarction

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Introduction: Evaluation of heart failure in STEMI (ST elevation myocardial infarction) patients in real clinical practice is based primarily on subjective methods of investigation. In this respect, it is highly important to implement fast objective bedside methods of pulmonary congestion evaluation. One of them is the technique of sonographic quantification of total number of B-lines for detection of interstitial-alveolar syndrome.

Objective: To estimate frequency of detected pulmonary venous congestion by means of bedside sonographic investigation of the lungs in STEMI patients and compare the results with data received by both physical examination and well-known instrumental assessment methods.

Results: The study included 109 STEMI patients with Killip class III and IV were excluded from the study. In addition to clinical and radiological assessment of pulmonary congestion, in the first days of myocardial infarction all patients were performed pulmonary ultrasound with the quantification of B-lines. Thus, 64% (n = 28) patients with Killip class I did not show any sonographic signs of pulmonary congestion (less than 5 B-lines), whereas 36% (n = 16) patients had congestive heart failure with total number of B-lines over 15. Of these patients, 11% (n = 5) had expressed severe congestion (B-line score≥5). Among Killip class II patients, 87% showed signs of congestion, of them 23% had severe interstitial-alveolar syndrome. In the following 2–3 days after MI onset, all patients with Killip I class and presenting with B-lines score≥5, developed signs of pulmonary congestion, confirmed by physical and/or X-ray methods of investigation.

Conclusion: Ultrasound assessment of the lungs with sonographic quantification of B-lines is an available method of early heart failure diagnosis in STEMI patients.

P1603 Changes in echocardiographic parameters and biomarkers during hospital stay in patients with acute heart failure

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1Peoples Friendship University of Russia (PFUR), Cardiology, Moscow, Russian Federation

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Conclusion: Ultrasound assessment of the lungs with sonographic quantification of B-lines is an available method of early heart failure diagnosis in STEMI patients.

Purpose: The purpose of this study was to investigate changes in echocardiographic parameters and biomarkers during hospital stay in patients with AHF.

Methods and Results: Of 101 hospitalized patients with AHF derived from MEDIA-DHF cohort, 60 had preserved left ventricular (LV) ejection fraction (EF) (HFPEF) and 41 had reduced LV EF (HFREF). Concerning echocardiography, although LV EF was unchanged during hospital stay (median: 38 [28-55] % at admission, 41 [30-57] % at discharge, p = 0.37), peak LV outflow tract (LVOT) velocity and tricuspid annular plane systolic excursion (TAPSE) improved during hospitalization (median: peak LVOT velocity 0.63 [0.58-0.69] m/s at admission, 1.13 [1.04-1.29] m/s at discharge, p = 0.005, TAPSE 16 [15-19] at admission, 19 [17-21] mm at discharge, p = 0.04). Median E/e' decreased during hospitalization (median: 21.1 [15.8-29.6] at admission, 16.6 [11.7-24.3] at discharge, p = 0.004). Inferior vena cava (IVC) diameter at rest decreased and respiratory variability of IVC diameter improved during hospitalization (median: IVC diameter 22 [16-24] at admission, 13 [11-18] mm at discharge, p = 0.009, variability 32 [8-44] % at admission, 43 [29-70] % at discharge, p = 0.04). The results were similar in HFPEF and HFREF, except that TAPSE improved in only HFREF patients (median: HFPEF 17 [13-20] at admission, 17 [16-18] at discharge, p = 0.34, HFREF 16 [15-18] at admission, 19 [18-25] mm at discharge, p = 0.06) and median E/e' decreased in only HFPEF patients (median: HFPEF 21.3 [16.0-30.5] at admission, 14.3 [11.5-24.3] at discharge, p = 0.007, HFREF 21.0 [14.0-25.5] at admission, 19.2 [19.2-22.0] at discharge, p = 0.29). Concerning plasma biomarkers, B-type natriuretic peptide (BNP), mid-regional pro-atrial natriuretic peptide (MR-proANP), and soluble CD146 levels all significantly decreased during hospitalization (median: BNP 935 [514-2037] pg/mL at admission, 308 [183-609] pg/mL at discharge, p < 0.001, MR-proANP 449 [274-653] pg/mL at admission, 366 [242-549] pg/mL at discharge, p < 0.001, soluble CD146 328.0 [405.9-653.8] pg/mL at admission, 449.8 [373.9-529.2] pg/mL at discharge, p = 0.003). The results were consistent between HFPEF and HFREF.

Conclusions: Echocardiographic parameters and biomarkers which indicate the severity of congestion and cardiac function significantly improved during hospital stay in patients with AHF.
P1604
Performance of early change of cardiac output in the diagnosis of acute heart failure (AHF) in patients with acute dyspnea

EZ Ezza1; EM Malek Echeikh1; ZW Zara1; AN Azaiez1; SA Sekma1; BAA Ben Abdallah1; BK Beitla1; MMA Mestial1; DZ Dridi1; BH Boubakar1; GMH Grissa1; BW Bouida1; NS Nouira1

1university of monastir, monastir, Tunisia

On behalf of: great network

Purpose: To evaluate the performance of cardiac output (CO) change with dynamic and pharmacological maneuvers in the diagnosis of AHF in patients admitted to emergency department (ED) with acute dyspnea.

Methods: A prospective study conducted in the emergency department (ED) including patients over 18 years admitted for acute dyspnea. We measured CO using thoracic bio impedance: at baseline, during supine position (SP), leg rising (LR), under Valsalva maneuver (VM) and after administration of sublingual nitroglycerin (NTG). Early change of cardiac output with VM and NTG can be a simple method to recognize HF in patients who are admitted to ED for acute dyspnea.

Results: 395 patients were included, 212 patients with HF. Cardiac output at baseline was higher in the non-AHF group (p < 0.01). The effects of the various maneuvers on COwere summarized in the figure.

Conclusion: Early changes of cardiac output with VM and NTG can be a simple method to recognize HF in patients who are admitted to ED for acute dyspnea.

P1605
Value of systolic time intervals in the prediction of 30 day mortality after hospital discharge in Acute Heart Failure patients

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1university of Monastir, Monastir, Tunisia

Background: Acute heart failure (AHF) is one of the leading causes of unscheduled hospitalization and is associated with frequent readmissions and substantial mortality. Simple and noninvasive measurements of systolic time intervals (STI) could be useful to predict these complications in patients admitted to the emergency room (ER). The present study assessed the prognostic performance of STI in AHF patients.

Patients and methods: We included all patients over 18 years old admitted to the ER for AHF. The diagnosis of AHF was determined on the basis of clinical examination, echocardiography, and brain natriuretic peptide measurement. Measurement of STI included the pre-ejection period (PEP), left ventricular ejection time (LVET), and systolic time ratio (STRatio=PEP/LVET). STI were determined by thoracic bio impedance: at baseline, during supine position (SP), leg rising (LR), under Valsalva maneuver (VM) and after administration of sublingual nitroglycerin (NTG).

Results: A total of 500 AHF patients were included, with a mean age 68.4 ± 12 years, sex ratio (M/F) 1:04. Compared to survivors, Non survivors patients had higher STRatio (48.7 ± 17 vs 43.2 ± 11, p < 0.01) values. LVET and PEP values were not significantly different between both groups.

Conclusion: Only STRatio value could be considered as a meaningful non invasive method to predict mortality 30 days after hospital discharge in AHF patients.

Table. Patient’s characteristics at emer

<table>
<thead>
<tr>
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<th>All patients</th>
<th>30 days death</th>
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<tbody>
<tr>
<td>Age</td>
<td>68.4 ± 12.3</td>
<td>73.2 ± 11</td>
</tr>
<tr>
<td>Sex (H/F)</td>
<td>256/244</td>
<td>16/11</td>
</tr>
<tr>
<td>Comorbidity (%)Arterial</td>
<td>314 (62.8)</td>
<td>16 (93)</td>
</tr>
<tr>
<td>HypertensionDiabetesCoronary Artery Disease</td>
<td>237 (47.4)</td>
<td>13 (48.1)</td>
</tr>
<tr>
<td>Primary Perfusion Failure</td>
<td>38 (7.6)</td>
<td>9 (33.3)</td>
</tr>
<tr>
<td>FailureRefractory Failure</td>
<td>100 (20)</td>
<td>5 (18.5)</td>
</tr>
<tr>
<td>PEP (ms)LVET (ms)STRatio (%)</td>
<td>86 (17.2)</td>
<td>5 (18.5)</td>
</tr>
<tr>
<td>PEP (ms)LVET (ms)STRatio (%)</td>
<td>118 (23)</td>
<td>120/16</td>
</tr>
<tr>
<td>PEP (ms)LVET (ms)STRatio (%)</td>
<td>274±52</td>
<td>258±47</td>
</tr>
<tr>
<td>PEP (ms)LVET (ms)STRatio (%)</td>
<td>44±13</td>
<td>48±7</td>
</tr>
</tbody>
</table>

*p < 0.05 between the two groups

P1606
Diastolic left ventricular function and relation to coronary and myocardial flow after primary coronary angioplasty

D Dawood Sharif1; H Abu Shqara2; Y Sharif2; A Sharif-Rasslan3; U Rosenschein1

1Bnai Zion Medical Center, Haifa, Israel; 2Technion, Haifa, Israel; 3The Academic Arbel Hospital, Mathematics, Haifa, Israel

Primary percutaneous coronary intervention (PPCI) in patients with acute ST-elevation myocardial infarction (STEMI), resumes coronary flow in the infarct related artery (IRA) and myocardial perfusion which both determine left ventricular (LV) function and prognosis.

Objective: Evaluate LV diastolic function, coronary velocity parameters and their inter-relationship in the infarct related and non-infarct related coronary artery.

Methods: Eighty patients with acute STEMI, 60 anterior and 20 non-anterior, treated with PPCI were studied. Complete transhoracic Doppler echocardiography and sampling of blood velocity in the left anterior descending (LAD) coronary artery were performed immediately after PPCI and 5 days later.

Results: In the control group, LAD velocity and diastolic function parameters did not change during hospitalization and were unrelated. In the study group these parameters were dynamic; LAD diastolic velocity time integral and diastolic pressure half time increased, E wave deceleration time increased before discharge while A wave peak velocity decreased. TIMI grade <3 was associated with larger mitral P wave velocities, p < 0.02. Early after PPCI, longer LAD diastolic deceleration time was associated with longer mitral E wave deceleration time, p < 0.04. Killip Class = 1 was associated with lower mitral annular E velocities, p < 0.04. E/A = 8 and PCWP >12 were related to larger LAD systolic velocities, p < 0.05, and longer early pressure half time, p < 0.02.

Conclusions: IRA flow and LV diastolic function are dynamic and interrelated but not non-IRA.

P1607
Interest of a systematic investigation when a tako tsubo syndrome is suspected

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1Toulouse Rangueil University Hospital (CHU), Cardiology department, Toulouse, France; 2Toulouse Rangueil University Hospital, Cardiac Imagery Center, Toulouse, France

Background: Diagnostic criteria for Takoe Tsubo Cardiomyopathy (TTC) exist since 2004, but there is currently no recommendation of learned societies as the minimum balance required. Exponential increase of TTC diagnoses assumes the risk of misdiagnosis and delayed appropriate management.

Aim: Determine the prevalence of differential diagnosis in a “real life” population of patient with suspected TTC.

Methods and Results: Between 10.2009 and 01.2016, 8726 patients were admitted for acute coronary syndrome (ACS) with troponin elevation in our center. Among them 144 (1.7%) patients were suspected for TTC and were included in a prospective cohort. According to the initial presentation, cardiac MRI, urinary and/or plasma catecholamines and thyroid balance were conducted. Among them, 26 (18%) diagnosis and therefore management were changed after the completed assessment. Fourteen (9.7%) patients were reclassified as ACS (2 with spastic angina), 3 (2.1%) as myocarditis, 2 pheochromocytoma (1.4%), 6 miscellaneous diagnoses (4.2%) and 1 thyrotoxicosis (0.7%). MRI was the most efficient exam to catch misdiagnoses in 14 cases (9.7%).

Conclusion: Differential diagnosis in patients with suspected TTC represents more than 15% of these population and need to perform a minimum check-up with MRI and catecholamin measurement.

P1608
Clinical characteristics and in-hospital outcomes among patients hospitalized for acute heart failure stratified by initial therapy

CI Radulescu1; L Antohi1; M Chivulescu1; I Cosel1; A Covaliov1; R Radu1; A Ambrosy2; C Collins2; M Caraci3; O Chiscionel; M Gheorghiu4

1Institute of Cardiovascular Diseases Prof. C.C. Iliescu, Cardiology, Bucharest, Romania; 2Duke University Medical Center, Cardiology, Durham, United States of America; 3Vanderbilt University, Emergency Medicine, Nashville, United States of America; 4Northwestern University, Cardiology, Chicago, United States of America

Introduction: Patients hospitalized for acute heart failure (AHF) have variable in-hospital trajectories as a result of different etiologies and precipitating factors. There are limited data addressing the heterogeneity of in-hospital course by initial therapy.
Objective: To identify clinical characteristics and in-hospital outcome of patients hospitalized for AHF and stratified by clinical response to initial intravenous (IV) therapy.

Methods: The Romanian AHFS (RI-AHFS) registry prospectively enrolled 3224 consecutive patients admitted for AHF over a 12-month period. Based upon clinical response in the first 24 hours to initial IV therapy, patients were divided into four subgroups: A. persistent improvement, B. initial improvement followed by clinical deterioration, C. continuous worsening, and D. refractory signs and symptoms. In-hospital outcomes included all cause mortality (ACM) and length of stay (LOS).

Results: Overall, the breakdown of patients included 75.1% in group A, 16.1% in group B, 3.4% in group C, and 5.4% in group D. Baseline characteristics and in-hospital management are shown in Table 1. In-hospital ACM was 6.8% in group A, 8.2% in group B, 34% in group C, and 27% in group D. Similarly, median (25th, 75th) LOS was 8 (6, 9) days in group A, 8 (4,12) days in group B, 9 (3,18) days in group C, and 15 (12, 23) days in group D.

Conclusions: Although the vast majority of AHF patients substantially improved in response to initial IV therapy, some patients experienced a persistently unfavourable or a deteriorating in-hospital trajectory. A better characterization of the pathophysiology of AHF may facilitate targeted adaptation of existing therapies and development of novel interventions in patients at risk for an unfavourable clinical course.

Table 1

<table>
<thead>
<tr>
<th>Age(years)</th>
<th>Gender(Male) %</th>
<th>Ischemic etiology (%)</th>
<th>Cardiogenic Shock (%)</th>
<th>Creatinine(mg/dl)</th>
<th>LVEF &lt; 40%</th>
<th>IV Furosemide(%)</th>
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<tbody>
<tr>
<td>68.5</td>
<td>52</td>
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<td>1.2</td>
<td>93</td>
<td>91</td>
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<tr>
<td>68.8</td>
<td>53</td>
<td>56</td>
<td>4</td>
<td>1.3</td>
<td>90</td>
<td>97</td>
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<td>67.8</td>
<td>57</td>
<td>61</td>
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</table>

P1609 Evaluation of the sST2-guided optimization of medical treatments of patients admitted for HF to prevent readmission: the STADE-HF study

C Corentin Curtinier1; K Sokale1; AM Dupuy2; S Cadil1; F Cransac1; A Decamps1; S Soltas1; A Verchère1; C Belloc1; C Roubille1; F Pesle1; G Mercier1; JP Cristol2; Y Audurier1; F Roubille1

1 University of Montpellier, Cardiology, Montpellier, France; 2 University Hospital of Montpellier, biochemistry, Montpellier, France

Funding Acknowledgements: EURLIBO society

Background: The prevalence of heart failure (HF) is about 1-2%. It is a major cause of health burden representing between 2 billions euros per year in France. 63% of these costs are due to hospitalization. The sST2 (member of Interleukine-1 family) is a potent predictor for survival in HF; probably better than natriuretic peptides. In this trial we aim at evaluating the ST2-guided therapy as a help for the physician to optimize the recommended treatments in order to prevent readmissions.

Methods: The trial will be a prospective bioclinical intervention randomized open-labelled trial of evaluation of the two strategies with two parallel arms: conventional sST2 is not known from the clinician) versus ST2-guided therapy (sST2 assessed at day 4 is known from the clinician). It will be conducted in the University Hospital of Montpellier. The study will include adults hospitalized for HF if ST2 at day 4 > 37 ng/ml, the clinician will be encouraged to optimize the therapy as much as the patient tolerates it. If ST2 is < 37 ng/ml, no incentive to optimize the treatment will be made. Based on the hypothesis of a 50% reduction of readmissions, 330 patients will be included.

Discussion: Many tools have been proposed to decrease the burden of readmission in patients with HF but the cornerstone remains the optimization of recommended medical treatment with improvement of survival: beta-blockers, ACE-inhibitors or ARB-2 inhibitors, mineralocorticoid inhibitors, ivabradine and sacubitril-valsartan. The higher the sST2 is, more likely is the impact of drugs with antiremodeling effect. The optimal dosage of these agents in individuals is guided largely by subjective indices, namely the clinician’s assessment of symptoms, bedside signs and tolerability. There is therefore an interest in a biomarker (sST2) to guide the management of patients admitted for HF, in order mainly to reduce the burden of readmission. It is the first time that this kind of approach is evaluated in patients with HF.

P1610 Use of invasive mechanical ventilation in acute heart failure: the experience of a referral cardiac centre

G Giulio Binghini1; D Congia1; A Mumolo2; A Parru1; D Pasqualucci1; E Serra1; M Porcu1

1 G. Brotzu Hospital, Department of Cardiology, Cagliari, Italy; 2 University of Cagliari, Cagliari, Italy

Acute heart failure (HF) refers to rapid onset or aggravation of symptoms and signs due to elevated intracardiac pressures and/or a reduced cardiac output. It is a life-threatening condition requiring urgent evaluation and treatment. Data from registries of HF showed that up to 16% of cases need an invasive mechanical ventilation (IMV). Our aim is to perform a retrospective evaluation of clinical and haemodynamic characteristics and outcomes of patients (pts) hospitalized in an 8-bed CCU of a referral cardiac centre from January 2014 to May 2016 for acute HF, who underwent IMV. During the study period 1437 pts have been hospitalized for any cause, of them 54 (3.8%) need an IMV because of acute HF. Mean age of pts was 68 ± 16 years, 36 (67%) were males and in 52% of cases, HF was due to acute coronary syndrome. Arhythmia was the reason of decompression in 26% of pts, in 2 (1.4%) cases the cause of HF was myocardial infarction and in other 2 a pulmonary embolism. 35% of pts were diabetics, 57% had a history of cardiopathy, while 28% had a chronic kidney disease and 15% a COPD. Before hospitalization, 44% of pts were treated with a RAAS blocker (ACE-I or ARB), 41% with a B-blocker, 41% took an ant-platelet drug, 46% followed a diuretic therapy and 34% an anti-coagulant regim. At the time of intubation, mean systolic blood pressure and heart rate were 114 ± 33 mmHg and 96 ± 19 bpm respectively. Lab tests showed that the mean value of serum creatinine was 1.8 ± 1 mg/dl and of hemoglobin was 12.3 ± 2 g/dl. First blood-gas-analysis performed displayed an acidosis in 23 cases (59%). In 28% of pts, ECG showed a ST-elevation and in 9.3% a presumed new left bundle branch block. During IMV, in 49 pts (91%) a sedative agent was employed and about in 3/4 also a neuromuscular blocking drug was necessary.

To identify clinical characteristics and in-hospital outcome of patients admitted for AHF over a 12-month period. Based upon clinical response in the first 24 hours to initial IV therapy, patients were divided into four subgroups: A. persistent improvement, B. initial improvement followed by clinical deterioration, C. continuous worsening, and D. refractory signs and symptoms. In-hospital outcomes included all cause mortality (ACM) and length of stay (LOS).

Overall, the breakdown of patients included 75.1% in group A, 16.1% in group B, 3.4% in group C, and 5.4% in group D. Baseline characteristics and in-hospital management are shown in Table 1. In-hospital ACM was 6.8% in group A, 8.2% in group B, 34% in group C, and 27% in group D. Similarly, median (25th, 75th) LOS was 8 (6, 9) days in group A, 8 (4,12) days in group B, 9 (3,18) days in group C, and 15 (12, 23) days in group D.

Conclusions: Although the vast majority of AHF patients substantially improved in response to initial IV therapy, some patients experienced a persistently unfavourable or a deteriorating in-hospital trajectory. A better characterization of the pathophysiology of AHF may facilitate targeted adaptation of existing therapies and development of novel interventions in patients at risk for an unfavourable clinical course.

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</table>

P1611 Right heart failure and cardiogenic shock contribute to longer length of stay in patients with acute heart failure

B Bambang Widayanto1; D Firdaus1; SIS Danny1; DA Zamroni1; I Malatia1; DPL Tobing1; DA Juara1

1 Dept of Cardiology and Vascular Medicine, Universitas Indonesia-NCVC Harapan Xia Hospital, Jakarta, Indonesia

Morbidity and mortality of patients admitted with acute heart failure (AHF) remains high. The aim of this study was to describe patient profiles and predictor of length of stay in patients with AHF. We examined 1846 patients hospitalized in CCU of our National Cardiovascular Center in 2015. Among those, 697 (37.7%) were patients with AHF, with acute coronary syndrome as the most prevalence cause (62.1%). Median age was 60 (32-89) years old, and 81.8% were male. Hemodynamic profiles showed 68.15% patient had warm and warm presentation, and 7.6% had cardiogenic shock. The most prevalence co-morbid is diabetes (44.8%), chronic kidney disease (8.31%) and pneumonia (21.52%). Median length of stay in CCU was 3 (1-75) days, and patient with cardiogenic shock and right HF stay longer in CCU (8.1 (6-50) days and 7 (6-21) days, respectively). These 2 groups of patients also need more inotropes and vasopressors, and more likely to have acute kidney injury that need continuous renal replacement therapy. In conclusion, we observed that patients with right heart failure and cardiogenic shock who need renal replacement therapy during hospitalization contributed to longer length of stay in hospital among all patients with acute heart failure.
P1612

Twenty percent of patients with acute decompensated heart failure (ADHF) do not receive appropriate treatment in the emergency department (ED). J Mc Cambridge1; C Keane1; M Walsh1; P Campbell1; PR Kalra2; MR Cowie1; J Riley1; R O’Leary1; M Ledwidge1; J Caballero1; M McDonald1

1St Vincent’s University Hospital, Heart Failure Unit, Dublin, Ireland; 2Portsmouth Hospitals NHS Trust, Portsmouth, United Kingdom; 1Royal Brompton Hospital, London, United Kingdom

Funding Acknowledgements: Enterprise Ireland, ResMed, Boston Scientific, Cardiogram.

Introduction: Increasing heart failure (HF) admission and ED attendance rates present a major challenge. It is generally accepted that early appropriate intervention reduces length of hospital stay and time to clinical stability.

Purpose: To evaluate the numbers being diagnosed with ADHF and numbers receiving HF-directed treatment in those presenting to ED with ADHF.

Method: This analysis is taken from one of the centres in an ongoing multicentre study evaluating clinical care pathways for patients admitted with ADHF. It focuses on the patient experience in ED. Specifically, we looked at patients’ initial diagnosis (ADHF, mixed respiratory infection/ADHF, respiratory infection alone, acute coronary syndrome, other), numbers receiving diuretics/nirotates in ED and time from presentation to treatment. A p-value < 0.05 was taken as significant.

Result: This analysis included 84 patients presenting to ED with ADHF, of which 47 (55.9%) had a new diagnosis of HF (de novo, DN) and 37 (44.1%) had a known history of HF (recurrent admitters, RA). Median age for this group was 75 years (71 for DN, 78 for RA). RA had a higher median number of co-morbidities (4) compared to DN (3). The time from presentation to first medical contact in ED was documented in 78.6% (66) of patients, with no significant difference between the median times for DN and RA (101 minutes and 91 minutes respectively, p = 0.381). Only 80.9% (68) of all patients were initially diagnosed as either ADHF or mixed respiratory infection/ADHF. RA were more likely to be diagnosed as either ADHF or respiratory infection/ADHF than not when compared to DN (89.2% vs. 74.5% respectively, p = 0.044). Of the entire cohort, 81.7% (67) received some sort of HF-directed therapy (oral/intravenous diuretic and/or intravenous/intravenous nirotate). RA received a HF-directed therapy more often than DN (86.6% vs. 76.6% respectively, p = 0.248) and RA also received IV diuretics more often than DN (82.9% vs. 70.2% respectively, p = 0.192), though neither difference reached statistical significance. DN tended to receive HF-directed therapy earlier with a median time-to-treatment of 232 mins (IQR 301 mins) compared to 324 mins (IQR 214 mins) with RA (p = 0.202).

Conclusion: One fifth of patients presenting to ED with ADHF were not initially diagnosed with ADHF and did not receive HF-directed therapy as part of their initial management. RA were more likely to be diagnosed with ADHF than DN. Earlier recognition and treatment of ADHF in ED may be improved via increased clinician awareness/comfort with the features of HF, easier access to a patient’s HF record for RA and training ED doctors in the use of rapid, focussed echocardiography.

P1613

The Beacon patient management system for outpatient heart failure monitoring
FA Frank McGrew1; SC Sandra Harlton1; LLR Letitia Redden1; HS Norman2

1Republican Specialized Centre of Surgery, Intensive Care Unit, Tashkent, Uzbekistan

Introduction: Increasing heart failure (HF) admission and ED attendance rates present a major challenge. Remote patient monitoring systems make it possible to easily treat clinically unstable symptoms in an outpatient setting ($300.00) resulting in considerable financial savings to the patient as compared to the high cost of an inpatient hospitalization ($4000.00).

Purpose: Demonstrate how the use of the Beacon Patient Management System (BPM) can permit heart failure management in an outpatient setting and provides accurate assessment of a patient’s HF status. This permits prompt changes in device programming, initiation or adjustment of anticoagulation, medication adjustments, and optimum scheduling of subsequent care. This not only provides a method with extreme patient acceptance, but also a major economic advantage. In this further use of remote monitoring can greatly enhance congestive HF management. The beacon management system transmissions information made it possible to easily treat clinically unstable symptoms in an outpatient setting ($300.00) resulting in considerable financial savings to the patient as compared to the high cost of an inpatient hospitalization ($4000.00).

Methods: We studied early postoperative period of 48 patients who underwent TFR during 2015. In 6 patients the postoperative period was complicated by the development of RVF. After surgery, all patients received on prolonged mechanical ventilation. Data of hemodynamics and echocardiography served as diagnostic criteria of post-operative RVF. Drug therapy includes the use of vasopressor and inotropic agents. Oxygen therapy was in accordance with the concepts of “safe ventilation”, “safe hypoxemia”, and by using different modes of ventilation.

Results: One of the most important principles in managing postoperative RVF is to be able to maintain systemic blood pressure while minimizing RV filtration. Other important principles include reducing RV afterload, minimizing blood transfusions and optimizing ventilator settings. It is also essential to tailor therapy to the specific etiology of postoperative RVF.

Non-invasive respiratory support in CPAP mode (NIPPV) is an effective method, which is in complex of adequate intensive and pharmacotherapy allows to significantly stabilize the clinical condition, respiratory and hemodynamic status of patients with RVF after TFR.

Conclusions: Modern and comprehensive monitoring of cardiac hemodynamics in the early postoperative period allows to detect a RVF development after TFR, with the establishment of its causation.

Background: Acute Heart Failure (HF) management often results in expensive emergency room visits and hospitalizations. Remote patient monitoring systems could permit outpatient management of acute worsening of CHF with significant economic savings.

Method: The beacon outpatient monitoring system uses transtelephonic monitoring of multimodal information, which can be integrated by the patient’s physician and allied health personnel managers. The ability to monitor various components of device programming, initiation or adjustment of anticoagulation, medication adjustments, and optimum scheduling of subsequent care. This not only provides a method with extreme patient acceptance, but also a major economic advantage. In this further use of remote monitoring can greatly enhance congestive HF management. The beacon management system transmissions information made it possible to easily treat clinically unstable symptoms in an outpatient setting ($300.00) resulting in considerable financial savings to the patient as compared to the high cost of an inpatient hospitalization ($4000.00).

Conclusion: The Beacon system offers a remote monitoring system, which is rapid and provides accurate assessment of a patient’s HF status. This permits prompt changes in device programming, initiation or adjustment of anticoagulation, medication adjustments, and optimum scheduling of subsequent care. This not only provides a method with extreme patient acceptance, but also a major economic advantage. In this further use of remote monitoring can greatly enhance congestive HF management. The beacon management system transmissions information made it possible to easily treat clinically unstable symptoms in an outpatient setting ($300.00) resulting in considerable financial savings to the patient as compared to the high cost of an inpatient hospitalization ($4000.00).

P1614

Management features of postoperative right ventricular failure after tetralogy of fallot repair
S Sardor Ibragimov1

1Republican Specialized Centre of Surgery, Intensive Care Unit, Tashkent, Uzbekistan

Objective: The aim of the study was to develop the diagnostic and treatment algorithm for patients with right ventricular (RV) failure (RVF) in an early postoperative period after tetralogy of Fallot repair (TFR) in an adult population.

Methods: We studied early postoperative period of 48 patients who underwent TFR during 2015. In 6 patients the postoperative period was complicated by the development of RVF. After surgery, all patients received on prolonged mechanical ventilation. Data of hemodynamics and echocardiography served as diagnostic criteria of post-operative RVF. Drug therapy includes the use of vasopressor and inotropic agents. Oxygen therapy was in accordance with the concepts of “safe ventilation”, “safe hypoxemia”, and by using different modes of ventilation.

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P1615

The efficacy of urapidil in the treatment of acute heart failure complicated with hypertension in elderly patients
J Jing Gao1; C Hu2; XIAO H Li2

1Xuan Wu Hospital, Capital Medical University, department of cardiology, Beijing, China People’s Republic of; 2Yuquan Hospital of Tsinghua University, Cadre ward, Beijing, China People’s Republic of

Objective: To assess the efficacy of urapidil in the treatment of acute heart failure complicated with hypertension in elderly patients.

Methods: 140 cases of acute heart failure complicated with hypertension in elderly patients were randomized into urapidil or nitroglycerin group. All patients were monitored for systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate (HR), situation at the time of before treatment, 24h, 48h, 72h, 7d after treatment, and contrasted to observe the changes in N-terminal pro-B-type natriuretic peptide raw (NT proBNP) and left ventricular ejection fraction UEF in elderly patients with acute heart failure of urapidil at the time of before treatment, 48h and 7d after treatment.

Result: The level of SBP DBP and HR in urapidil group was significantly lower on hour 24, hour 48, hour 72 and day 7 after treatment than before treatment P < 0.05. The level of BNP in urapidil group was significantly lower on hour 24, hour 48 and day 7 after treatment than before treatment P < 0.05. The level of UEF in urapidil group
was significantly higher on day 7 after treatment than before treatment P < 0.05. The effect of urapidil was significantly lower than that of nitroglycerin on SBP P = 0.05.

Conclusions: The effect of urapidil is obvious on reducing and stabilizing SBP/DBP/HRR and improving cardiac function in elderly patients with hypertension accompanying acute heart failure.

P1616
Utilization of mechanical ventilation in patients hospitalized for acute heart failure
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Background: During hospitalization for acute heart failure (AHF), in some patients hypoxemia may be too severe or may not be promptly improved by pharma-cotherapies and these patients are emergently requiring invasive mechanical ventilation(IMV) via intubation. Although in this setting IMV may be a life-saving therapy, it is associated with an immediate decrease in cardiac output and later on with development of complications including barotrauma and pulmonary intra-alveolar oedema.

Aim: To identify clinical variables independently associated to need of IMV during hospitalization for AHF.

Methods: The Romanian AHFS (RO-AHFS) registry prospectively enrolled 3224 consecutive patients admitted for AHF in 5 academic and 8 community hospitals, over a 12-month period. A multivariate logistic regression model was developed to identify baseline clinical variables predictive of in-hospital utilization of IMV.

Results: IMV has been performed in 113 (3.5%) of patients during hospitalization for AHF. Patients who required IMV had higher respiratory rate (RR) (50 ± 11 vs 21 ± 7, p = 0.006) and lower systolic blood pressure (SBP) (101 ± 22 mmHg vs 143 ± 27 mmHg; p < 0.001) at presentation compared to patients who did not require IMV.

A proportion of 43% of patients in IMV group were in cardiogenic shock (CS) at presentation, distinct to 3.9% in CS in patients without IMV. IMV has been associated to higher in-hospital mortality (24.7% vs 7.1%; p < 0.001) and with longer median length of stay (14 vs 6 days).

Using a multivariate logistic regression model, sodium at admission (HR=1.26;95%CI=1.12-1.41), EF < 35% (HR=1.55;95%CI=1.33-1.82), respiratory rate > 22 (HR=1.54;95%CI=1.13-2.05), need of inotropic agents (HR=3.89;95%CI=2.91-6.15) were found to be independent risk factors for need of IMV during hospitalization.

Conclusions: In present study, rate of IMV utilization was lower compared to other registries. Clinical variables associated to hemodynamic abnormalities were highly predictive for subsequent utilization of IMV and may be useful for disposition decision-making pathways.

P1617
Clinical characteristics and outcome of decompensated heart failure patients according to ACE-inhibitor titration
R M Christodorescu1; LR Lala2; D Daraban1; A Pop-Moldovan2; A.M Apostolescu2; M Trofenciuc2; S Dragan1
1University of Medicine Victor Babes, Timisoara, Romania; 2Vasile Goldis Western University, Arad, Romania; 3Institute of Cardiovascular Diseases, Cardiac Rehabilitation Clinic, Timisoara, Romania

Background and purpose: ACE inhibitors are currently the standard therapy for HF patients. The aim of the study was to evaluate in-hospital management and outcome of patients hospitalized with chronic decompensated heart failure according to ACE-inhibitor therapy.

Methods: In this study we evaluated consecutive patients, enrolled during 2015 in a county hospital with a primary diagnosis of decompensated heart failure. Patients were divided according to ACE-inhibitor therapy during hospitalization: group 1(no initiation, maintained or lowered doses of ACE-inhibitors), group 2(initiation or titration during hospitalization for decompensated heart failure). Both groups were evaluated at baseline and after 6 months follow-up heart failure rehospitalizations, death. For statistical analysis we used independent t test for comparison of continuous values, Pearson x2 test for comparison of categorical values, and multivariate logistic regression for predictors of in-hospital mortality.

Results: A total of 109 consecutive patients (83% males) with chronic HF hospitalized for a decompensation episode were enrolled. Mean age was 68 ± 11 years and mean ejection fraction was 33 ± 13%. 63% of patients had no ACE inhibitor therapy at admission. Patients in group 1 (n = 69) had a significantly lower glomerular filtration rate (eGFR) (62 ± 22 vs 69 ± 20 ml/min; p = 0.024) than in group 2 (n = 40). Patients in group 1 had a lower SBP (131 ± 29 vs 146 ± 28 mmHg, p = 0.037) than in group 2. By logistic regression, at 6 months of follow-up, lack of initiation or lowering of ACE-inhibitors doses did not influence mortality while initiation or titration of ACE-inhibitor treatment proved to be a protective factor for outcome (p = 0.049, OR=0.2).

Conclusions: ACE-inhibitor initiation or titration during hospitalization for decompensated heart failure is safe and improves short-term outcome while no initiation or lowering doses does not influence the short-term outcome. ACE inhibitors are still underused in HF treatment and guidelines recommendations are not routinely followed for these patients.

P1618
Clinical inertia following discharge of patients with acute heart failure
E Berthelot1; JG Elicher2; M Savali3; P Degroot3; R Sirard4; T Damy3; JN Trochu5; E Donal5; M Galvier6; D Damien Logar5
1UM-HP; 2Hospital Cardiologique, Dijon, France; 3University Hospital of Grenoble, Grenoble, France; 4Cardiology Hospital of Lille, Lille, France; 5Hospital Pitie-Salpetriere, Paris, France; 6University Hospital Heart Monod, Creteil, France; 7University Hospital of Nantes Nord Laennec, Nantes, France; 8Toulouse Rangueil University Hospital (CHU), Toulouse, France

On behalf of: OFICA

Background: after acute heart failure (AHF), most patients are often discharged early and before treatment is optimized. Thus, following months are critical for optimization of care. Using a cohort of patients admitted for AHF, we analyzed treatments at discharge, during the next 3 months and relationships with mortality in patients with reduced left ventricular ejection fraction (LVEF).

Methods: a single-day national HF survey was conducted in a sample of 170 hospitals. Clinical characteristics including LVEF as well as treatment at discharge and at 3 months were obtained. Vital status was also obtained at one year. Data was recorded during both hospitalizations and one-year follow-up.

Results: early changes in HF treatment was recorded and analyzed in 275 patients admitted with AHF and LVEF ≤ 40% (age 72 ± 14, 66% males). At discharge, ACE-I or ARB were prescribed in 80% with daily mean dose reaching 36 ± 31% of target dose, beta blocker (BB) in 70% with daily mean dose of 27 ± 51% of target dose, aldosterone antagonists (AA) were prescribed in 23% and loop diuretics in 88% cases. At 3 months, there was relatively few changes in rates of prescriptions as well as doses compared to discharge: loop diuretics were started/increased and stopped/decreased in 7/25% and 6/7% of patients respectively, ACE-I or ARB in 6/21% and 9/7% respectively, beta-blockers in 8/23% and 8/8% respectively, and aldosterone antagonists in 7% and 9% respectively. All cause mortality at 12 months was 19% with differences according to prescription or not of ACE-I/ARB at 3 months (15 vs 29%, p = 0.002) as well as BB (15 vs 27%, p = 0.008). After adjustment on clinical characteristics, only the lack of ACE-I or ARB was related to mortality (OR 2.50 [95%CI 1.33-4.73], p = 0.005).

Conclusions: individual treatments remain poorly optimized after discharge and such inertia impacts outcome. These results suggest a large room to improve HF management in the daily practice, especially in the post-discharge period.
Independent clinical predictors of in-hospital mortality among AHF patients treated with inotropes/vasopressors included: age (HR=1.08, 95% CI 1.04-1.13), ischemic aetiology (HR=1.42, 95% CI 1.14-1.73), QRS duration >120msec (HR=1.78, 95% CI 1.54-1.93), non-academic clinical settings (HR=1.91, 95% CI 1.74-2.23) administration for more than 24 hours (HR=2.02, 95% CI 1.74-2.35).

Conclusions: Association between utilization of inotropic agents and in-hospital mortality reflects a complex relationship between cardiac electromechanical abnormalities and variation of indication in different clinical settings.

### Table 1

<table>
<thead>
<tr>
<th>Inotropes/vasopressors+</th>
<th>Inotropes/vasopressors-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>71 ± 8</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>55</td>
</tr>
<tr>
<td>Ischemic aetiology(%)</td>
<td>67</td>
</tr>
<tr>
<td>SBP(mmHg)</td>
<td>98 ± 22</td>
</tr>
<tr>
<td>HR(beats/min)</td>
<td>104 ± 18</td>
</tr>
<tr>
<td>QRS duration</td>
<td>39.4</td>
</tr>
<tr>
<td>LVEF(%)</td>
<td>30 ± 11</td>
</tr>
<tr>
<td>Creatinine(mg/dl)</td>
<td>1.9 ± 0.9</td>
</tr>
<tr>
<td>Naitro(mmol/l)</td>
<td>130 ± 4</td>
</tr>
<tr>
<td>P</td>
<td>0.02</td>
</tr>
</tbody>
</table>

| P1620 Temporal trends in nitrate utilization for acute heart failure in elderly emergency patients: a single-centre observational study |

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Background: We previously conted a pilot study that reported the safety of isosorbide dinitrate boluses for elderly emergency patients with acute heart failure syndrome.

Aims: To assess the temporal trend in the rate of elderly patients treated with isosorbide dinitrate, and to evaluate subsequent outcome differences.

Methods: This was a single-centre study. We compared patients aged > 75 years who attended the emergency department with a primary diagnosis of acute pulmonary oedema in the years 2007 and 2014. The primary endpoint was the rate of patients who received isosorbide dinitrate bolus in the emergency department. Secondary endpoints included in-hospital mortality, need for intensive care and length of stay.

Results: We analyzed 368 charts, 232 from patients included in 2014 (63%) and 136 in 2007 (37%). The mean age was 85 ± 6 years in both groups. There was a significant rate in the number of patients treated with isosorbide dinitrate between 2007 and 2014: 97 patients (42%) in 2014 vs 24 patients (18%) in 2007 (p < 0.01). Comparing the two periods, we report similar in-hospital mortality rates (8% vs 11%, p = 0.5), rates of admission to the intensive care unit (13% vs 17%, p = 0.3) and lengths of stay (10 days in both groups).

Conclusion: We observed a significant rise in the rate of elderly patients treated with isosorbide dinitrate boluses for acute heart failure. However, we did not observe any significant improvement in outcomes.

P1621 Argentinean Registry of Inotropes and Vasoactive Drugs (REINA Registry)

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1Universidad Abierta Interamericana University, Buenos Aires, Argentina; 2Austral University Hospital, Buenos Aires, Argentina; 3Finochietto Clinic, Buenos Aires, Argentina; 4Instituto Cardiovascular de Buenos Aires, Buenos Aires, Argentina; 5Hospital Center Churruca-Woca, Buenos Aires, Argentina; 6Julio Mendez Hospital, Buenos Aires, Argentina; 7Hospital de Catamarca, Catamarca, Argentina; 8Hospital El Cruce, Florencio Varela, Argentina

On behalf of: Cardiovascular Emergencies and Critical Cardiology Council

Objectives: To analyze preferences of utilization of Pulmonary Artery Catheter and Echocardiography as monitoring tools in patients requiring vasoactive drugs admitted to REINA registry.

Methods: Population: There were included patients over 18 years old admitted in 21 argentinean institutions due to vasoactive drugs requirements. REINA registry was a prospective, observational and multicenter evaluation with hemodynamic scenarios previously defined as: hypovolemia, cardiogenic, non septic distributive, septic, mixed pattern (cardiogenic plus distributive), isolated right ventricle failure, left ventricle obstruction and hypotensive, normotensive and hypertensive hypovolemia.

Results: There were included 376 patients from 21 centers, with an average age of 66.1 years, being 77.4% of them males. The observed prevalence for each scenario and the use of pulmonary artery catheter and echocardiography were respectively: distributive non sepsis 307.9%, patients, 43.3% and 33.3%, distributive sepsis 104.2%, patients, 18.7% and 68.7%, isolated failure of right ventricle 102.6% patients, 60% and 70%, hypertensive hypovolemia 59.1% patients, 7.6% and 64%, hypotensive hypervolemia 22.8%, patients, 59% and 67.2%, normotensive hypervolemia 267.7% patients, 13.7% and 78.3%, hypovolemia 822.1% patients, 26.8% and 59.7%, left ventricle obstruction 10.2% patients, 100% and 100%, mixed pattern 36.9%, patients, 41.6% and 55.4% and cardiogenic 112.9% patients, 47.7% and 71.1%.

Two hundred and eight four cardiovascular patients presented with hypotensive states corresponding 112 of them to medical scenarios and 172 to surgical ones. The pulmonary artery catheter was utilized in 5600% medical patients against 67 cardiological (38.9%) ones (P = 0.03) while echocardiography was used in 91 medical (81.2%) patients against 86 surgical (50%) patients (P < 0.000001).

Conclusions: An elevated utilization of both methods was detected. The observed use of pulmonary artery catheter was largely over the referred numbers of the literature. In patients with hypotension it was observed a superior use of both methods in medical conditions over surgical ones.

P1622 Risk factors for in-hospital worsening heart failure in patients hospitalized with acute heart failure

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Introduction: Although most patients hospitalized for acute heart failure (AHF) respond to standard therapy, a subset of patients may clinically decompensate and experience in-hospital worsening heart failure (WHF), placing them at substantial risk for in-hospital mortality.

Objective: To identify clinical variables associated with in-hospital WHF in patients hospitalized for AHF.

Methods: The Romanian AHFS (RO-AHFS) registry prospectively enrolled 3224 consecutive patients admitted for AHFS over a 12-month period. In-hospital WHF was defined as worsening of signs or symptoms of HF necessitating intensification of intravenous (IV) diuretics and/or initiation of IV vasodilators and/or inotropes, assisted ventilation, and/or mechanical circulatory support. Clinical predictors of in-hospital WHF were identified using multivariate logistic regression analysis.

Results: The incidence of in-hospital WHF was 16.1% and the majority of episodes occurred within 3 days of hospitalization. Patients experiencing in-hospital WHF tended to be older (72 ± 9 vs. 69 ± 11 years; p = 0.06), have an ischemic etiology of HF (99% vs. 55.8%; p = 0.05) and lower ejection fraction (35 ± 8 vs. 38 ± 10%; p < 0.001), and have a previous HF hospitalization within the last year (69% vs. 51%; p = 0.01). In-hospital all cause mortality was higher in patients experiencing in-hospital WHF (8.8% vs. 7.1%; p = 0.03). Independent risk factors for in-hospital WHF included older age (HR = 1.02, 95% CI 1.01-1.09), an ischemic etiology of HF (HR = 1.31, 95% CI 1.12-1.54), left bundle branch block on admission ECG (HR = 1.51, 95% CI 1.42-1.78), baseline serum Na < 135mEq/L (HR = 1.68, 95% CI 1.24-2.03), and signs and symptoms of hypoperfusion at presentation (HR = 3.05, 95% CI 1.72-4.38).

Conclusions: In-hospital WHF occurred in 16.1% of patients hospitalized for AHF and was associated with higher in-hospital mortality. The ability of clinical variables readily available at initial presentation to risk stratify patients for in-hospital WHF should be studied prospectively.
**P1623**

*Clinical outcomes of de novo and acute decompensated heart failure patients according to ejection fraction*

<table>
<thead>
<tr>
<th>EF Group</th>
<th>All cause death</th>
<th>Death after 1 year</th>
<th>Death within 1 year</th>
<th>Comparison with HFrEF</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFpEF (EF &lt; 40%)</td>
<td>171 (44.6)</td>
<td>88 (28.1)</td>
<td>88 (23.0)</td>
<td>HR 0.91 (0.77)</td>
</tr>
<tr>
<td>HFmrEF (40% ≤ EF &lt; 50%)</td>
<td>245 (40.0)</td>
<td>144 (25.0)</td>
<td>141 (23.5)</td>
<td>HR 1.15 (0.94)</td>
</tr>
<tr>
<td>HFrEF (EF ≥ 50%)</td>
<td>264 (42.6)</td>
<td>101 (21.5)</td>
<td>98 (21.5)</td>
<td>HR 1.14 (0.88)</td>
</tr>
</tbody>
</table>

**Purpose:** To compare the outcomes of patients with de novo acute heart failure (AHF) or acute decompensated HF (ADHF) according to preserved ejection fraction (HFpEF, EF ≥50%), or reduced EF (HFrEF, EF < 40%) and to define the prognosis of HF patients with a mid-range EF (HFmrEF, 40% ≤ EF < 50%).

**Methods:** Between March 2011 and February 2014, 5,625 consecutive AHF patients were enrolled, which consisted of 2,867 (53.0%) patients with de novo and 2,547 (47.0%) with ADHF. Each of the enrolled group was stratified by EF (HFpEF, HFrEF, or HFmrEF).

**Results:** In de novo, all-cause death rates were not significantly different between HFpEF and HFrEF (adjusted hazard ratio [HR] 1.15, 95% confidence interval [CI] 0.96 to 1.38, p = 0.14). However, among ADHF patients, HFrEF had a significantly higher mortality rate compared to HFpEF (adjusted HR 1.25, 95% CI 1.06 to 1.47, p = 0.007). Also, in ADHF HFmrEF was associated with a significantly lower mortality rate within one year compared to HFrEF (adjusted HR 0.76, 95% CI 0.60 to 0.96, p = 0.02), but a significantly higher mortality rate after one year compared with HFpEF (adjusted HR 1.42, 95% CI 1.05 to 1.93, p = 0.02).

**Conclusions:** HFmrEF may indicate a better prognosis compared with HFpEF in ADHF, but not in de novo AHF. For ADHF patients, the prognosis associated with HFmrEF was similar to that of HFrEF within the first year following hospitalization and similar to HFrEF one year after hospitalization.

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**Figure 1**

Survival curve in de novo (A) and ADHF (B)
P1625
Impact of atrial fibrillation in hospital evolution of decompensated heart failure patients: Insights from CONAREC XVIII registry.
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1CONAREC. Argentine Council of Cardiology Residents., Buenos Aires, Argentina

Introduction: Although atrial fibrillation (AF) is a frequent arrhythmia in patients hospitalized for decompensated heart failure (HF), the information about its impact in prognosis is conflicting, and there is lack of information in this regard in Latin America.

Objective: The main objective was to analyze if chronic AF modifies hospital evolution (mortality, length of stay) of HF patients in a contemporary population from Argentina. A key secondary objective was to find clinical predictors of death in AF - HF patients.

Methods: An analysis of the database of the prospective registry CONAREC XVIII, developed by residents of cardiology from 64 centers from Argentina was performed. The baseline characteristics and hospital evolution were analyzed. The AF diagnosis and treatment before hospital admission was coded as “chronic AF”, and first episodes of AF were excluded from the analysis. In a second time the factors related to hospital mortality in AF-HF patients were evaluated. The statistical analysis was conventional for descriptive and comparative analysis, and a multivariable model was developed to search for predictors of death. A p value of ≤ 0.05 was considered significative.

Results: Of 1160 consecutive HF patients recluted at 64 cardiology residency centers in two consecutive months, 415 (35.9%) had chronic AF (AF group) and 745 did not (non-AF group).

The median age was 78 years in the AF group vs 70 in the non-AF group (p < 0.01), 43% in the AF group were female (vs 38 %, p < 0.01). The AF group had higher rate of HF with preserved ejection fraction (53 vs 38 %, p: 0.01), and the rates of all the comorbidities analyzed (renal failure, COPD, thyroid diseases) were higher in AF patients. No differences in the length of hospitalization (median 6 days in both groups) or in mortality (10.4% vs 11.8 % p < 0.05) were found. In the multivariable analysis, shock, renal failure, and prior use of digoxin were independent predictors of death in AF patients (OR: 6.9, 2.05, and 2.07, respectively, all p < 0.05).

Conclusion: Prior AF does not modify hospital evolution of decompensated heart failure patients. Patients with AF and HF represent a high-risk population, with higher rates of comorbidities, and among them, digoxin use was independently associated with hospital mortality.

P1626
Hyponatremia and long-term outcomes in heart failure
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1chu ibn rochd, cardiology, casablanca, Morocco

Background: Hyponatremia (serum sodium [Na] < 135mmol/L) is a predictor of morbidity and mortality in patients with heart failure (HF), but the long-term outcomes associated with hyponatremia are less clear. We aimed to evaluate the long-term outcomes of hyponatremic patients in a large HF cohort.

Methods: a descriptive study was carried from May 2008 to November 2014. 1600 patients presenting clinical and echocardiographic signs of heart failure and followed at the heart failure unit were included. Serum sodium measurement at the time of catheterization was used to assess sodium status. Baseline characteristics and outcomes for patients with hyponatremia were compared to those without hyponatremia. Kaplan-Meier survival estimates were generated out to 6 years, with a median follow-up time of 3.8 years in the study population.

Results: 1600 patients were enrolled. For the entire cohort median age was 61; 70% were male; median EF was 27%. 16% of the patients had hyponatremia. Kaplan-Meier survival estimates were generated out to 6 years, with a median follow-up time of 3.8 years in the study population.

Conclusion: Hyponatremia was associated with worse survival for HF patients in our cohort. Hyponatremia is an important risk factor for poor outcomes and a potential target for the development of new therapies.

P1627
Survival in heart failure according to ejection fraction: the mid-range gains its place - seven years follow up.
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1Hospital Sao Lucas, Cardiology, Porto Alegre, Brazil; 2Hospital Sao Lucas, Nursing, Porto Alegre, Brazil; 3Hospital Sao Lucas, Nursing, Porto Alegre, Brazil; 4Hospital Sao Lucas, Nutrition, Porto Alegre, Brazil; 5Lutheran University of Brazil, Cardiology, Canoas, Brazil; 6Institute of Cardiology of Rio Grande do Sul. Cardiology / Echocardiography, Porto Alegre, Brazil; 7Lutheran University of Brazil, Hospital Sao Lucas, Cardiology, Canoas, Brazil

Introduction: Although ejection fraction may not be ideal to stratify heart failure (HF) patients, it has a historical importance to guide therapy and prognosis in clinical practice. Recently, the European Society of Cardiology defined a new HF category – the mid-range ejection fraction (EF). However, there may be few studies evaluating the long-term survival in this new category.

Purpose: To analyze characteristics and long-term survival in HF patients with mid-range (40-49%) EF in comparison with reduced (<40%) and preserved (>50%) EF categories.

Methods: A historical cohort from a registry of consecutive patients admitted with acute heart failure in a tertiary hospital from January 2009 to December 2011. The follow up time was 7 years. Categorical variables were compared with Pearson chi-square and continuous with ANOVA tests. A Kaplan-Meier survival curve was analyzed according to ejection fraction.

Results: Mid-range EF was present in 17%, reduced in 33% and preserved in 50% of the 381 patients analyzed. There was no statistical difference on comorbidities, presence of atrial fibrillation and causes of decompenation. Patients with preserved EF were older, mostly females, with non-ischaemic aetiology, admitted with higher blood pressure and had a smaller diastolic diameter. Patients with reduced EF were younger, mostly males, admitted with lower blood pressure and had a higher diastolic diameter. Ischaemic aetiology was similar between patients with reduced and mid-range EF (table). Survival was worse in patients with mid-range EF (mean 0.8 years with 95% CI 0.5 – 1.0) when compared with patients with reduced EF (mean 1.3 years with 95% CI 1.0 – 1.6)(P<0.007)(figure).

Conclusion: Patients with mid-range ejection fraction had worse survival when compared with patients with reduced EF in our preliminary analysis.

Table: Population characteristics.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TOTAL SAMPLE</th>
<th>EJECTION FRACTION (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (mean±SD)</td>
<td>68±13.8</td>
<td>64±12.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>180 (47,2)</td>
<td>82 (64,6)*</td>
<td>0.001</td>
</tr>
<tr>
<td>Female</td>
<td>201 (52,8)</td>
<td>45 (35,4)</td>
<td>1.12 (63,7)</td>
</tr>
<tr>
<td>Aetiology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-ischaemic</td>
<td>241 (63,4)</td>
<td>76 (60,3)</td>
<td>0.004</td>
</tr>
<tr>
<td>Ischaemic</td>
<td>139 (36,6)</td>
<td>56 (39,7)</td>
<td></td>
</tr>
<tr>
<td>LV Diameter (mean±SD)</td>
<td>5.6±1,1</td>
<td>6.1±1,1*</td>
<td>0.001</td>
</tr>
</tbody>
</table>

LVM< left ventricle. * Statistical difference.
**P1628 International normalized ratio at admission and mortality risk in patients with acute heart failure**

E Enrique Santas Olmeda1; A Payá1; R Heredia1; J Gummi1; R Farcazan1; I Cardells1; E Valero1; D Escribano1; G Guitarda1; A Bayés-Genís2; J Lupino2; J Sansachs1; J Nunez1

1Hospital Clinic Universitari. Universitat de Valencia, Valencia, Spain; 2Germans Trias i Pujol Hospital, Badalona (Barcelona), Spain

Introduction: Anticoagulation control in heart failure (HF) patients on treatment with vitamin K antagonist (VKA) is often suboptimal, especially in the setting of acute HF (AHF). However, evidence regarding the prognostic value of international normalized ratio (INR) at admission in patients with AHF is scarce. In this work, we aimed to evaluate the association between INR and the risk of long-term mortality in patients with AHF treated with AVK.

Methods: In this observational study, we retrospectively assessed INR on admission in 1137 consecutive patients with AHF on treatment with acenocoumarol. INR was categorized according to the degree of anticoagulation quality: a) low-INR<2, b) normal-INR 2-3 and, c) high-INR>3. Cox regression and Cox regression adapted for competing events were used for evaluating the association among INR categories and the risk of all-cause and cardiovascular mortality, respectively.

Results: Mean age was 74 ± 10 years, 51.1% were females, 62.4% showed left ventricular ejection fraction<35% and 52.2% were previously admitted for AHF. Median NT-proBNP was 4174 pg/ml (2450-7813). Normal, low and high-INRs were found in 666 (58%), 210 (18.5%) and 267 (23.5) patients, respectively. During a median (interquartile range) follow-up of 2.3 years (0.8-4.3), 968 (83.9%) patients died (74.8% of them of CV-eticiology). Compared to patients with normal-INR, cumulative risk of all-cause and CV mortality were higher for those patients belonging to low and high-INRs categories (Figure 1a and 1b, respectively). In multivariate analysis, both patients with infra and supratherapeutic INR showed an independent increase of risk of all-cause mortality (HR= 1.56, CI 95%:1.23-1.98; p= < 0.001, and HR=1.52, CI 95%: 1.17-1.96; p= 0.002, respectively), and CV mortality (HR= 1.40, CI 95%: 1.06-1.82; p= 0.016 and HR=1.30, CI 95%: 1.01-1.73; p = 0.045, respectively).

Conclusion: In AHF patients on treatment with AVK, INR<2 and >3 at admission are associated with higher risk of all-cause and CV-death. Further studies are warranted to clarify the pathophysiological mechanisms behind these findings.

**P1629 Comorbidities in heart failure patients: the impact on re-hospitalization and long-term mortality**

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Introduction: Hospitalization for heart failure (HF) is associated with high in-hospital and post-discharge mortality rates, regardless the documentation of a reduced or preserved left ventricular ejection fraction (EF). Comorbidities, particularly non-cardiovascular, have a major role in the post-discharge event rates of HF patients (pts), especially regarding readmissions (reH) and mortality, although these outcomes may not be necessary related.

Purpose: To evaluate the burden of comorbidities in long-term mortality and reH in pts discharged from hospital after an episode of acute coronary-decompensated HF (AHF).

Methods: Demographic, clinical, laboratory and echocardiographic data of 100 pts consecutively admitted for AHF (cardiology ward, tertiary hospital center) and discharged alive, were retrospectively analyzed. The influence of comorbidities on post-discharge events occurring during the follow up was determined (Cox regression, Kaplan-Meier survival analysis and Mann-Whitney test, were applied).

Results: The included population (55% men, 68.3 ± 13.1 years) was followed during a period of 14.2 ± 5.5 months after hospital discharge. The post-discharge mortality rate (INR), HF reH, and all cause reH was 14%, 31% and 54%, respectively. The median number of comorbidities was 4 (IQR: 4-6) per pt. Anemia (HR= 12.7, CI= 1.99-81.5, p = 0.007) and chronic liver disease (CLD) (HR= 25.9, CI= 5.1-130.4; p < 0.001) were independent predictors of long-term mortality. Dementia was an independent predictor of long-term mortality (HR= 2.9, CI= 1.3-6.8, p = 0.027), and all cause reH (HR= 2.5, CI= 1.2-4.9; p = 0.001). In particular, in the subgroup of patients with preserved EF (n = 35), CLD was an independent predictor of long-term mortality (HR= 7.6, CI= 1.3-45.8; p = 0.027), and dementia was an independent predictor of HF reH (HR= 5.5, CI= 1.2-24.4, p = 0.025).

Conclusion: No independent predictors of mortality were found in pts with reduced EF or mid-range EF. Anemia (p = 0.027), history of cancer (p = 0.023), CLD (p < 0.001), dementia (p = 0.020), previous stroke (p = 0.003), and the presence of more than 4 comorbidities (p = 0.026), correlated with the number of all cause reH.

**P1630 One month prognosis after decompensated heart failure through the assembly of artificial neural networks**

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Introduction: Heart failure is the main reason for hospitalizations in people aged 65+. Physicians usually overestimate the risk of death in these patients. The individual determinants of risk are not sufficient to determine an accurate global prognosis. Artificial intelligence has gained a position as an alternative to statistical tools, promising a better performance.

Objective: Train and validate a system based on the assembly of a set of artificial neural networks for the prognosis of mortality one month after decompensated heart failure.

Methodology: Prognostic evaluation study based on a prospective cohort of patients that were admitted into the emergency service between 2010 and 2013 diagnosed with decompensated heart failure, aged 18+, who met the Framingham criterion. The population was divided into 70% (323 patients) for training and tests of the neural networks were trained using a genetic algorithm. The architecture consisted of 15 input variables, a hidden layer, and an output neuron. The 11 networks exhibiting the best performance in the tests were selected for assembly through three steps: simple voting, weighted voting by predictive values, and likelihood ratio. The operational characteristics were calculated for the
prognosis of death after 30 days and were compared with two clinical prediction rules and a logistic regression applied on the same population. Results: The average age was 72.4, 51.9% were males, 80% had hypertension, 23.3% diabetes, and 87 coronary disease. 30 days mortality was 13.8%. The different methods of assembly exhibited better results in the prognosis than the individual networks that were part of them. Weighted voting by predictive values had the best global performance (See table). Conclusion: The assembly of neural networks through weighted voting by predictive values showed satisfactory performance for the prognosis of death after 30 days in acute heart failure, improving the results obtained by two clinical prediction rules and a logistic regression.

P1632 Blood pressure variation and mortality from acute decompensated heart failure in case of first and second hospitalization
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2The University of Texas Medical School, Cardiovascular Medicine, Houston, United States of America
Background: Mortality post cardiac arrest (CA) remains alarmingly high. Few prognostic tools have evaluated patients with return of spontaneous circulation (ROSC) post CA. Although the CASS score has been utilized in this population, its cumbersome calculations have impaired wide spread adoption. Methods: CASS- a novel prognostic score- was developed based on established CA risk factors and implemented via an easy to use web-application available on smart phones. This score was prospectively compared to the CAHP score in 43 patients who suffered CA with ROSC. The primary end point was in-hospital mortality. We evaluated the discrimination between both scores using the area under the receiver-operating characteristic (ROC) curve. Additionally, Hosmer-Lemeshow goodness-of-fit was used to determine calibration between CASS and CAHP score. Results: The AUC were similar between CASS (AUC=0.63, 95% CI (0.45-0.81)) and CAHP (AUC=0.70, 95% (0.52-0.87)). Additionally, the calibration of CASS (p=0.47) was better than CAHP (p = 0.08).
Conclusion: Both CASS and CAHP perform similarly in prognostication of mortality in patients post CA with ROSIC. However, CASS offered additional benefits including ease of use, automated calculation, and inter-specialty communication via a downloadable web application.

P1633 Biomarkers in the prognosis of acute heart failure
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Recurrent heart failure (RHF) is a main problem in the heart failure spectrum, and every new event worsens the vital prognosis and the subsequent functional class. Develop strategies to early detections of those patients at risk for RHF is critical. Biomarkers such as B-type natriuretic peptide precursor (pro-BNP), high-sensitivity troponin (T hs-Tn), and C-reactive protein (CRP) assessed at discharge may be useful.
114 patients with heart congestive heart failure admitted to our coronary care unit and with pro-BNP, hst-Tn and CRP measure prior to discharge were included. Patients within acute coronary syndrome evidences were excluded. The management of patients was made according to European Clinical Practice Guidelines. The primary endpoint was HF hospitalization at 3 months from discharge. 67 of 109 patients included were men, the mean age was 70±15 years. The primary endpoint was observed in 22 patients (20.1%). Patients with the event were p = 0.001 had more risk factors (hypertension 72% vs 49% p = 0.02; and diabetes 74% vs 32% p = 0.009).

Table 1:

<table>
<thead>
<tr>
<th>Quartiles (Q)</th>
<th>H. mortality for Q SBP %</th>
<th>Increase of risk</th>
<th>H. mortality for Q DBP %</th>
<th>Increase of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>15.4</td>
<td>-</td>
<td>16.8</td>
<td>-</td>
</tr>
<tr>
<td>Q2</td>
<td>3.3</td>
<td>5,39%</td>
<td>4.1</td>
<td>4,78%</td>
</tr>
<tr>
<td>Q3</td>
<td>3.2</td>
<td>5,99% CI: 2.1- 4.7</td>
<td>3.0</td>
<td>6,69% CI: 2.5- 17.7</td>
</tr>
<tr>
<td>Q4</td>
<td>2.2</td>
<td>8,20% CI: 2.5- 22.7</td>
<td>2.3</td>
<td>8,59% CI: 2.9- 24.9</td>
</tr>
<tr>
<td>H. mortality: Hospital mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

H. mortality: Hospital mortality
had more severe valvopathies (78.5% vs 60.6% p = 0.02). No other signif-
ificant differences in the clinical characteristics of the patients were found.
Patients who presented the primary endpoint had higher levels of TN-T (129.7±[119.8-140.8]μg/L), pro-BNP (16,987.89/[20,94-17,395]pg/mL), and also in CRP (95.57/[78,09-98,01]μg/dL) compared to those patients without events (TN-T 69,08[59,09-79,39]μg/L), pro-BNP (54,86[49,08-10,655]pg/mL, CRP(28,86-48,09]μg/dL), p = 0.03, < 0.001, p = 0.04 respectively.In the univariate analysis each one marker was associated with the occurrence of the primary endpoint at 3 months (odds ratio: 1.9 [1.1-2.1], p = 0.002). This relationship remained in the multivariate analysis (OR 1.5 [1.2-2.1], p = 0.009).

P1635
Is there any difference between the new three groups of heart failure? A single center experience.
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1Hospital Center Churruca-Visca, Buenos Aires, Argentina

Background: In 2016, the new European guidelines differentiate 3 groups in heart failure, those with ejection fraction (EF) over 50%, those between 40 and 49% and those with less than 40%. We analyzed if the middle group has any special difference between the others in our particular population.

Method: It is a prospective analysis of 474 patients admitted for decompen-sated heart failure, consecutively in our Cardiology Department, from June 2012 to November 2016, with a median follow up of 26 months (Q1 13 - Q3 33). We divided 3 groups (G) according to their EF; G1 >39% (206 p), G2 40-49% (61 p) and G3 ≥50% (122 p). Quantitative variables with normal distribution were expressed with medium and with standard deviation (analyzed by test Fisher’s Test); those with not normal distribution, were expressed with median (m) and quartiles (analyzed by Maren Whitney’s Test). Dichotomous variables were analyzed by Chi2.

Results: We observed the same median age between G1 and G2, but differences statistically significant (DSS) between G2 and G3 (p = 0.005), with same amount of older ≤75 years old in G1 and G2, but bigger with G3, and no DSS in gender. The main data found was there were no DSS between G in hospital follow up, but there were DSS between G2 and G1 in rehospitalization (p = 0.035, G1 25.5% vs G2 12.3%), but not with G3. The intermediate group appears to be similar to G1 in cardiovascular risk factors, previous infarction, clinical presentation, treatments and etiology of myocardopathy. On the other hand, G2 is similar to G3 on hematocrit, renal function, the presence of LBBB, RBBB and treatment. The differences observed between G2 and G1 were the cause of decompen-sation (progression, p = 0.01 -G1 18.4% vs G2 5%-, and arrhythmias, p = 0.0482 -G1 10.2% vs G2 22%), the presence of hyperbilirubinemia (p = 0.001, G1 60.3% vs G2 41.7%), hyperthyroidism (p = 0.0000, G1 13.3% vs G2 22.2%) and LBBB (p = 0.042, G1 36.3% vs G2 16.7%). The ones between G2 and G3, were age (p = 0.0059, G2 70 years old vs G3 77 years old), diabetes (p = 0.0262, G2 38.3% vs G3 23.8%), history of infarction (p = 0.0092, G2 31.1% vs G3 14.8%), etiology (diferent to ischimic or valvular, p = 0.043, G2 13.1% vs G3 26.2%) and presence of sinus rhythm (p = 0.048, G2 64.4% vs G3 48.8%). None of the G had DSS in presence of previous devices, renal clearance, use of mechanical ventilation or non-invasive one and renal evolution.

Conclusions: We observed that in our population, patients with intermediate EF, 40-49%, are similar to both G in some characteristics, but on the evolution, they behave like those with normal EF.

We think we should compare both extremes into G2 (those near EF<41% and those near 49%), but our sample is still too small.
P1637  
**Impact of community-acquired pneumonia on prognosis of patients with acute decompensated heart failure.**

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**Introduction:** Community-acquired pneumonia (CAP) is a factor that has to be taken into consideration when evaluating the prognosis of patients with acute decompensated heart failure (ADHF). NIS cohort (USA 2001-2009) showed pneumonia like most frequent comorbidity in patients with ADHF.

**Purpose:** evaluate CAP on prognosis of patients with ADHF

**Methods:** In one-year period, was analyzed 852 medical records of patients hospitalized for ADHF.

**Results:** the prevalence of CAP among patients was 16.5% not age depending. Patients having decompensated heart failure and CAP had a longer hospitalization period (13.1 vs 11.9 days; p = 0.008), higher risk of readmission to hospital (OR 1.9; p = 0.02) and higher hospital mortality (OR 13.5; p = 0.001). The mortality at the first day of hospitalization was significantly higher when HF is associated with CAP. During one-year follow-up, the combination of ADHF and CAP makes the risk of death higher (OR 4.8; p < 0.001).

**Conclusion:** CAP is a factor worsening the one year prognosis and hospital prognosis of patients with acute decompensated heart failure.

<table>
<thead>
<tr>
<th>Variable</th>
<th>CAP - %</th>
<th>CAP + %</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male sex, %</td>
<td>57.3</td>
<td>38.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cardiogenic pulmonary edema</td>
<td>17.9</td>
<td>31.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>1.4</td>
<td>5.6</td>
<td>0.88</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>17.1</td>
<td>20.2</td>
<td>0.41</td>
</tr>
<tr>
<td>Bronchial asthma</td>
<td>3.0</td>
<td>1.6</td>
<td>0.38</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>2.2</td>
<td>4.0</td>
<td>0.24</td>
</tr>
<tr>
<td>COPD</td>
<td>1.6</td>
<td>0.8</td>
<td>0.50</td>
</tr>
<tr>
<td>H. mortality in group 50-59 years old</td>
<td>0</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>H. mortality in group 60-69 years old</td>
<td>1.9</td>
<td>28.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H. mortality in group 70-79 years old</td>
<td>1.6</td>
<td>27.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H. mortality in group 80-89 years old</td>
<td>5.1</td>
<td>30.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hospitalization period</td>
<td>11.9</td>
<td>13.1</td>
<td>0.009</td>
</tr>
<tr>
<td>Readmission to hospital</td>
<td>30.4</td>
<td>45.6</td>
<td>0.02</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>2.7</td>
<td>27.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>First day hospitalization mortality</td>
<td>1.1</td>
<td>12.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>One year mortality</td>
<td>19.9</td>
<td>54.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

P1639  
**Deterioration of renal function does not condition poor prognosis in acute decompensated heart failure patients with previous insufficiency**

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**Background:** renal insufficiency is one of the main prognostic factors in heart failure (HF). However, the prognostic value of worsening renal function during episodes of HF decompensation is controversial.

**Purpose:** the aim of this study is to analyse the rate of renal function impairment during acute HF episodes and its impact on prognosis depending on previous renal function.

**Material and Methods:** we analysed 150 consecutive patients (mean age 69.9 years, 61% men) admitted to a cardiology service for acute decompensated HF, 54 with previous HF hospitalization (36%), 116 with hypertension (HTN) (77%); 69 diabetic (DM) (46%); 140 class II or IV NYHA (93%), and 42 ischemic cardiomyopathy (28%), with mean left ventricular ejection fraction (LVEF) 42.9%. We classified the patients into two groups based on the glomerular filtration rate (MDRD) ≥ 60 or < 60 mL/min/1.73m2. Worsening of renal function was defined as the occurrence of both a > 25% and a > 0.3 mg/dL increase in serum creatinine from admission.

**Results:** 89 patients had MDRD ≥ 60 mL/min/1.73m2 and 61 patients had MDRD < 60 mL/min/1.73m2. When we compared the two groups we found that patients with MDRD < 60 mL/min/1.73m2 had more frequently previous HF hospitalization (49.5% vs 29.0%, p = 0.036), were less frequently treated with ACEIs/ARBs (82% vs 94%, p = 0.016), betablockers (70.2% vs 84.3%, p = 0.043), mineralocorticoid receptor antagonists (78.7% vs 91%, p = 0.013), and more frequently treated with hydralazine (4.9% vs 0%, p = 0.035). Also they have lower levels of haemoglobin (12.6 ± 1.9 vs 13.5 ± 1.8 g/dL, p = 0.007) and higher levels of NT-proBNP (7822.86 ± 8448.81 vs 3474.45 ± 3966.87 pg/mL, p < 0.001).

Age, sex, history of hypertension, diabetes, NYHA III-IV class, ischemic cardiomyopathy and left ventricular ejection fraction were no statistically different between the two groups.

During the hospitalization worsening of the renal function was observed in 49 patients (32.7%): 16 (26.2%) in the group with MDRD < 60 mL/min/1.73m2, and 33 (37.1%) MDRD ≥ 60 mL/min/1.73m2 (p = 0.164). After a mean follow-up of 18.3 ± 6.9 months, 54 (36%) patients had an event (exitus or HF readmission). In the MDRD < 60 mL/min/1.73m2 group, 30 patients (49.1%): 9 out of 16 (56.2%) who suffered worsening of renal function and 21 out of 40 (52.4%) did not have an event. On Kaplan-Meier curves, and log rank test showed that these differences were only statistically significant in MDRD > 60 mL/min/1.73m2 group (p = 0.041) (Figure 1).

**Conclusions:** Worsening of renal function is not associated with poor prognosis in acute decompensated heart failure patients with previous renal insufficiency.

**On behalf of:** the GREAT network

**Introduction:** Acute right ventricular (RV) failure is a complex clinical syndrome which has been poorly studied worldwide. So far just few data have been published on the incidence and characteristic of the RV dysfunction including its association with clinical outcomes, functional parameters of left ventricle (LV) and co-morbidities.

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Purpose: To evaluate the association of longitudinal RV systolic dysfunction (RVSD) with 1-year rehospitalisations and deaths in patients with acute dyspnea: to study clinical findings and co-morbidities typical for patients having RVSD.

Methods: Prospective multicentre observational cohort study enrolled consecutive patients admitted to the emergency department in two university hospitals with acute dyspnea due to decompensated heart failure, exacerbation of chronic obstructive pulmonary disease, pneumonia, pulmonary embolism and other conditions. Demographic, clinical, echocardiographic data, co-morbidities and clinical outcomes of 307 patients were included in the analysis. Echocardiography was performed during the first 48 hours after the presentation to the hospital. The longitudinal RVSD was defined by reduced tricuspid annular plane systolic excursion (TAPSE) of <17 mm. Rehospitalisations and deaths were assessed after 1-year follow-up period. For statistical analysis Mann Whitney U and Pearson Chi-Square tests were used. P-value < 0.05 was considered statistically significant. Kaplan-Meier curves illustrate the survival analysis.

Results: In analysed cohort mean age was 69.1 ± 12.3 years and 189 pts (61.56%) were female. The first (I) study group consisted of 166 (54.1%) patients with longitudinal RVSD; in the second (II) group 141 (45.8%) patients had normal RV longitudinal function (TAPSE ≥ 17 mm). Rehospitalisations and deaths in 1-year follow-up period occurred significantly more often in the group with longitudinal RV dysfunction than in group II: 37 (15.0 %) vs. 14 (5.7 %), (p = 0.022) and 11 (4.4 %) vs. 3 (2.5 %) (p = 0.029), respectively. (Fig. 1).

Conclusions: Patients with acute dyspnea and longitudinal RV dysfunction demonstrated significantly worse clinical outcomes with higher rate of rehospitalisations and deaths during 1-year follow-up, more severe LV dysfunction and unfavourable clinical profile.

P1640 Utility of bio-adrenomedullin (bio-ADM) and penKidephalin (penKid) in evaluating congestion grading and acute kidney injury in patients admitted for acute heart failure

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Background: Bio-Adrenomedullin (bio-ADM) and PenKid (penKid) have already proved to be good predictors of short-term mortality and worsening renal failure respectively in patients with acute heart failure (AHF). No data are available so far on the utility of the combination of the two biomarkers in detecting congestion, acute kidney injury (AKI) and in-hospital mortality.

P1641 Acute myocardial infarction of complicated with heart failure in women

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1 J.F. Cabral Cardiology Institute, Comelites, Argentina

Objective: To evaluate clinical characteristics and hospital evolution in women with acute myocardial infarction complicated by HF

Material and method: Prospective, observational study of of 328 patients with acute myocardial infarction admitted to the ICU of the Institute of Cardiology of Comelites, between August 1, 2012 and May 2014 within 24 hours of onset of symptoms, 91 pts were female, of which 22% had HF, representing group I: women with HF, and the remaining Group II. Group 1 (women with HF, 22%) and the remaining conform Group 2. Both groups were different in age (71.2 ± 10 vs. 68.8 ± 11 years, p = 0.017), diabetes (50 vs 23.9%, p = 0.024), obesity (23.1 vs 16.2%, p = 0.04), cholesterol at admission (164.5 ± 54 vs 144.7 ± 25 mg/dl, p = 0.029), previous location (50 vs 29.4%, p = 0.012) and males (40 vs 11.3, p = 0.003). There were no differences regarding the use of angiotensin (90.5 vs 92.6%, p = 0.40) and primary angioplasty (39.4 vs 41.7%, p = 0.10). Group 1 had more frequent death (35 vs 28.8%, p < 0.001), pulmonary oedema (28.3 vs 1.2%, p < 0.001), BCR (10.5 ± 2%, p = 0.008), Ventricular atrial block complete (25 vs 2.8%, p = 0.01), more invasive procedures such as hemodynamic monitoring (18 vs 6.1%, p = 0.01) and mechanical ventilation (4 vs 1.4%, p = 0.009), were more need Cardio-defibrillator (4.6 vs 0.6%, p = 0.32). Ejection Fraction was different in both groups (45 ± 18 vs 59 ± 12, p < 0.001). At admission were predictors of development to Heart Failure: anterior location (OR=3.15, 95% CI 1.5-7.5, p = 0.002), and diabetes (OR=2.8, 95% CI 1.2-7.1, p = 0.023).

Conclusions: Women with acute myocardial infarction who develop HF are older, more obesity, had more frequency of diabetes, in spite of being treated in an invasive form in a similar way had worse in-hospital evolution. Anterior location and diabetes were independently predictors was development to HF.
**Background:** It is the question of gender differences in laboratory parameters in patients with myocardial infarction with acute heart failure and outcomes.

**Methods:** In a study of 135 patients with acute heart failure included - 56 women aged 74.4 ± 8.9 years and 79 men 59.6 ± 13.1 years. 52% men and women had inferior myocardial infarction. The levels of laboratory parameters have been analyzed: blood urea, creatinine, transaminases, cholesterol, low-density lipoproteins, prothrombin by Quick, thrombin time, the acid-base balance.

**Results:** Women with acute heart failure had significantly higher levels of aspartate transaminase, serum creatinine, low-density lipoprotein cholesterol. Men with acute heart failure had significantly higher levels of total bilirubin, activated partial thromboplastin time, thrombin time. In the group of women with acute heart failure was 6 deaths (10.7%). In the group of men with acute heart failure were 3 deaths (3.8%). Regression analysis showed no relationship between the studied parameters and outcomes with the exception of age.

**Conclusion:** In patients with myocardial infarction with acute heart failure there are some gender differences in biochemical parameters, but they do not affect the outcomes. The main factor of poor prognosis of patients with myocardial infarction with acute heart failure is age.

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**P1645**

**High-dose loop diuretics at discharge is associated with cardiovascular mortality in patients with heart failure**

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1Showa University Northern Yokohama Hospital, Division of cardiology and cardiac catheterization laboratories, Yokohama, Japan

**Background:** Few studies have reported on the impact of high-dose loop diuretics at discharge on prognosis in Japanese patients with heart failure (HF).

**Purpose:** Our purpose was to assess the relationship between loop diuretic dose at discharge and cardiovascular mortality in patients with HF.

**Methods:** We enrolled decompensated HF patients who were admitted to our hospital between April 2010 and March 2015. High loop diuretic dose was defined as a dose of oral furosemide at discharge. We compared HF patients that were received high-dose loop diuretics at discharge (HL group) with low-dose loop diuretics at discharge (LL group) with regard to risk of cardiovascular mortality, all-cause mortality, and the rate of readmission due to HF.

**Results:** A total of 301 patients with HF were admitted to our hospital. We excluded 13 patients who died during hospitalization and 73 patients who did not receive loop diuretics at discharge. The median follow-up duration was 631 days. Cardiovascular mortality was significantly lower in the LL group than in the HL group (2.3% vs. 25.0%, P < 0.001). In patients with STEMI Killip class can be predicted with variables included from January 2010 to April 2015. Multivariate analysis was performed to determine independent predictors of Killip Class I.

**Conclusion:** High-dose loop diuretics at discharge is associated with cardiovascular mortality in patients with HF.

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**P1646**

**Predictors of high Killip class after ST segment elevation myocardial infarction in the era of primary reperfusion**

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**Background/Introduction:** Primary percutaneous coronary intervention (PCI) has improved outcomes after ST segment elevation myocardial infarction (STEMI), but patients with high Killip class still have a poor prognosis, and those ≥ II benefit from a closer monitoring in a specialized cardiac care unit.

**Purpose:** We aimed to determine the predictors of Killip class in a group of patients admitted for acute STEMI.

**Methods:** Patients were consecutively included from January 2010 to April 2015. Multivariate analysis was performed to determine independent predictors of high Killip Class.

**Results:** From 1111 patients, 230 (20.7%) were in class II or higher. Mean age was 64.0 ± 14.0 years and 853 (76.8%) were male. Primary PCI was performed in 991 (88.2%), and 120 (10.8%) only received thrombolysis as acute reperfusion therapy. Independent predictors of high Killip class are depicted in Table 1. In-hospital mortality increased with Killip class (I, 5.3%; II, 16.7%; IV, 36.7%).

**Conclusion:** In patients with STEMI Killip class can be predicted with variables available at the time of presentation and is strongly associated with in-hospital prognosis.

**Independent predictors of Killip Class≥II**

<table>
<thead>
<tr>
<th>Killip I, N (%)</th>
<th>Killip I, N (%)</th>
<th>OR (95% CI)</th>
<th>P value Cox</th>
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<tr>
<td>Killip II, N (%)</td>
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**Previous medical history**

- **Age:** > 65 years 365 (41.4) 152 (66.1) 2.1 (1.4-3.3) < 0.001
- **Female sex:** 180 (20.4) 78 (33.9) 1.6 (1.1-2.2) 0.017
- **Diabetes:** 166 (18.8) 72 (31.3) 1.4 (1.0-2.1) 0.05
- **History of heart failure:** 13 (1.5) 20 (8.7) 3.2 (1.4-7.3) 0.006
- **Chronic kidney disease:** 46 (5.2) 35 (15.2) 2.0 (1.3-3.6) 0.016
- **Anemia:** 108 (12.3) 74 (33.0) 3.0 (2.0-4.5) < 0.001

**At presentation**

- **Anterior location:** 324 (36.9) 127 (55.7) 2.4 (1.8-3.4) < 0.001
- **< 1 vessel disease:** 353 (40.2) 129 (56.6) 1.6 (1.1-2.2) 0.008
- **>2 hours of evolution:** 565 (64.4) 176 (77.2) 1.6 (1.1-2.4) 0.01
- **TIMI < 3:** 739 (84.0) 206 (90.4) 1.8 (1.2-2.7) 0.004
- **Ventricular fibrillation:** 13 (1.5) 32 (14.0) 4.7 (2.8-7.8) < 0.001
- **LVEF < 45%:** 148 (16.9) 129 (57.3) 4.6 (3.1-6.7) < 0.001

**OR:** Odds Ratio; CI: Confidence Interval; LVEF: Left Ventricular Ejection Fraction; Chronic kidney disease: glomerular filtration rate <60 mL/min; Anemia: haemoglobin <12 g/dL in women and 13 g/dL in men.

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Results: Finally, data from 137 patients including 102 HF and 35 non-HF were analyzed. HF patients had significantly lower serum amylase [interquartile range, 54 [33]-133 IU/L versus 68 [21]-151 IU/L, P=0.001] and lipase [25 [21]-141 IU/L versus 31 [16]-18 IU/L, P=0.018] as compared with those without non-HF causes. Multivariable regression analysis in HF patients showed that the significant independent correlates of the lower amylase level were lower blood urea nitrogen (BUN) [coefficient, 0.552; P<0.001] and albumin [coefficient, 0.233; P=0.020] levels, greater uric acid [coefficient, -0.328; P=0.001] and B-type natriuretic peptide (BNP) [coefficient, -0.227; P=0.024] levels, and that the significant independent correlates of the lower lipase level were the presence of atrial fibrillation [coefficient, 0.254; P<0.011], the lower BUN level [coefficient, 0.377; P<0.001] and the greater BNP level [coefficient, -0.364, P = 0.001].

Conclusion: These findings suggest that HF patients may be suffering from exocrine pancreatic insufficiency in association with the severity of congestion, which may affect malnutrition.
Results: The average age of our patients was 42 ± 18 years. A male predominance was noted with a sex ratio of 2.14. Heart failure complicating infective endocarditis of native valve had occurred in 66 cases (77.6%). The preexisting valvar heart disease was the main underlying observed in 38 patients (44.7%). On admission, 59 patients (69.4%) were in heart failure and heart regurgitation occurred in 29 cases 34.1%. The gateway was suspected in 66 patients (32.9%); the most frequently found was dental in 28 patients (32.9%). The multivariate study of predictors of heart failure occurred identified the following factors: the affected aortic valve, the presence of vegetation, the presence of Staphylococcus aureus and prosthesis disinsertion. Besides antibiotic treatment, 56 of our patients underwent surgical treatment with an average of 24.8 days. The indication for surgery was hemodynamics in 46 cases and septic in 10 cases. The total mortality in our registry was 19.6%, but higher in the group with heart failure (28.2%) with a significant difference p = 0.011. The realization of a multivariate analysis of independent determinants of mortality of infective endocarditis complicated by heart failure group concluded the significant influence of anemia (OR = 5, 95% CI = 0.8- 27; p = 0.06), Staphylococcus aureus (OR = 5, 95% CI = 0.8 to 29.8; p = 0.07) and the protective role of surgery (OR = 0.15, 95% CI = 0.05-0.40).

Conclusion: Our results support the conclusion that heart failure remains an independent predictor of hospital mortality at 1 year. It is more common in infective endocarditis complicated by heart failure group associated with severe regurgitation. Early surgery is associated with reduced mortality and should be widely considered to improve results.

P1650
Multimodal systolic index is an independent predictor of acute heart failure and in-hospital mortality in patients with ST-segment elevation myocardial infarction

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Introduction: Acute heart failure (AHF) and cardiogenic shock (CS) demands a dreadful fulfillment of ST-segment elevation myocardial infarction (STEMI). In these patients, a modified shock index (MSI) ≥ 1.3 have been associated with higher mortality rates and AHF. Our study aims to assess the predictive value of MSI ≥ 1.3 for AHF, in-hospital mortality and 1-year mortality and hospitalization rate in patients admitted with STEMI.

Methods: Retrospective, descriptive and correlational study with all patients admitted with a STEMI in a Cardiology department between the 1st of October 2010 and 31st of August 2015. The baseline characteristics and hospitalization data of patients with MSI (heart rate / mean arterial pressure) ≥ 1.3 were compared to patients with a MSI ≤ 1.3. The 1-year follow-up was made through phone call by a Cardiologist. We performed a univariate and multivariate statistical analysis of in-hospital mortality, mortality and hospitalization rate at 1-year using SPSS.

Results: A total of 1478 patients were included, 1138 (77%) were men with a mean age of 63.93 ± 13.39 years. A MSI ≥ 1.3 was present in 96 (6.5%) patients and was more common in females (10.9% vs 5.2%, p < 0.01) and older patients (65.6 vs 63.8 years, p < 0.02). It was also associated with diabetes mellitus, past history of stroke and dementia.

On admission, patients with a MSI ≥ 1.3 had more frequently an anterior MI (71.9% vs 41.1%, p < 0.001), atrial fibrilation (17.7% vs 4.1%, p < 0.001), a Killip Class ≥ 2 (49% vs 8.3%, p < 0.001) or CI (29.2% vs 1.7%, p < 0.01) and lower hemoglobin levels (13.3 vs 14.1, p < 0.001).

Patients with a MSI ≥ 1.3 had lower left ventricular ejection fraction (43.95% vs 56.46%, p < 0.001), more malignant arrhythmias (6.3% vs 1.6%, p < 0.01), and less corona collateralization (74% vs 87.4%, p < 0.001) and percutaneous corona intervention (87.7% vs 82.2%, p < 0.001). They had more frequently left main occlusion (3.1% vs 0.5%, p < 0.001). There was no relation between a MSI ≥ 1.3 and other coronary artery disease.

These patients were more frequently treated with invasive mechanical ventilation (14.6% vs 3.0%, p < 0.001) and non-invasive ventilation (6.3% vs 0.7%, p < 0.001).

Regarding outcomes, a MSI ≥ 1.3 was strongly associated with in-hospital mortality (28.1% vs 14.4%, p < 0.001) and death at 1 year (12.8% vs 7.1%, p = 0.015) or hospitalization (40.9% vs 27.2%, p < 0.001).

Multivariate statistical analyses, a MSI ≥ 1.3 was a strong independent predictor of AHF at admission or during hospitalization (OR 3.66, 95% CI 1.7-8.1, p = 0.001) and in-hospital mortality (OR 4.48, 95% CI 1.8-11.1, p < 0.001).

Conclusion: In our study, a MSI ≥ 1.3 was a strong independent predictor of AHF and in-hospital mortality among STEMl patients, although it was not associated with 1-year outcomes. It is an easily accessible tool that can help identify more critical patients and monitor them more closely during hospitalization.

P1651
Hypertonic saline solution in the management of severe decompensated heart failure in the elderly

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Introduction: Low plasma sodium level is frequent in heart failure and is a marker of bad prognosis. Its treatment with hypertonic saline solution has been proposed in previous studies.

Aim: In this study, we compared the outcomes of low plasma sodium level associated with heart failure treated as usual or using hypertonic saline.

Methods: This is an observational, retrospective and single centre study from 2013 to 2015. We included patients admitted for heart failure with low plasma sodium level at entry or treated with hypertonic saline solution during hospitalization.

Results: 167 patients (78 years; 45% of women) were included: group 1 (n = 156 usual care), and group 2 (11 patients treated with hypertonic saline solution). Group 2 patients had a higher BNP and a worse kidney function. Hypertonic saline solution normalized plasma sodium level (137 ± 7 mmol/L vs. 129 ± 3 mmol/L; p < 0.001), decreased body weight (median 73 kg vs 80 p < 0.001). Compared to group 1, group 2 patients had a prolonged length of in-hospital stay (31 days vs. 10 days).

Conclusion: Our study does show a benefit of the hypertonic saline solution to rapidly correct sodium level, with kidney function preservation. It underlines the bad outcomes associated with low plasma sodium level. A large-scale randomized controlled study should be realized to conclude.
Liver function tests in patients admitted with acute decompensated heart failure

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Background: Episodes of acute decompensated heart failure (ADHF) can affect multiple organs in an unfavorable way, which may have an adverse impact on outcomes. We aim to analyze the prevalence and implications of abnormal liver function tests (LFT) in patients during hospitalization for ADHF.

Methods: Retrospective study of 258 consecutive patients admitted in the emergency department for ADHF. The liver function tests included aspartate aminotransferase (AST) and alanine aminotransferase (ALT), which were evaluated during hospitalization (maximum values of AST and ALT) and at discharge. The cut-off values were those used by the central laboratory of our hospital (AST 15-37 U/L and ALT 17-50 U/L).

Results: The prevalence of abnormal LFT (above upper limit of normal for AST and ALT) was: during hospitalization AST 34.5%, ALT 14.3%; and at discharge AST 31.4%, ALT 15.1%. Abnormal LFT during hospitalization were associated with a higher risk of in-hospital death (12.4 vs. 0.8%, \( p < 0.001 \)) for AST, 13.5 vs 3.8% (\( p = 0.001 \)) for ALT. Patients with abnormal ALT during hospitalization were also at a higher risk of admission to the intensive care unit (29.4% vs 13.4%, \( p = 0.006 \)).

Conclusions: Abnormal LFTs are frequent in ADHF during hospital stay and predict worse outcomes, probably in association with a state of more severe hypoperfusion and signs of acute decompensated HF. This is the most frequently sings of acute decompensated HF in current clinical practice.

Heart rate reduction and diastolic function in patients with decompenated systolic heart failure and left bundle branch block

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Background and purpose: Patients with systolic heart failure and left bundle branch block (LBBB) have more severe diastolic dysfunction than patients without LBBB. Recent experimental studies have suggested that increased heart rate aggravates diastolic dysfunction in patients with LBBB. The purpose of the present study was to evaluate the effect of heart rate reduction on diastolic function in patients with decompenated systolic heart failure and LBBB.

Methods: This prospective study recruited 50 consecutive patients admitted for decompenated heart failure, with left ventricular systolic dysfunction, heart rate > 70 bpm under guideline medical therapy, in whom heart rate reducing therapy with ivabradine was initiated. Patients were divided into 2 groups: group 1 (n = 25) with LBBB and group 2 (n = 25) without LBBB. For both groups echocardiography was recorded at baseline and after 6 months of ivabradine therapy. Parameters of diastolic function (mitral E velocity, E/A ratio, e’ velocity, E/e’ ratio, E deceleration time) were assessed and compared for both groups. Clinical characteristics and concomitant heart failure therapy were also assessed in both groups. Statistics: data were expressed as mean \pm standard deviation or median (interquartile range).

Results: Mean age of HF population was 67 ± 12 years. Comorbidities were CAD, previous MI, hypertension, diabetes, COPD and chronic renal disease in 68.6%, 55.3%, 60.1%, 41.9%, 29.9% and 35.9% of the cases respectively, 24.7% had atrial fibrillation. Mean EF was 25.4 ± 7.9%, NYHA III-II, LV EF < 40% and >18 years of age who were receiving contemporary guidelines recommended therapy were included in the analysis and HF patients’ clinical characteristics, background therapy and signs and symptoms have been evaluated.

Conclusions: Heart rate reduction with ivabradine improves diastolic function in patients with decompenated systolic heart failure and LBBB.
percentages, comparisons between baseline and follow-up data were done with Student’s paired and unpaired test.

**Results:** Mean age was 64 ± 13 years in group 1 and 57 ± 11 years in group 2, heart rate at baseline was 88 ± 9 bpm in group 1 and 90 ± 9 bpm in group 2 (p = 0.4). After 6 months heart rate decreased to 69 ± 12 bpm in group 1 and 73 ± 10 bpm in group 2. Echocardiographic changes of diastolic function parameters in both groups of patients are illustrated in the table below. Concomitant heart failure therapy was similar in both groups. Mean natriuretic dose at 6 months was 11 ± 3 mg/day in group 1 and 10.8 ± 3 mg/day in group 2 (p = 0.6).

**Conclusion:** In patients with decompensated systolic heart failure, LBBB and sinus rhythm, heart rate reduction with natriuretic seems to improve diastolic function at 6 months.

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**P1657**

**Asymptomatic left ventricular dysfunction is a predictor of short and long-term among patients with myocardial infarction in southeast Asia:** Is there a difference between gender? J. Jakin Kewcharoen1; V. Kittipibul2; P. Sutthi1; V. Lertsuwanwadi1; B. Sirimahachai1; A. Ariyachapanich1

**Background:** Decreased left ventricular ejection fraction (LVEF) is associated with worse outcomes in patients with ST-elevation myocardial infarction (STEMI). However, little is known about this association in developing countries.

**Purposes:** The aim of the study was to evaluate the impact of LVEF on mortality rate in patients undergoing primary percutaneous coronary intervention (PCI) and its differences between gender.

**Methods:** We conducted a retrospective study of all patients with a diagnosis of STEMI who underwent primary PCI at a tertiary care hospital in Thailand from January 2011 to December 2015. Patient characteristics, treatments, and outcomes were gathered. T-test, and Chi-square were used to analyze.

**Results:** A total of 795 patients (mean age 60.2 ± 13.6 years, 74.8% male, 55.4% hypertension, 30.8% diabetes mellitus and 70% dyslipidemia) were included. Mean LVEF was 50 ± 13%. The LVEF was ≥50%, 35-49% and < 35% in 53.4%, 33.1% and 13.4% of patients. The 30-day mortality rate was higher in patients with LVEF between 35-49% and < 35% (Odds ratio 2.3 and 8.4, p = 0.02 and < 0.001, respectively). There were also statistically significant higher 6-month and 1-year mortality rates in patients with lower LVEF. At baseline, the LVEF was not different between male and female (49.7 ± 1.7 vs 50.9 ± 1.4, p = 0.30). LVEF < 35% was associated with 30%-6-month and 1-year mortality in both male and female patients (p < 0.05 for all).

**Conclusions:** In this single center experience, LVEF appeared to be a predictor of short-term and long-term outcomes among patients with STEMI who underwent primary PCI in Thailand. The effect of LVEF on mortality rate was relatively the same between gender.

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**P1658**

**Clinical features of patients with heart failure with very reduced ejection fraction (HFrEF):**

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**Purpose:** At present the diagnostic criteria of Heart Failure include patients with Left Ventricular Ejection Fraction (LVEF) < 30%. But in our unit we detected a population with very low ejection Fraction (< 25%) (HFrEF). The principal purpose is to describe a patients with HFrEF.

**Material and method:** We analyzed consecutively Mexican patients from Heart Failure Clinic of the Instituto Nacional de Cardiología. All over 18 years old, both genders with clinical, laboratory and Imaging Diagnosis according 2016 European and AHA-ACC clinical guidelines. Both groups based on LVEF criteria: HFrEF: LVEF < 25% and HFrEF: LVEF > 25% - 40%. We determine retrospectively: Natural History, Clinical characteristics, follow-up from diagnosis, pharmacological treatment, hospitalizations and re-admissions. For statistical difference we declare p value equal or less than 0.05.

**Results:** According criteria, we describe 109 patients with HFrEF and 131 with HFrEF. HFrEF ranges were 8% - 25%. Both groups were homogeneous in: General characteristics, Gender, Obesity Rate, Sinus rhythm, Diabetes, Hypertension, Dyslipidemia, Smoker History, Myocardial Infarction and BMI. More Valvular Heart disease patients were seen in HFrEF group. Transplant and LVAD program were not available for patients.

**Mean follow-up:** HFrEF : 5.80 ± 0.63 years (2mo-17.56 y) vs HFrEF: 6.16 ± 0.78 years (3mo-18.53), observing annualized re-hospitalization rates 18.34% vs. 11.80 (OR 1.68; p<0.05). Admissions to Emergency Room (greater than 2) were more frequent in HFrEF group 5.50% vs. 3.47%. Also in HFrEF group compared to HFrEF group, a higher event rate was observed at follow up in: Renal Failure (3.87% vs. 1.38%), Dyskinesia (1.83% vs. 0.69%), PCI/CA (1.92% vs. 10.42%) and CABG (1.83% vs. 0.96%). According with new recommendations of 2016 guidelines our therapeutics pattern included: Sacubitril/Valsartan (HFrEF 16.51% vs HFrEF 6.94%) and Ixabepilone (HFrEF 3.67% vs HFrEF 2.08%).

**Conclusions:** Of our experience we propose Heart Failure Group with Very Low ejection Fraction. Observed under exclusively pharmacological treatment for a mean period of 5.80 years. We determined a higher index of clinical events. We suggest the need to evaluate long-term clinical characteristics such as the new therapeutic strategy.

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**P1659**

**Heart failure with mid range ejection fraction (HFmrEF): a retrospective observational study in a single centre in the eastern province of Saudi Arabia**

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**Background:** The recent ESC/HFA heart failure guidelines have introduced a new suggested classification, where patients are divided into three categories: heart failure with reduced Ejection Fraction (HFrEF), preserved EF (HFpEF), and mid range EF (HFmrEF). The new entity described as HFmrEF includes patient with an EF between 40% and 49%. There is scarcity of research describing this cohort of patients. To better understand this particular patient population, we have analyzed all the heart failure patients in a single center in the Eastern Province of Saudi Arabia who qualify as HFrEF.

**Methods:** Retrospective observational study looking at consecutive patients with heart failure who had an echocardiogram done between January 1st and December 1st 2015 with an ejection fraction quantified between 40% and 49%. Demographic data of those patients were collected along with their comorbidities, risk factors, and anti-failure therapies, if any.

**Results:** 384 patients with HFrEF were identified. 52.58% were males. Out of 348 patients, 146 were diabetic, constituting 41.96% of the total population. The majority of the patients, 71.26% of the cohort, were hypertensive. 40.51% had renal impairment, defined by an eGFR < 60, 41.07% of the patients had received cardiotoxic cancer therapies and were labeled as chemo-induced cardiomyopathies. With regards to medications, 61.20% were on IGB, 56.80% were on ACE-I/ARB, and 18.39% were on MRA. 43.1% were on diuretic therapies and were labeled as chemo-induced cardiomyopathies. The majority of the patients that were on anti-failure therapies were those with a lower EF ranging between 40-44%.

**Conclusion:** We present our descriptive data of patients with HFrEF in a single institution in the eastern province of Saudi Arabia. The sample might not be representative as our center is a tertiary cancer and renal transplant facility that may account for the large prevalence of chemo-induced cardiomyopathy and renal impairment. Interestingly, the patients with EF of 40-44% are the ones that are predominantly receiving the conventional anti-failure therapies and treated in a similar fashion to HFrEF patients. Further follow up studies are needed to assess their outcomes.
A systematic review of clinical prediction rules for the diagnosis of chronic heart failure in the community and their validation in a novel cohort

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Background: Early diagnosis of heart failure in the community may be hampered by lack of access to diagnostics. Clinical prediction rules, which have been included in diagnostic guidelines, may help rationalise access to diagnostics for those who are most likely to have heart failure.

Purpose: This study sought to review the literature for clinical prediction models for the diagnosis of patients with heart failure in the community. It also sought to validate the models in a novel cohort of patients with a suspected diagnosis of heart failure referred to a rapid access diagnostic clinic from the community.

Methods: MEDLINE and EMBASE were searched from 1946 to Q2 2016 followed by hand searches of retrieved reference lists, and consultation with experts in the area. Studies were eligible if they contained at least one multivariable model for the diagnosis of chronic heart failure. Studies relating to acute heart failure were excluded. We also sought to validate the models in a novel cohort of patients with a suspected diagnosis of heart failure referred to a rapid access diagnostic clinic.

Results: In total, 5,055 articles were identified with nine articles subsequently meeting the eligibility criteria. Three models had undergone internal validation and four had undergone external validation. No clinical impact studies have been completed to date. Area under the curve (AUC) varied from 0.74 to 0.93. Four rules were validated in a novel cohort. AUC varied from 0.60 to 0.65 in the novel cohort for clinical models alone with AUC up to 0.89 in combination with ECG and BNP. The AUC for B-type natriuretic peptide (BNP) was 0.86 (95% confidence interval 83.3%-88.6%).

Conclusion: This review demonstrates that there are a number of clinical prediction rules relevant to the diagnosis of heart failure in the literature. Clinical impact studies are required to compare the use of clinical prediction rules and biomarker strategies in this setting.

Non-invasive monitoring of peripheral and cardiac influence on exercise limitation in patients with heart failure with preserved ejection fraction

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Background: We distinguish between HF with reduced ejection fraction (HFREF, LVEF <45%) and preserved EF (HFpEF; LVEF ≥45%) and echocardiographic evidence of diastolic dysfunction. HF in particular is the most common reason for elderly hospitalization and its prevalence is rising. Circulating endothelial cells (CEC) and endothelial progenitor cells (EPC) have been described as new non-invasive markers of endothelial damage. They are measureable in peripheral blood and correlate with other markers of endothelial function. Therefore, CEC and EPC can depict the presence and extent of vascular damage. Ability to estimate, quantify and observe changes in CEC and EPC levels reliably will open new doors in the screening, treatment and follow-up of patients with heart failure and other cardiovascular diseases.

However, uniform procedures to isolate and determine the number of CEC still have to be established.

Aim: We carried out a test-retest-study in which we applied the same method of estimating CEC levels twice and compared the results.

Methods: Endo-CEC was an observational trial in HFR EF patients, HFpEF patients, patients with diabetic nephropathy and patients with arterial hypertension. Blood samples were obtained from in total 101 patients and CECs and EPCs were determined in the peripheral blood from 25 HFpEF patients, 25 HFREF patients, 25 patients with diabetic nephropathy and 26 patients with arterial hypertension.

To evaluate the test-retest-reliability blood was taken at two points of time and CEC and EPC levels were estimated and expressed both in CEC/EPC per ml and as a percentage of peripheral blood mononuclear cells.

Results: Out of 101 patients included in this analysis, 25 had Diabetic nephropathy of which 21 (84%) were male and 4 (16%) were female, out of 25 HFpEF patients, 20 (80%) were male and 5 (20%) were female. In the group of HFREF patients, 15 (60%) were male and 10 (40%) were female while the group of arterial hypertension was evenly distributed with 14 (54%) men and 12 (46%) women.

Comparing the CECEPC and CEC/EPC levels of the visits, no correlation between the two visits could be detected (ICC CECEPC/ICC CEC/EPC 0.077; ICC CEC/EPC 0.19).

The intraclass correlation of EPC measurements was statistically significant in each group (EPC/ml: Arterial Hypertension: ICC=0.883; DiabNeph: ICC=0.894; HFpEF: ICC=0.865; HFREF: 0.904).

Conclusion: This method of determining the number of CEC via flow cytometry is not reliable to use as a prognostic marker or follow-up parameter for the treatment period of heart failure or diabetic nephropathy patients. Therefore, there is still need to enhance the method of measuring CECs by identifying disturbing factors or reasons.

As understanding and estimating the occurrence of CEC and EPC promise high potential for further treatment and supervision of heart failure and other diseases associated with endothelial dysfunction, there is absolute necessity to do further research.
VE/CO2 slope [HT: 29.8±4.1, HFpEF: 33.0±4.8, p=0.019]. Additionally, they covered a shorter distance in 6-MWT [HT: 538 ± 81, HFpEF: 470 ± 67cm, p=0.009]. Non-invasive monitoring of cardiac function shows us that the lower maximum cardiac index in HFpEF patients is not caused by reduction in stroke volume recruitment [HT: 151 ± 16, HFpEF: 176 ± 53, percentage of maximum stroke volume compared to minimal stroke volume, p= 0.036] but only by a reduced peak heart rate [HT: 81 ± 10, HFpEF: 71 ± 14 percent of predicted maximum heart rate, p=0.011]. HFpEF subjects were furthermore slightly but insignificantly limited peripherally, meaning in their arteriovenous oxygen difference (AVDO2) calculated using the Fick principle [HT: 134 ± 33, HFpEF: 121 ± 28, milliliters oxygen difference per liter blood flow per minute p=0.155]. When looking at the AVDO2 alone one finds that 57% of all HFpEF subjects had an AVDO2 below average, with only 33% of HT subjects respectively. The lowest AVDO2 values were all reached by HFpEF subjects while the highest values were reached by HT subjects.

Conclusion: NonCM during CPET can show that HFpEF subjects are both centrally and to a certain extent peripherally limited during exercise compared to HT subjects. This is why a combined CPET and NICOM assessment can be of use for monitoring HFpEF patients, either in interventional pharmacological trials.

Arterial stiffness indices in a chronic heart failure population: a comparison between preserved and reduced ejection fraction population

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Background: patients with heart failure with preserved ejection faction (HFpEF) have important reduction of arterial stiffness (AS) that may impair the left ventricle-arterial coupling.

Method: the population were outpatients met heart failure (HF) Boston Criteria, clinically stable, consecutively admited in a HF clinic, wich were dichotomized according to LV EF measured by echocardiography. AS indices were estimated by previously validated logarithmic equation from the measurement of blood pressure (BP) and heart rate (HR) (Karalis et al. 2013, Waterhouse. et al, 2012). The indices studied were: the central blood pressure (Central SBP); total vascular resistance (Vasc Res Total); BP augmentation and pulse wave velocity (PWV). To test the difference between the means was used the Student’s T test, and if P < 0.05 was considered statistically significant.

Results: 77 patients were included, mean age was 63.1 years old, 58% were males, and 52.2% were ischemic and 52% were NYHA class II. The HFpEF population had higher prevalence of hypertension (71.4% vs 93.1%, P=0.02). The indices central SBP and Total Vasc Res were significantly higher in patients with HFpEF.

Conclusion: In this preliminary analysis of our population of outpatients with heart failure we found out a the indices Central SBP and Total Vasc Res significantly higher in the group with HFpEF.

Lipids, oxidative stress and inflammation as sex-specific predictors of systolic left ventricular dysfunction in acute coronary syndrome

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Background: Antioxidant and lipid-lowering effects of estrogen are mechanisms for the resistance of women to atheroma growth. Oxidative stress and inflammation have sex-specific influence on acute coronary syndrome (ACS) prognosis.

Purpose: the study examined the relationship of lipids with oxidative, inflammatory markers and coronary disease severity in women and their significance as predictors for development of left ventricular systolic dysfunction after ACS.
Conclusion:

function was independent of the usage of statin therapy at baseline (men - 23.1% = 1.024-1.478; p = 0.027) and chronic (WBC OR 1.357; 95%CI 1.002-1.837; p = 0.049) corelation was noted in female patients. The recorded index of systolic function was independent of the usage of statin therapy at baseline (men - 23.1% vs 41.7%, p = 0.103; women - 17.5% vs 30.4%, p = 0.043).

Conclusion in ACS settings may have indirect specific role for myocardial damage through oxidative stress and inflammation. Inflammatory markers are characteristic for sex female predictors of acute and chronic systolic dysfunction.

P1667

Wearable defibrillator protected optimization of therapy and development of LVIF in newly diagnosed heart failure

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Introduction: Guidelines recommend that prophylactic defibrillator (ICD) implanta- tion in patients with newly diagnosed heart failure (HF) should be postponed after an intervention and a period of optimization of medical therapy. The wearable defibi- rillator (WS) offers arrhythmic protection during that time. Duration and efficacy of such a strategy is currently under discussion.

Method: We analyzed data of all patients who received a WD in the years 2014-2016 in our center (n = 141) for newly detected HF (mean LVEF 26 ± 11%) under further medical therapy only (n = 62) or an additional intervention (coronary stenting, bypass or valve surgery; n=79). Patients were re-evaluated at 1 and 3 month, or later and not referred if they were asymptomatic whatever time. Results: Mean wear time of the WD was 65 ± 39 days. Neither death nor any arrhyth- mias needing shock therapy was observed. In 72% of patients the LVEF increased >35% and 9% of patients had a LVIF in the remote period. LVEF increased similarly in interventional (> 53%) and medically treated patients (> 73%).

Discussion: Therapy can be safely optimized in newly diagnosed HF patients with reduced LVEF. ICD implantation can be omitted in the majority of these patients. The probability of a WD discharge seems to be low in this cohort.

P1668

Remote results of percutaneous coronary interventions at patients chd with reduced of the left ventricle contractility

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The purpose: to study clinical efficiency percutaneous coronary interventions and its influence on myocardial contractility at pts CHD with low left ventricle ejection fraction (LVEF) in the remote period (12-24 Mac) without estimate viability of the myocardium.

Materials and Methods: 1266 pts with various forms of CHD were included. At pts CHD with reduced of LV contractility the left ventricle PCI have been executed at 11.9% (138) pts. In the research conducted by us it has been included 65 (47.1%) pts with low LVEF (less than 45%) at which it was possible to study the remote results. Pts of a male have made - 80.5% (82), and female - 19.5% (13). The age of pts fluctuated from 39 until 76 years, and has on the average made 59.5 ± 8.4 years. From the standard risk factors most often met an arterial hypertension - at 87.7 %, (87.7%) and arterial diabetes - at 90.7 % (90.7%), pts with PCI had fluctuated from 27.3 % to 45%, and has on the average made 38.5 ± 4.9%

44.6 % (29) cases PCI have been executed at pts with acute myocardial infarction; in 49% (28) cases at a stable angina of pressure IV-IVC, and in 15.4 % (10) cases at an unstable angina. Three-vascular defeat of a coronary channel took place in 47.7% (31) cases, two-vascular in 29.2% (19) and one-vascular defeat at 23.1% (15) cases. At pts with multivascular defeat (n = 50) in 62% (33) cases the incomplete functional is executed; in 20% (11) cases full functional and in 18 % (9) cases full anatomic myocardial revascularization were performed. In total it has been implanted 115 stents (on the average 1.8 stents on one pt) from them 80% (82) drug eluting stents; 15.7 % (18) bare metal stents and 4.3 % (5) bioresorbable vascular scaffold.

Results: In our research frequency of angiographic success at implantation stents at pts CHD with low LVEF have made 92.3 % (60), and clinical success at a hos- pital stage - 85.7 % (59). Frequency of development of complications has made 12.3 % (8) cases; from them dissection a coronary artery has developed in 62.5 % (5) cases; the "no-reflow" phenomenon has developed in 25% (3) cases and in 1 case the bleeding from a gastrointestinal path took place. Frequency of develop- ment myocardial infarction type 4 and a lethal outcome equaled - 0. In the remote period the LVEF fluctuated from 30% to 61.5 %, and has on the average made 43.5 ± 6.9 % (p<0.000). Increase the fraction of emission LV was observed at 60% (39) pts, decrease at 15.4 % (10) pts and at 10.8 (7) pts of LV ejection fraction has not changed. The lethal outcome has developed at 8 (12.3%) pts, operation CABG is executed at (11.5%) the pt.

The conclusion: Thus, frequency of clinical success at a hospital stage of super- vision has made 85.7% (59) cases. In the remote period authentic increase of an average index of fraction of ejection left ventricle to 43.5% ± 6.9 % was marked at initial 38.5 ± 4.9 % (p = 0.000).

P1669

Heart failure nurses, luxury or necessity? a substudy of the INTERACT-in-hf (improving knowledge transfer to efficaciously raise level of contemporary treatment in heart failure) study

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Background: The complex nature of heart failure (HF) and its high burden chal- lenge the management of national health systems. To address these questions, international associations of cardiology developed guidelines for best practice in heart failure care. However, implementation of these guidelines is a challenge, partly due to health care organization. The INTERACT-in-HF study was set up to investigate current practice in chronic HF care from different perspectives in three different European regions (Flanders Bel- gium, region Maastricht and Aachen). This study showed that HF nursing is well established in the Netherlands and less established in Flanders and Germany.

Purpose: The ESC guidelines state that it is important to provide HF-patients with disease specific information in order to improve self-care and to make them able to make their own justified lifestyle decisions. Educating patients is supposed to be an important role of HF-nurses.

This substudy investigates the knowledge and implementation of guidelines con- cerning patient education and the role of HF-nurses according to patient education. Methodology: A quantitative research design was used. All HF-nurses in Flanders, the Netherlands and Germany, being members of respectively the Belgian working group on cardiovascular nurses, the Dutch Nursing Cardiovascular Association and German association of HF-nurses, were approached in order to fill in a digital questionnaire about their knowledge and implementation of guidelines concerning patient education.

Data were analysed using SPSS v 23.0 (IBM).

Results: 23 Flemish, 59 Dutch and 7 German HF-nurses with cardiology experi- ence participated in our survey. Almost every HF-nurse knows and implements the ESC-guidelines and their own national guidelines. Little regional differences were found between HF-nurses concerning knowledge and implementation of existing guidelines. Flemish nurses educate their patients significantly more about vaccina- tion than their Dutch or German colleagues (X², p = 0.003) and information about sexuality is mentioned less by all of them.

Conclusion: Despite the fact that ESC guidelines recognize the role of HF-nurses, few of them are actually active in Flanders and Germany. Though there are regional differences in health care organization between the Netherlands, Flanders and Ger- many, all HF-nurses in the participating centres offer education, and little difference was found regarding knowledge and implementation of guidelines.

P1670

A French national observational study on 2013 ESC Heart Failure guidelines: Impact on therapeutic management of chronic heart failure patients by office based cardiologists: RECO-Coeur study

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Among outpatients with HFrEF, a good adherence to pharmacologic treatment guidelines as determined by prescription of ACEI/ARB, BB, MRA, ivabradine with at least 50% of recommended dosages was associated with improved clinical outcomes during 8 month follow up.

Table 1: Univariate analysis and Multivariate analysis of All cause death and CV death

<table>
<thead>
<tr>
<th>Adherence score</th>
<th>All cause death</th>
<th>CV death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor vs Good</td>
<td>2.08[1.29;3.34]</td>
<td>2.27[1.37;3.77]</td>
</tr>
<tr>
<td>Moderate vs Good</td>
<td>1.45[1.23;2.81]</td>
<td>2.06[1.32;3.20]</td>
</tr>
<tr>
<td>Poor vs Good</td>
<td>1.64[1.14;2.34]</td>
<td>1.22[1.01;1.47]</td>
</tr>
<tr>
<td>Moderate vs Good</td>
<td>1.26[1.05;1.52]</td>
<td>1.07[1.00;1.87]</td>
</tr>
</tbody>
</table>

On behalf of: RECO-Cœur study

Aim of the study: to determine the prescription rates of different drugs in a group of ambulatory patients with stable chronic heart failure (CHF) in NYHA class II-III followed by French cardiologists.

Methods: Non-interventional, multi-center, cross-sectional study carried out with office based French cardiologists. Each investigator had to include the first 8 consecutive eligible patients seen in outpatient. Data from medical records and study visit were collected and recorded through an electronic case report form.

Results: 263 cardiologists included from 07/15/2015 to 10/28/2016, 2652 patients, age: 73.4 ± 11.9 years old, 1624 (62%) male, NYHA class: 66%: 66%, hypertension: 62%, diabetes mellitus: 28%, renal impairment: 21%, coronary artery disease: 43%, peripheral arterial disease: 14%, COPD: 15%, depression or cognitive disorder: 10%. Mean LVEF was 43.1 ± 12 %, 341 patients (7%) had a LVEF < 40%, 845 (33%) a LVEF between 40 and 50% and 776 (30%) a LVEF ≥ 50%. Prescriptions rates and doses achieved for each classes of drugs are presented in the Table.

In conclusion: there is no great difference in prescription rates of CHF drugs in subgroups of patients divided according to LVEF. In comparison to previous French registries, in patients with LVEF < 40%, there is a small increase in prescription rates of recommended CHF drugs and in recommended doses but there is still room for improvement, particularly for betablocker therapy.

Table of the study population

<table>
<thead>
<tr>
<th>Drugs</th>
<th>LVEF &lt; 40%</th>
<th>LVEF 40-50%</th>
<th>LVEF ≥ 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE-I</td>
<td>66%</td>
<td>59%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Target doses</td>
<td>49%</td>
<td>51%</td>
<td>52%</td>
</tr>
<tr>
<td>≥50% target doses</td>
<td>31%</td>
<td>29%</td>
<td>32%</td>
</tr>
<tr>
<td>ARB</td>
<td>19%</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>Target doses</td>
<td>22%</td>
<td>27%</td>
<td>28%</td>
</tr>
<tr>
<td>≥50% target doses</td>
<td>31%</td>
<td>30%</td>
<td>28%</td>
</tr>
<tr>
<td>Betablockers</td>
<td>84%</td>
<td>81%</td>
<td>73%</td>
</tr>
<tr>
<td>Target doses</td>
<td>27%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>≥50% target doses</td>
<td>37%</td>
<td>39%</td>
<td>39%</td>
</tr>
<tr>
<td>MRA</td>
<td>35.5%</td>
<td>26%</td>
<td>21%</td>
</tr>
<tr>
<td>Diuretics</td>
<td>76%</td>
<td>66%</td>
<td>74%</td>
</tr>
<tr>
<td>Iabradine</td>
<td>5%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>LCZ696</td>
<td>2.7%</td>
<td>2%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Digoxin</td>
<td>5%</td>
<td>6%</td>
<td>10%</td>
</tr>
</tbody>
</table>

P1671

Optimisation of guidelines adherence is associated with better prognosis in outpatients with heart failure with low ejection fraction (HFrEF): the QUALIFY registry

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On behalf of: QUALIFY Investigators

Funding Acknowledgements: It is funded via grants from SERVIER France

Aim: Implementation of HF guidelines is associated with improvement in outcomes but remains suboptimal in clinical practice. We assessed the impact of physicians’ adherence to treatment guidelines on clinical outcomes in HFrEF.

Methods and results: QUALIFY is an international prospective observational survey of 7,092 CHF outpatients recruited 1-15 months after HF hospitalization from 36 countries. We analysed the relationship between 6 month outcomes and baseline adherence score for the use of ACEIs or ARBs, BBs, MRAs and Iabradine (if indicated) in 6,669 patients with data available at six months. Score was calculated for each patient by summing the points attributed: 0 for non-prescription in the absence of contraindications, 0.5 point for the use of < 50% of target dosage (TD) < 10% of TD for MRA) or 1 point for use in ≥ 50% of TDs (TD for MRA). The table presents the relationship between 6 month outcomes and adherence score (Cox proportional hazards regression model on time to event - multivariate analysis conducted by selecting only covariates significant at 1% in Univariate analysis).

Conclusion: Among outpatients with HFrEF, a good adherence to pharmacologic treatment guidelines as determined by prescription of ACEI/ARB, BB, MRA, ivabradine with at least 50% of recommended dosages was associated with improved clinical outcomes during 8 month follow up.

P1672

LCZ696 compassionate use programme at mater dei hospital, malta

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Background: LCZ696 is a combination drug for use in Heart Failure with reduced ejection fraction (HFrEF) consisting of valsartan and sacubitril. It has been included in the treatment algorithm of the 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. The trial PARADIGM-HF has shown a 20% risk reduction in death from CV cause and 21% HF hospitalization risk reduction when LCZ696 was compared to Enalapril.

Purpose: to assess the effect of LCZ696 in HF patients included in the Compassionate Use Programme at Mater Dei Hospital.

Method: Patients that attend the HF Clinic were selected between October 2015 and May 2016. Inclusion criteria included: Age > 18; NYHA Class II-IV; LVEF < 50%; at least one hospitalization for HF within the last 12 months; ACE-inhibitor or ARB therapy with a stable dose for prior 4 weeks. The patients were reviewed regularly at the HF clinic. Symptomatology, blood pressure, renal function, potassium and NT pro BNP were monitored.

Results: A total of 21 patients were included: 16 males, 5 females. The average age was 58.8 years. 71% had a diagnosis of dilated cardiomyopathy and in 29% the cause of HF was ischaemic heart disease. The mean ejection fraction (EF) was 24%. The choice of the starting dose depended on renal function, potassium levels and blood pressure readings. 29% of patients were started on 50mg twice daily, whereas 71% were started on 100mg twice daily. 81% of patients reached target dose within an average time of 37.5 days. The patients who were started on a lower dose required an average of 60 days to reach target dose, compared to an average of 32 days to target dose in patients who were initiated on 100mg twice daily. 19% of patients did not reach target dose in view of hypotension and hyperkalaemia respectively.

57% had a significant decline in NT pro BNP levels after 6 months of treatment with LCZ696. We managed to stop loop diuretics in 15% of patients and reduce the dose in 45%. Since starting LCZ696, only 2 patients required hospitalization for HF exacerbation. 30% of patients experienced hypotension and 33% hyperkalaemia. Only 1 patient had a significant deterioration in renal function. LCZ696 had to be stopped in 2 of the patients. This was due to significant impairment in renal function and persistent hyperkalaemia respectively despite adjustment of other medication.

Conclusion: The introduction of LCZ696 had an overall positive effect on HF management with reduction in NT pro BNP levels, number of hospitalizations and reduced need of loop diuretics. Further follow-up will include the use of Kansas
Compared to non-ischemic subgroups of outpatients the ischemic patients had a mean age of 61.58±13.70 completed Turkish Research Team-HF (TREAT-HF) multi-centered, prospective, observational, cohort study were analyzed to compare ischemic and non-ischemic subgroups.

Results: Comparison of ischemic (n = 564, male 76.8%) and non-ischemic (n = 689, male 66.9%) subgroups regarding demographics, clinical characteristics, risk factors, symptoms and medications were given in Table. Medications except high doses of ACEIs and ARBs were more used in non-ischemic patients (p = 0.015) and the presence of diabetes (4.857 [1.287-18.338], p = 0.02) independently predicted poor 6-MWT performance in HF patients. A MLHQF ≥50 was 74% sensitive and 62% specific (AUC 0.71, p < 0.001) in predicting poor exercise capacity in HF patients.

Conclusion: MLHQF in HF is the best correlate of exercise capacity assessed by 6-MWT. These findings suggest that exercise capacity and quality of life indices are closely related in HF patients.

Table: Comparison of our study groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Non-ischemic (n = 564)</th>
<th>Ischemic (n = 689)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>59.80 ±14.92</td>
<td>63.66 ±11.78</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Heart rate (bpm)</td>
<td>82.20 ±17.26</td>
<td>80.28 ±18.15</td>
<td>0.076</td>
</tr>
<tr>
<td>Ejection fraction (%)</td>
<td>30.34 ±8.36</td>
<td>32.46 ±7.92</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>23.1</td>
<td>41.1</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Diabetes Mellitus (%)</td>
<td>14.4</td>
<td>31.6</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Dyspnea (%)</td>
<td>58.1</td>
<td>49.7</td>
<td>0.003</td>
</tr>
<tr>
<td>Edema (%)</td>
<td>26.2</td>
<td>20.4</td>
<td>0.017</td>
</tr>
<tr>
<td>Anemia (%)</td>
<td>22.8</td>
<td>27.4</td>
<td>0.065</td>
</tr>
<tr>
<td>Medical therapy-blocker (%)</td>
<td>-83.3</td>
<td>-80.4</td>
<td>-0.217</td>
</tr>
<tr>
<td>Ibradene (%)</td>
<td>13.5</td>
<td>11.3</td>
<td>0.334</td>
</tr>
<tr>
<td>Diuretic (%)</td>
<td>77.8</td>
<td>66.0</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>MRA (%)</td>
<td>53.3</td>
<td>48.4</td>
<td>0.108</td>
</tr>
<tr>
<td>ACEI/ARB (%)</td>
<td>70.1</td>
<td>72.3</td>
<td>0.415</td>
</tr>
<tr>
<td>Acetylsalicylic acid (%)</td>
<td>61.7</td>
<td>77.3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Statin (%)</td>
<td>30.8</td>
<td>48.7</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Dibuxine (%)</td>
<td>30.0</td>
<td>16.3</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Trimetazidine (%)</td>
<td>10.5</td>
<td>11.6</td>
<td>0.551</td>
</tr>
<tr>
<td>Achieving target dose of A-blocker-ACEI/ARB</td>
<td>-20.626.6</td>
<td>-16.127.6</td>
<td>-0.0720.734</td>
</tr>
</tbody>
</table>

ACEI: Angiotensin converting enzyme inhibitors, ARB: Angiotensin II receptor blockers, MRA: Mineralocorticoid receptor antagonist.
Diagnosis of myocardial viability in patients with chronic heart failure: search for the best methods

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AIMs: to reveal the significance and efficiency of different diagnostic methods of myocardial viability. Methods and Results: 214 patients are included in study. Inclusion criteria: stable angina class II-III (CCS); occlusion or subtotal stenosis of one or more coronary arteries by angiography previous myocardial infarction (OMI) associated with congestive heart failure (CHF). Patients with acute coronary syndrome, multivessel disease (SYNTAX score ≥32) were excluded of the study.All patients were randomized in 3 groups. At group: p=76 myocardial viability was determined by cardiac magnetic resonance (CMR) with delayed enhancement, at group 2 (p=78) – two-dimensional low dose Dobutamine stress echocardiography (LDDSE), at group 3 (n=60) both of methods. Coronary revascularization was performed to all patients with viable myocardium. Late follow-up of intervention was planned for 18 months after procedure. The mass of hibernating myocardium was able to identify only in groups I and III, where in indicators was 36 and 44% accordingly (p<0.05). At hospitalization period patients surviving was 100% with no complications. Late follow-up were done in 193 of 214 patients, from which 70 included in I group, 68 – II group, 56 – III group. Control methods matched to initials. Summary frequency of cardiovascular complications was 2.8, 8.8 and 5.45% according to groups (p<0.05), but by frequency of non-fatal MI wasn't revealed any significantly differs, but repeated intervention on stented segment of arteries differs at I and II groups (1.4 and 5.9% accordingly; p<0.05).To the end of observation dynamic of recovery of wall motion abnormality was more significant at I and III groups, nearly more than 30% compared to the II (group p<0.05). Positive myocardial remodeling and significant increase of EF (Ejection Fraction) was marked in all groups. Strong positive correlation between duration of myocardium hibernation and its function's recovery time was revealed. (r=0,54, p<0.05). I and III groups patient's hibernating myocardium mass was significantly decrease to 37 and 34% accordingly (p<0.05)

Conclusions: CMR with delayed enhancement is safe and effective method of detection of myocardial viability, compared to low dose Dobutamine stress-echocardiography allows significantly better estimate dynamic functional recovery of hibernating myocardium and its remodeling after coronary revascularization.

P1678 Safety and effectiveness of sacubitril/valsartan in real-life practice

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Introduction: The most recent medical addition to heart failure management, in those with reduced left ventricular ejection fraction, has been the use of Sacubitril/Valsartan.

Methods: Several clinical parameters were investigated, including some that were not studied in PARADIGM. Our goal was to perform a single center, retrospective, descriptive study, evaluating our patients' clinical outcomes, on Sacubitril/Valsartan.

Results: Demographics From December 2015-December 2016: Sacubitril/Valsartan was initiated in 140 patients. More than half of the patients (54%) suffered from ischemic cardiomyopathy; 24% were females. The mean age and left ventricular ejection fraction were 62 and 25%, respectively. The majority were NYHA 2 and 28% were NYHA 3. Diuresis Following initiation of Sacubitril/Valsartan, 16% were able to have doses of diuretics decreased, 12% had to have diuretics dosage increased, 58% had unchanged doses of diuretics (6% were not on diuretics before initiation of Sacubitril/Valsartan). Blood pressure Sacubitril/Valsartan was initiated in 19 patients with systolic blood pressures of less than or equal to 100mmHg. The lowest measured systolic pressure at initiation was 78±13mmHg. The mean diastolic pressure was normal for all patients. Blood pressure control was achieved in 79% of these patients and 52% were able to have up-titration of Sacubitril/Valsartan. Left ventricular Ejection Fraction Of 31 patients who obtained repeat left ventricular ejection fraction (LVEF) measurement, 13 (43%) increased their LVEF ≥5%, 12 (39%) decreased their LVEF ≥5%. Cardiac Transplantation On our transplantation and Ventricular assist device (VAD) list, 17 patients were on Sacubitril/Valsartan. 4 of these patients were deactivated from the transplant list, once on Sacubitril/Valsartan due to improving clinical status. 3 of these patients reached maximal dose Sacubitril/ Valsartan, while 1 patient reached medium dose.

Conclusion: In this single-center retrospective cohort study, we showed that Sacubitril/Valsartan was well tolerated even in patients with baseline hypotension. We observed decreased of diuretics requirement and improvement in LVEF in several patients. Moreover, there was no further need for cardiac transplantation and/or LVAD in some patients. Overall, our data suggested that Sacubitril/Valsartan had good safety and effectiveness in “real-life” practice.
P1680
Ivabradine and heart failure: experience from a real practice
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Introduction: Chronic heart failure (CHF) is the most common diagnosis at admission in patients above 65 years. The introduction of ivabradine as a new medication is expected to cope with HF.

Aim: To assess the effect of ivabradine (IV) after 6 months in patients with CHF NYHA class III-IV post-hospitalization.

Materials: We followed 180 patients with CHF for 6 months in an out-patient program. Of them, 80 were in sinus rhythm (SR). The baseline and 6 months levels of NT-proBNP, ejection fraction (EF), 6 min walking test (6MWT), NYHA functional class, and renal function were evaluated.

Results: IV was initiated in 40.3% of patients with SR. After 6 months, the 6MWT improved (22.5 m in the IV vs 23.5 m in the non-IV group; p = 0.043), NT-proBNP reduced with median 680 pg/ml and 552,5 pg/ml (p = NS), respectively, and EF increased in IV with 4.02% and decreased with 1.14% in non-IV, p = 0.06. After 6 months, 77% of the IV patients were in class II, whereas only 45% of the controls were in class I-II (p = 0.023).

Conclusions: Ivabradine in CHF leads to subjective improvement, increases the systolic function, improves the quality of life and functional NYHA class.

P1683
CHIC trial: Can a single outpatient visit, 8 to 15 days after the hospitalization for acute heart failure, decrease the number of re-hospitalizations?
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On behalf of: Equipe Insuffisance Cardiaque, Service de cardiologie, Hôpital Bichat Claude Bernard

Among people suffering from congestive heart failure (CHF), the first 6 months after a hospitalization is the most critical period for the risk of recurrences. This prospective randomized study aims to evaluate if a single outpatient visit, with echocardiography 9 to 15 days after discharge for CHF hospitalization, decreases the number of re-hospitalizations during the following 6 months. Between 2013 and 2016, 326 patients hospitalised for acute heart failure in Bichat Hospital, with either a none-optimal treatment for CHF according to the practitioner in charge or NT-proBNP value above 3500 ng/l at discharge were included. These 233 men and 93 women were randomized 1/1 into 2 groups, one “interventional” (162 with scheduled additional outpatient visit, ECG and echocardiography 8 to 15 days after hospitalization) and one “standard” (165 pursuing the standard of care). Follow-up included phone calls at 3 and 6 months after hospital discharge. In the first 100 patients included, age ranged from 26 to 97 years old (mean age 68 ± 14), and hospitalisation lasted 2 to 77 days (mean 13 ± 8). Reasons for inclusion were high NT-ProBNP in 44% or non-optimal therapy at discharge in 56%. Hypertension was present in 63% and diabetes mellitus in 48%. Decompensation was de novo in 51%. LVEF was preserved in 71%. Main aetiology of heart failure were ischemic and dialated cardiomyopathy (1/3 of cases each) and cardiac arrhythmias in 14%. At discharge, 74% of patients received an ACEI, 15% an ARB (renin angiotensin system blocker 89%), and 91% a beta-blocker. Follow-up is started and complete baseline data will be presented during the meeting. Prevalence of heart failure with preserved ejection fraction appears to be lower than anticipated in patients not selected in the Cardiology department, but these patients were considered as being amenable to optimisation of therapy in the idea of the practitioner in charge.

P1684
General practitioner perceptions of services for patients with advanced heart failure: a qualitative study
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Introduction: Heart failure with preserved ejection fraction (HFpEF) is a heterogeneous entity and many clinical trials have been done so far, all with negative results. Heterogeneity is pointed out as an explanation for this, making inclusion and exclusion criteria especially important in this setting. Our aim was to evaluate the inclusion and exclusion rates of a cohort of patients admitted for HFpEF if they would be proposed to enter three major trials on HFpEF (TR-PROVE, TOPCAT and PARAGON).

Methods: A cohort of patients admitted for HF decompensation between June 2015 and June 2016 on a tertiary HF center was analyzed. Electronic medical records and echocardiograms were analyzed for data extraction. HF was defined as current ESC criteria guidelines. We selected patients with left ventricular ejection fraction (LVEF) >45% and excluded a prior those with history of previously reduced LVEF, more than moderate valvular heart disease, constrictive pericarditis, congenital heart disease and previous cardiac transplantation. We applied inclusion and exclusion criteria of 3 major trials to this population

Results: Among 176 patients with HFpEF criteria and LVEF >45% and without taking into account longitudinal blood pressure values criteria, rates of inclusion would be 25% for PARAGON, 47% for TOPCAT and 84% for I-PRESERVE. The main reasons for exclusion were rapid atrial fibrillation (21% in TOPCAT), anemia (19% in PARAGON), COPD (15% in TOPCAT and PARAGON), elevated creatinine (13% in TOPCAT and 4% in I-PRESERVE) and lower age (7% in I-PRESERVE and 3% in TOPCAT and PARAGON).

Conclusions: The low inclusion criteria rate on this real world cohort illustrates the complexity of addressing these patients and raises uncertainty about these important clinical trials conclusions when generalized. Disease heterogeneity and associated comorbidities should be taken into account on future clinical trials to make clinical practice decisions easier.
### Background
The holistic needs and healthcare service support of patients with advanced heart failure are often neglected. Collaboration and communication between Primary Care, Cardiology and Palliative Care Services is likely key in meeting the multidimensional needs of patients. It is unclear if such a model of care exists in this region.

### Purpose
This qualitative study assessed current services models available within one geographical region and explored the adequacy of these models in meeting the needs of patients and carers with heart failure, as perceived by General Practitioners (GPs).

### Method
Semi-structured interviews were conducted with GPs recruited via the medical school and postgraduate deanery. Selected GPs represented each healthcare trust area in the region, ensuring a snapshot of perception was achieved. Interviews were transcribed, independently coded using NVivo 9TM and analysed using a six-step thematic analysis approach. Key themes were identified inductively.

### Results
Twenty semi-structured interviews were conducted between June and August 2016. A number of recurring themes emerged. Care provided by the heart failure nursing team (HTF) was highly regarded. However, access to this service was limited to patients under the care of a Cardiologist, thus excluding those with advanced disease no longer seen by a Cardiologist. This lack of community facing HTF was associated with inadequate handover of care from the HTF to GPs at discharge. Discussions about end of life care are frequently neglected by Cardiologists and GPs. GPs reported that this may be due to poor awareness of the need for these discussions and lack of clarity regarding who is responsible. It was reported that at all stages of heart failure management, the emphasis is on medical treatment, rather than holistic assessment of underlying needs. Linked to this was reported that at all stages of heart failure management, the emphasis is on medical treatment, rather than holistic assessment of underlying needs. Linked to this was a poor awareness of the role of Specialist Palliative Care (SPC) services in the management of heart failure in the community. GPs’ perceptions that SPC services are overstretched, cancer focused and lack expertise in heart failure lead to its limited utilisation. Barriers to referral for SPC include difficulties identifying palliative care needs and a fear of causing distress.

### Conclusions
GPs describe significant shortcomings in the delivery of holistic care to patients with advanced heart failure in the region. There is a clear need to review existing service models within the region, with a focus on collaborative service planning, education, effective communication, role delineation and greater access to specialist palliative care.

### Results
After one year we have screened 144 patients of which 115 had HFrEF according to the last ESC HF guidelines. In the baseline characteristics, we can observe most patients are women (67.8%), obese 48.3% with a BMI above 30 kg/m2 and 15.7% above 35 kg/m2, have hypertension (84.3%), type II diabetes (37.4%), atrial fibrillation (67.7%), sleep apnoea (47.8%) and iron deficiency (50%). Echographically most patient have an increased left atrium volume index (39.2%), increased E/E’ above 13 (37.1%), increased left ventricular mass index is only present in 25% of the patients. The mortality rate after 1 year is 5.4%, the half related to cardiovascular disease, pulmonary hypertension of right ventricular failure. 31 patients got hospitalized in the first year (26.9%).

In conclusion, the characteristic of our HFrEF population does not differ from the patients included in the main HFrEF trials. However, our mortality and hospitalization rate are lower. This could be related to a diagnosis in an earlier stadium, selection bias or to an intensified treatment regime of the different co-morbidities.

### Methods
Poster session 3

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**P1685**

**Personalized approach to heart failure with preserved ejection fraction (HFrEF), the Maastricht experience**

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**Background**
Heart failure (HF) with preserved ejection fraction (HFrEF) is one of the main dilemmas in modern cardiology. The recently postulated paradigm gives to co-morbidities a central role being the cause of low grade systemic inflammation producing endothelial and microvascular dysfunction, alteration of myocardial signalling and involvement of other organs; lungs, skeletal muscle and kidneys.

**Purpose**
The absence of effective treatment leads to pursue a different approach to the HFrEF patient. Multidisciplinary strategies have been proven to reduce mortality and hospitalization significantly and are recommended by the ESC HF guidelines. Nevertheless these efforts have mostly been focused on HFrEF A multidisciplinary, individualized approach to HFrEF patients could be the answer that is lacking.

**Methods**
In Maastricht University Medical Center a specific HFrEF out-patient clinic have been implemented. Suspected patients are referred from their general practitioner, cardiologist or another medical specialist to the HFrEF out-patient clinic. An intense and complete medical assessment is performed: electrocardiogram, cardiac echography, lung function test, six-minute walking test, exercise testing, twenty-four hour Holter monitoring, ApneaLink, Hospital Anxiety Depression Subscale score and laboratory tests including biobank analysis. If coronary artery disease is suspected a coronary computed tomography or coronary angiography will be performed. The patient gest a medical consultation with a dedicated HF specialist. Once a week a multidisciplinary meeting all patients get discussed with all HF specialist and internal medicine or pulmonologists if needed. If co-morbidities have been diagnosed, these will be treated. Sometimes the diagnosis of HFrEF remains uncertain. In those cases, a right heart catherisation will be performed.

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**P1686**

**Hospital discharge letter quality - An important standard between hospital and community heart failure teams**

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**Introduction**
Heart failure (HF) admissions are increasingly prevalent. Discharge Letters (DL) are an important communication between secondary care and community teams for the ongoing management of HF patients, and as a dataset for National HF audits. This audit sets out to assess the quality of DL at a district general hospital in the UK.

**Methodology**
DL for patients admitted with symptoms of HF to the joint cardiology and renal ward were analysed for meeting criteria (figure 1) deemed as ‘good practice standards’ by the National Institute for Cardiovascular Outcomes Research (NICOR) and National HF Audit. The initial audit evaluated DL from September 2015 and was re-audited in September 2016 following actions to improve quality of DL. These included promoting the aide-memoire of the required criteria through a screensaver on trust computers, hospital doctor induction and placing hard and electronic versions on computers.

Each criterion was scored using a 3 point scoring system and a total score was calculated and standardised by converting to a percentage. The scores were analysed by looking at the total DL score as well as analysis by criteria.

**Results**
September 2016 DL scores showed an improvement compared to 2015 (p-value = 0.039) as shown in table 1: 93% of DL had a score over 50% in 2016 compared to only 45% in 2015. A notable increase can be seen in the percentage of DL which included each criteria in 2015 and 2016 (figure 1), most markedly the first four criteria. Patient vital signs and medication are areas requiring more work.

**Conclusion**
This audit demonstrates that educational activities improve inclusion compliance of the majority of HF data standards within DL. This is likely to improve communication between hospital and community HF teams which is important in optimising the management of HF patients. Compliance in data standards within DL still has room for improvement, and further systems to improve this can be explored.

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Heart failure specialist versus general cardiologist in the management of chronic heart failure in Russia

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Purpose: HF is responsible for considerable mortality rates and resource utilization. The aim of this study is to identify differences in HF management practices and outcomes between general cardiologists and cardiologists specializing in the treatment of patients with HF in real Russian clinical practice (from the Russian hospital Heart Failure Registry (RUS-HFR).

Methods: HF patients (included in the RUS-HFR from Oct 2012 to Jan 2014) were discharged from cardiology wards and were followed-up (FU) in outpatient HF clinic for patients implanted with an LVAD in 3 teaching hospitals of the west region of France and implanted with a continuous flow LVAD as destination therapy were included.

Results: The average duration of FU was 30 month. After 2.5 yrs the survival of patients was 77% vs 65% (p<0.05) vs 40% (p<0.01) and HF hospitalizations were 33% vs 28% (p=0.05) vs 103% (p<0.01) in the groups 1,2,3, respectively. Among all groups more than 88% and 79% patients regularly visited the doctor and had HF NYHA II-III. There were important differences between the practice patterns of cardiologists and HF specialists. HF specialists treat patients more aggressively. Cardiologists reported that 68%-78%, 81-85%, 52-54% and 60-79% of their patients were taking RAS blockers, MRAs and diuretics compared to 89%, 91%, 63% and 88% by HF specialists. Also, HF specialists were more likely than cardiologists to titrate RAS blockers and β-AB to higher doses: 46% vs 26-38% and 74% vs 52-56%, even in the presence of renal dysfunction and hypotension.

Conclusion: Cardiologists and HF specialists in Russia generally manage their patients in conformity with guidelines. However, in many areas, such as RAS blockers and β-AB use, HF specialists do so more aggressively. These approaches may, in part, explain the success of the outpatient HF clinic model in post-discharge mortality and raise the question of improve HF management in RF through to organize network of HF specialists and HF clinics throughout the country.

Left ventricular assistance device for destination therapy: results in the west region of France

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Background: Left ventricular assist device (LVAD) for destination therapy is a validated procedure in patients with advanced heart failure and contraindicated for transplantation. The aim of our study was to implement a destination therapy registry for patients implanted with an LVAD in 3 teaching hospitals of the west region of France from December 2005 to October 2015.

Results: 63 patients, 65 ± 7 years old, contraindicated for cardiac transplantation and implanted with a continuous flow LVAD as destination therapy were included. Preoperatively 92% were in NYHA class 3B or 4, 77% had a 3 or 4 INTERMACS profile, 61% had a stage 3 or 4 renal insufficiency, 36% liver failure, 35% type 2 diabetes, 19% peripheral arterial disease and 17% chronic pulmonary disease. Contraindications to transplantation were age (68%) and comorbidities (35%). Postoperatively, 78% of the patients were in NYHA class 2. Most common adverse events included bleeding (79%), ventricular arrythmias (63%), right ventricular dysfunctions (56%), strokes (38%), driveline infections (25%) and pump thrombosis (13%). At 24 ± 24 months of follow-up, 56% of patients had died and 3 had been transplanted. 28% of early deaths were related to right ventricular failure (56%) and 18% of total deaths were related to pump failure. Overall survival was 65.4 ± 6.1% at one year and 53.9 ± 6.7% at 2 years. Increases in pre-implant mean pulmonary arterial pressure, pulmonary vascular resistance, and total bilirubin were significantly correlated (p < 0.05) with lower survival.

Conclusion: Our study constitutes a French registar of 63 patients implanted with LVAD as destination therapy, with results comparable to literature. Despite frequent complications, LVADs allow an improvement in survival and functional capacities.
At follow-up, 61 patients had been stabilised at maximum tolerated therapy. Of these, 39 (63.9%) achieved the maximum dose of 97/103mg twice daily. A further 8 patients (13.1%) reached the 49/51mg dose and 14 (22.9%) remained on the 24/26mg strength without tolerating a dose increase. 36 patients (59.1%) were still in the process of being uptitrated to the maximum tolerated dose. 13 patients (11.8%) discontinued sacubitril/valsartan. The commonest reason was a composite of hypotension, presyncope or syncope (11/31; 69.2%). In this group, the mean drop in systolic blood pressure (SBP) at follow-up after commencement of sacubitril/valsartan was 17mmHg (range 0–45mmHg).

In patients in whom blood pressure effect was the predominant reason for discontinuation, half were noted to be concomitantly prescribed non-cardiac medications in which hypotension was a known side-effect. Other reasons for discontinuation included gastrointestinal disturbance (n = 3), acute kidney injury (n = 1), hyperkalaemia (n = 1) and back pain (n = 1). 2 patients had more than one indication for discontinuation of sacubitril/valsartan.

Conclusion(s): Sacubitril/valsartan is a well-tolerated medication in the majority of patients in our heart failure population. True hypotension was the dominant cause for discontinuation. Caution should be taken to consider reducing diuretics if clinically justifiable or rationalise other medications with anti-hypertensive side-effects to ensure that suitable patients only have the medication discontinued if truly intolerant.

Reassuringly, rates of hyperkalaemia and kidney injury were not higher than for standard angiotensin-blocking therapy and only a single patient developed an idiosyncratic side-effect.

Results: 10y total/nort h fatal ACS events were 60% in heart failure patients who reported use of salt shaker in table and 47% in patients who avoided this habit (p = 0.03). Multivariate logistic regression analysis highlighted that patients who reported were twice as likely to develop a new cardiac episode within the decade (OR=2.19 95% CI (1.12, 4.3), p = 0.02). Principal component analysis was performed for major hidden-salt-sources. Salt addition during cooking did not reach significance. Two out of four patterns identified, reached significance in a multivariate analysis; a pattern characterized by processed/fried meat products, fast food and salty yellow cheese was associated with unfavorable ACS prognosis (OR=1.4 95%CI (0.97, 2.04) whilst a pattern with healthier food choices (i.e. nuts, canned fish/vegetables, olives and feta cheese) was inversely associated with 10y recurrent events (OR=0.55 95% CI (0.37, 0.82)). A significant interaction was observed between age and addition of salt in table as well as the aforementioned hidden salt patterns (all p for interaction<0.05). Stratified analysis revealed that use of salt shaker retained its significance only in patients ≥65 years old (OR=0.27 95% CI (0.10, 0.71), p = 0.008).

Conclusion: salt, mainly this added in table, seemed to have an aggravating role in 10y prognosis of heart failure. Nonetheless, considering its detrimental role in appetite, instead of a general strict restriction, priorities should be set for a more efficient treatment approach.

P1692

Oral use of high doses of Furosemide as an alternative to intravenous or subcutaneous way in patients with severe Congestive Heart Failure

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Background/Introduction: ACCF/AHA 2013 Heart Failure guidelines recommend initial dosing of oral Furosemide of 20-40 mg, once or twice daily, and a maximum total daily dose of 600 mg. In the last few years, several patients with severe Congestive Heart Failure had income in our Home Hospitalization Service with high doses of continuous parenteral Furosemide infusion. When we got the patient stability, we explored the option of using the oral way to administer high doses in the attempt to use a non-invasive way in patients with a long term treatment.

Purpose: The aim of this work is to describe our experience in a local Home Hospitalization Service in the orally use of high doses of Furosemide (higher than 750 mg daily) as an alternative to intravenous or subcutaneous use, in patients with severe Congestive Heart Failure (NYHA 3-4) and a high probability of death within the first year (PALIAR INDEX 3-4). We also want to study the impact of this therapy over renal function, survival rates and hospital return rates.

Methods: We conduct a retrospective study of 33 months of following (2013-2016). We recruited patients with severe Congestive Heart Failure, NYHA 3-4 and PALIAR INDEX 3-4, who required high doses of continuous parenteral Furosemide (i.vsc) to stabilize and have been sequenced with oral Furosemide at equivalent doses for which we used the vials of 250 mg diluted in water that patient takes along the day (respecting sleep).

Results: Our cohort included 32 patients with an average age of 83 (SD: 6.41) years. Sixty eight percent were men. Regarding to the etiology, almost the 50% were due to valvular disease. The median of monitoring was of 284,5 days (IQR: 332) and the average daily dose of Furosemide of 800 (SD: 570) mg. Baseline creatinine was 1.72 and after a month of treatment there was a slightly increase (1.76) but was not statistically significant. Sixty two percent of patients suffered hypokalemia that recovered with supplementary intakes. The readmission rate was of 37%. The global mortality was of 56%.

Conclusion(s): In our limited experience, we have found that the use of high doses of oral furosemide in patients with severe Congestive Heart Failure is a good therapeutic option, with very good clinical and analytical tolerance.

P1693

Why are heart failure patients in a district general hospital not being discharged on mineralocorticoid receptor antagonists?

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Background: The UK National Heart Failure Audit found that all criteria for the management of chronic heart failure patients were being met in a district general hospital, except the recommendation that patients with heart failure with reduced
ejection fraction should be treated with a mineralocorticoid receptor antagonist (MRA) if they are still symptomatic and have an ejection fraction of <35%. The project looked to try and ascertain why less than the national average of patients in a district general hospital were being discharged on MRAs, and whether there were any practical measures that could be put in place to ensure the national guidelines are being met in future to help optimise the treatment of the chronic heart failure patients.

**Purpose:** The project was undertaken to try and address any factors that might be contributing to a district general hospital’s below-average rate of prescription and discharge on MRAs. It was also done to see whether any practical measures could be implemented to ensure optimal treatment of the chronic heart failure patients in a district general hospital.

**Methods:** The data from the National Heart Failure Audit was extrapolated and used in order to analyse any variables that may be contributing to the difference in the numbers of patients being discharged from hospital on MRAs elsewhere in the country compared to the district general hospital. The data provided a sample size of 81 patients.

**Results:** The biggest factor in patients not being discharged on an MRA was their place of care. A majority (55%) of patients who were discharged on an MRA were discharged from a dedicated cardiology ward. Those patients who were not discharged on an MRA were mainly cared for on other wards (68%), implying that specialist cardiology care is vital in discharging patients appropriately on an MRA.

**Conclusion:** There is evidence to support the hypothesis that a patient’s place of care impacts their optimal drug therapy for chronic heart failure. One of the outcomes of the project is to aim to increase awareness and education regarding the use of MRAs in chronic heart failure among non-cardiological medical specialties, in order to optimise chronic heart failure management post-discharge.

**P1694 Pending heart failure clinic opening: care performance measures in real-life practice**

**Aim:** to compare real clinical practice with current guidelines for the diagnosis and treatment of chronic heart failure (HF) before the HF Clinic opening.

**Material and Methods:** Of patients admitted for two Moscow city clinical hospitals with decompenesed HF from January to May 2015 were included into the registry (n=484). Clinical, demographic, laboratory and instrumental characteristics and medical treatment before and during hospitalization were evaluated, as well as recommendations contained in the discharge summary. Performance measures included left ventricular ejection fraction (LVEF) documentation in medical history, any beta-blocker for patients with HF with reduced EF (HFREF); evidence-based beta-blocker for patients with HFPEF; inhibitor of the renin-angiotensin-aldosterone system (RAAS) for patients with HFPEF; warfarin for patients with atrial fibrillation; aldosterone antagonist for patients with HFREF; implantable cardioverter-defibrillator for patients with EF ≤35%; and referral to outpatient disease management.

**Results:** The median age was 73 years (39, 95); men: 45%, 97% of patients had HF II-IV (NYHA), among them 26% – HF II, 64% - HF III, 10% – HF IV (NYHA). Echocardiography was done in 100% patients with HF EF <40% was found in 44% of patients. 21% of the patients did not receive medical treatment before admission. 56% of patients with HFREF received ACE inhibitors/angiotensin receptor blockers (ARBs), of which only 25% - in effective dose, beta-blockers were prescribed in 67% of HFPEF patients, among them 25% - in the target dose, two-thirds were treated with evidence-based beta-blocker. 38% of patients needed in mineralocorticoid receptor antagonists (MRA) received spironolactone. During hospitalization 82% of HFPEF patients received ACEI therapy, 11% – ARBs, 92% – beta-blockers, 89% – MRA, 83% – loop diuretics and 15% – thiazide diuretics. According to the discharge summary 5% of patients did not receive post-discharge inhibitor RAAS without explanation in the medical documentation. Evidence-based beta-blocker was prescribed to 70% of HFPEF patients. Spironolactone was recommended after discharge in 89% of HFREF patients. Warfarin for patients with atrial fibrillation and high CHA2DS2-VASC score risk was recommended in 52%. Necessity of cardioverter-defibrillator implantation for patients with EF ≤35% was discussed in 4% of discharge summaries. All discharge summaries contained recommendation of outpatient clinic visit but only in 15% of them exact date and place were mentioned.

**Conclusion:** Treatment of HF is one of the main areas targeted for improvement. Such registry is a valuable tool for optimizing the management of HF patients.

**The drug usage of patients with HF**

<table>
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<tr>
<th>Drug usage (%)</th>
<th>HF/EF (N=900)</th>
<th>HF/REF (n=84)</th>
<th>P value</th>
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<td>60.7</td>
<td>0.031</td>
</tr>
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<td>82.3</td>
<td>76.2</td>
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<tr>
<td>MRAs</td>
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<td>47.6</td>
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<td>8.4</td>
<td>0.300</td>
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<td>Loop diuretics</td>
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<td>Thiazide diuretics</td>
<td>34.7</td>
<td>37.3</td>
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</tbody>
</table>

**P1695 The effects of prolonged daytime fasting on clinical and laboratory parameters of heart failure patients treated with diuretics**

**Aim:** To investigate whether this negatively affects chronic heart failure (CHF) patients on diuretics.

**Material and Methods:** Of all patients admitted for two Moscow city clinical hospitals with decompenesed HF from January to May 2015 were included into the registry (n=484). Clinical, demographic, laboratory and instrumental characteristics and medical treatment before and during hospitalization were evaluated, as well as recommendations contained in the discharge summary. Performance measures included left ventricular ejection fraction (LVEF) documentation in medical history, any beta-blocker for patients with HF with reduced EF (HFREF); evidence-based beta-blocker for patients with HFPEF; inhibitor of the renin-angiotensin-aldosterone system (RAAS) for patients with HFPEF; warfarin for patients with atrial fibrillation; aldosterone antagonist for patients with HFREF; implantable cardioverter-defibrillator for patients with EF ≤35%; and referral to outpatient disease management.

**Results:** The median age was 54.4 ± 11.5 years. The mean baseline dose of furosemide was 108 ± 133.3 mg daily. All patients received their dose by half. There were no admissions for heart failure among study patients. There was no significant change in weight from baseline (87.4 ± 21.8 kg vs. 88.1 ± 21.5 kg, p=0.47), neither was there a significant change in renal function, serum Hb, as well as serum electrolytes (table 1).

**Conclusion:** Despite long hours with no oral intake, patients with CHF tolerated fasting well while requiring less diuretics. Larger studies are needed to determine if patients would normally drink less fluids if treated with less diuretics and if self-management with diuretics influences outcomes compared to strict regimens.
P1697 Impact of Ivabradine to improve the heart rate variability in patients with chronic heart failure

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Heart Rate Variability (HRV) is a noninvasive and sensitive technique to evaluate cardiovascular autonomic control and major determinant of cardiovascular health. Reduced HRV is an independent risk factor for heart disease and increased risk of mortality after a diagnosis of CHF or LV dysfunction.

The aim of the study is to analyze this circadian pattern in the HRV in patients with CHF and severe LV dysfunction (EF < 35%) in patients with HFREF and analyzed the effect of Ivabradine to improve the reduced HRV.

Methods: Were evaluated 30 pts mean ages 58.5 ± 3.5 y, with EF 33.5 ± 2.3 % in sinus rhythm. Holter ECG monitoring for 48 hours were performed in all pts in order to analyze the HRV before treatment with ivabradin (7.5 mg two times per day) 1st week and also a month after therapy. HRV was assessed based on the RR intervals and ECG signal was recorded using leads, to obtain a predictive value of reduced HRV by measuring 48 h standard deviation of N-N intervals (SDNN), also HRVindex, derived by dividing total heart rate intervals by the height of histogram. The echocardiography with speckle tracking imaging was performed basal and 1FMU in order to extract longitudinal strain.

Results: All patients with HFREF are with reduced SDNN - 55, ± 5 ms and reduced GLS -12.93 ± 3 %. The highest value for SDNN (> 70 ms) and HRV index are around 6.00 am and the lowest value are around 6.00 pm (~40 ms). Considering results from all SDNN and HRV index before and after treatment with ivabradin, the lowest values occur, on average, around 06:00 p.m. (B Legisl). In all patients, HRV on the 1st week and a month after therapy the HRV was assessed and the HRV index was found for all parameters before treatment and follow up (1FMU, 1FMU). After 1FMU therapy with ivabradin were found significant improvement of reduced HRV - SDNN 65.5 ± 36 ms , also in HRV index - 41.1 ± 1.2 ms. Reduced HRV is fairly correlated with EF % (p < 0.01, r = 0.47) and GLS % (p < 0.01, r = 0.47).

Conclusions: This is the first study to assess global physiological consequences of the circadian clock specifically within the myocardial deformation and HR/V This results provide evidence that the cardiomyocyte circadian clock influences not only heart rate and the responsiveness of the heart to increased workload, but also circadian pattern of regional dysfunction and deformation, which is important for global ventricular function. Ivabradin has positive effect to increase reduced HRV in patient with HFREF.


table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before (±SD)</th>
<th>After (±SD)</th>
<th>p Value</th>
</tr>
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<tr>
<td>Weight (Kg)</td>
<td>87.4±21.8</td>
<td>88.1±21.5</td>
<td>0.47</td>
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<tr>
<td>Hb (g/dL)</td>
<td>13.35±1.69</td>
<td>13.41±1.67</td>
<td>0.76</td>
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<td>Na (mmol/L)</td>
<td>137.9±6.2</td>
<td>137.9±4.2</td>
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<tr>
<td>K (mmol/L)</td>
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<td>4.64±0.62</td>
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<tr>
<td>BUN (mmol/L)</td>
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<td>6.74±2.96</td>
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<tr>
<td>Cr (µmol/L)</td>
<td>100.82±48.42</td>
<td>93.95±36.31</td>
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<tr>
<td>Mg (µmol/L)</td>
<td>0.84±0.10</td>
<td>0.82±0.10</td>
<td>0.38</td>
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</table>

Variables before and after a month of daytime fasting. Values are expressed in mean ± SD

P1698 Effects of sacubitril/valsartan vs. enalapril in paediatric patients with heart failure due to systemic LV systolic dysfunction: Design and rationale of the PANORAMA-HF study

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Background: Paediatric heart failure (HF) is characterised by significant morbidity and mortality, frequent hospitalisation, and poor quality of life. The rationale for medical therapy of paediatric HF primarily comes from adult studies. Sacubitril/valsartan (LCZ696) reduced mortality and delayed HF progression vs. enalapril, and was generally well tolerated in the PARADIGM-HF trial in adults with HF with reduced ejection fraction.

Study Design: This multicentre study will use an adaptive seamless, two-stage design (Figure). In part 1, an open-label, single-dose study with 36 paediatric HF patients (1 month to < 18 years) stratified into 3 age groups (Group 1: 6 to <18 years; Group 2: 1 to <6 years; Group 3: 1 month to <1 year) will receive sacubitril/valsartan in a sequential overlapping fashion and in descending age group order. The doses for Group 1 and 2 (0.8 mg/kg and 3.1 mg/kg) corresponds to 50 and 200 mg dose of sacubitril/valsartan in an adult with 50kg bodyweight. Group 3 will only be assessed with the 0.8 mg/kg dose of sacubitril/valsartan. The dose for Group 2, and subsequently for Group 3, may be adjusted based on safety information from the previous group(s).

Pharmacokinetics/pharmacodynamics and biomarkers (N-terminal pro-B-type natriuretic peptide and cyclic guanosine monophosphate) will be evaluated. Part 2 is a 52-week randomised, double-blind, parallel-group, active-controlled study. Eligible patients (N=350) will be stratified by age and functional classification and randomised to receive either sacubitril/valsartan or enalapril (target dose: 0.2 mg/kg twice daily (b.i.d); maximum dose 10 mg b.i.d). As there is no generally agreed, validated clinical efficacy endpoint for this patient population, a Global Rank primary endpoint has been developed; this will be derived by ranking patients (worst to best outcome) according to clinical events such as death, listing for urgent heart transplant or mechanical life support, worsening HF, and measures of functional assessment (New York Heart Association/PASS) and patient-reported outcomes (Patient Global Impression of Severity and the paediatric Quality of Life Inventory [physical functioning]). Additional patients will be enrolled to ensure that a minimum of 80 patients with clinical events are obtained. Safety areas of interest include identified risks common to both sacubitril/valsartan and enalapril such as hypotension, hyperkalaemia, worsening renal function, and angioedema.

Conclusion: This adaptive study design will determine if sacubitril/valsartan can offer a greater clinical benefit vs. enalapril in children with HF.

P1699 Safety of sacubitril/valsartan in patients receiving statins in the PARADIGM-HF trial

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Funding Acknowledgements: This study was funded by Novartis Pharma AG
Background: Sacubitril/valsartan (S/V) reduces mortality and morbidity in patients with chronic heart failure with reduced ejection fraction (HFREF). Healthy human studies showed that co-administration of S/V increased the Cmax of atorvastatin and its metabolites by up to 2-fold and AUC by up to 1.3-fold but did not find a similar increase with simvastatin. Both statins are widely used in patients with HFREF.

Purpose: To determine if concomitant use of statins with S/V was associated with a higher incidence of adverse events (AEs) in the PARADIGM-HF trial.

Methods: In the double-blind (DB) PARADIGM-HF trial, 8442 eligible patients with symptomatic HFREF were randomised, after consecutive run-in with enalapril (ENA) and S/V, to receive S/V or ENA in addition to other background therapy. In this post hoc analysis, potentially statin-related AEs and serious AEs (SAEs) were compared by treatment group, statin use (yes/no) at baseline and statin dose level (highest dose defined as ≥ 80 mg atorvastatin or simvastatin) in patients treated in DB period. The homogeneity of risk ratios (RR; S/V vs. ENA) of potentially statin-related AEs was evaluated by Breslow-Day test.

Results: Of the 8432 patients exposed to study treatment, 4633 (55.2%) received statins at baseline (most frequently atorvastatin or simvastatin). Common statin-related AEs including rhabdomyolysis, hepatitis and pancreatitis were low in both S/V and ENA groups (table). Rhabdomyolysis was reported in the S/V (n = 6) and the ENA (n = 3) group, with 1 case in each treatment group occurring without statin treatment. Medical review of rhabdomyolysis cases reported with S/V did not support a potential causal association with the drug (either an improbable temporal relationship with study drug, or presence of confounding factors). None of the assessed statin categories including statin vs. no statin, highest dose statin, atorvastatin, simvastatin or the combination demonstrated a statistically significant signal (p < 0.05) for an interaction between S/V and statins. The overall incidences of AEs and SAEs were higher in patients on a highest dose statin than in patients not taking statins but generally comparable between S/V and ENA treatment groups.

The rate of overall AEs and potentially statin-related AEs were also consistent across the frequently used statins.

Conclusions: Irrespective of concomitant statin treatment or statin dose level, no clinically meaningful differences in the AE profile were seen between S/V and ENA groups.

Background: Patients newly diagnosed with heart failure (HF) are initiated on HF medications however there remain patients who are not reaching these minimally important to prevent HF exacerbations. During Ramadhan months, Muslim are fast from dawn to sunset. There are no published guidelines/consensus in adjustment of medication during Ramadhan. Our study aim to evaluate the effectiveness and safety of standardized approach to individualize HF medications to twice-a-day regime, especially frusemide.

Methodology: Thirty patients recruited from outpatient HF clinic in a tertiary hospital. Convenience sampling for minimum 6 months. All patients were warm and dry at baseline. 60% has no differences throughout study in blood pressure, heart rate and body weight. However, one hospitalization due to dehydration secondary to overhydration, another patient required frusemide up titration as outpatient. Majority (87%) were able to comply with adjusted regime. 14% of the patient reported not thirsty and 43% very thirsty.

Conclusions: In our study, individualized frusemide adjustment among HF patient during Ramadhan is well-tolerated, effective and safe. However this study is limited by small sample size therefore further study is required to support wider practice recommendation.

Background: Patients newly diagnosed with heart failure (HF) are initiated on disease-modifying drug therapies and are gradually up-titrated to targeted doses. The success of this approach varies with studies reporting between 31-53% of patients achieving ACE inhibitor or angiotensin receptor blocker (ACEi/ARB) target dose and between 18-91% of patients achieving beta-blocker target dose.

Purpose: To determine if the extent to which prescription of recommended HF therapies and achievement of target doses of these agents is accomplished in patients attending a nurse-led outpatient HF clinic and (ii) the rate of adverse effects experienced by patients and the effect of adverse effects on titration to target doses.

Methods: This was a retrospective cohort study of HF patients post- de novo HF hospitalisation who first attended a nurse-led outpatient HF clinic in an Irish teaching hospital from January 2014 - June 2015. Chart review confirmed medications and doses prescribed, clinical and biochemical parameters. Target dose was defined from 2012 European Society of Cardiology heart failure guidelines where available or from the Summary of Product Characteristics of the originator product.

Results: Data were available for 51 patients (average age 65.3 ± 14.5 years, median 66). Of these, 42 patients had heart failure with reduced ejection fraction (HFREF) and 9 had heart failure with preserved ejection fraction (HFpEF). Median duration of titration was greater in HFREF patients (89 days) compared to HFpEF patients (47 days). At the end of the titration period, an ACEi/ARB was prescribed to 93% of HFREF and 78% of HFpEF patients. A beta-blocker was prescribed to 93% of HFREF and 67% of HFpEF patients. In the HFREF group 33.3% of patients were titrated to target ACEi/ARB dose, 9.5% to target beta-blocker dose and 4.8% to the target dose of both medications. An adverse effect was experienced by 92.2% of all patients during titration. The most common adverse effects were excessive reduction in blood pressure (n = 31, 60.8%), excessive reduction in heart rate (n = 26, 51.0%), high serum potassium level (n = 18, 35.3%) and deterioration in renal function (n = 20, 39.2%). No patient experienced adverse changes to pulmonary function. Taking into account titration limiting adverse effects, an individualized maximum tolerated ACEi/ARB and beta-blocker dose was reached in 90.5% and 78.6% of HFpEF patients respectively.

Conclusion: Over an average period of three months, a nurse-led HF clinic successfully titrated HFpEF patients to target medication doses which were maintained over one-year follow-up. The majority of patients were titrated to maximum tolerated doses of HF medications however there remain patients who are not reaching these individualised used doses. Adverse effects were the main barrier preventing titration in both HF patient groups.
failure (ADHF) remains poor, with over 15–20% mortality and 30–40% readmission rates in the first year post-discharge. In the PARADIGM-HF trial, the angiotensin receptor-neprilysin inhibitor sacubitril/valsartan was well tolerated and, compared with enalapril, was found to provide highly significant reductions in rates of mortality and HF hospitalization, and to delay HF progression. Given that PARADIGM-HF enrolled only patients who were ambulatory at the time of inclusion, there is limited evidence at present on the safety and tolerability of initiating sacubitril/valsartan treatment in patients hospitalised due to ADHF.

Methods: TRANSITION is a randomised, multi-centre, open-label clinical trial designed to compare pre-versus post-discharge sacubitril/valsartan treatment initiation in patients hospitalised for ADHF, including patients with newly diagnosed HF. The study aims to randomise 1000 hospitalised patients with HF with reduced ejection fraction (HFrEF, LVEF ≤ 40%) after hemodynamic stabilisation (defined as no need for intravenous diuretics in 24 hours prior to screening and systolic blood pressure > 115 mmHg for at least 6 hours prior to randomisation). All patients are stratified by pre-admission treatment status: on an angiotensin converting enzyme inhibitor (ACEI), on an angiotensin receptor blocker (ARB), or ACEI/ARB-naïve. Patients are randomised 1:1 within each stratum for initiation of sacubitril/valsartan treatment either pre-discharge (no later than 12 hours before discharge) or within 1–14 days post-discharge. The study design is represented in Figure 1. The primary endpoint is the proportion of patients achieving the target dose of 200 mg sacubitril/valsartan twice daily at 10 weeks after randomisation. Key exploratory endpoints will assess among others, patterns of biomarkers (N-terminal pro B-type natriuretic peptide, NT-pro-BNP, and high-sensitivity C-reactive protein (hsCRP) levels in patients with HFrEF and diabetes mellitus type II.

Current status: Presently, 244 patients have been randomised in 16 countries and 133 centres at the time of abstract submission.

Conclusion: TRANSITION study will provide evidence on the safety and tolerability of initiating sacubitril/valsartan treatment pre-discharge or shortly after discharge, in hemodynamically stabilised patients with HFrEF hospitalised for ADHF.

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STUDY DESIGN

P1704
Comparative efficacy of long-term digoxin and ivabradine therapy on prognosis, left and right heart functional parameters in patients with chronic heart failure and preserved ejection fraction

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The aim of study was to assess the comparative efficacy of long-term digoxin (D, 0.25 mg) and ivabradine (I, 15 mg) therapy on prognosis, left (L) and right ventricular (RV), left atrial (LA) and right (RA) atrial parameters, NT-pro-BNP and high sensitivity C-reactive protein (hsCRP) levels in pts with III NYHA functional class chronic heart failure (CHF) and preserved LV ejection fraction (LVEF). Methods: 165 pts (age 63.2) with symptomatic CHF and PEFF in sinus rhythm with heart rate (HR)=70 bpm were randomly assigned to groups A (n = 55, receiving D), B (n = 53, receiving I), and C (n = 57, non-receiving both drugs) in addition to ACE inhibitors, beta-blockers and diuretics. RV fractional area change (FAC), tricuspid annulus plane systolic excursion (TAPSE), pulmonary artery (PA) ejection (ET) time, RA and LA functional index (Fl), relation of pulmonary vein (PV) systolic and diastolic fraction (S/D), PV systolic contribution (SC), difference between duration of reversal atrial flow (Av) and late (A) transmural filling, NT-pro-BNP and hsCRP levels were assessed at baseline, 12, 24 and 36 months.

Results: 1-year, 2-year and 3-year mortality were 29.1%, 34.6% and 43.6%; 30.2%, 37.7% and 45.5%; 35.1%, 42.1% and 52.6% in groups A, B, and C, respectively. 1-year, 2-year and 3-year hospitalization rates were 41.8%, 52.7% and 61.8%; 43.4%, 54.7% and 62.3%; 63.3%, 75.4% and 82.5% in groups A, B and C, respectively. Event-free analysis showed lower probability (RR reduction) of 1-year, 2-year and 3-year hospitalization rates at 33.9% and 31.3%, 30.1% and 27.5%, 25.1% and 24.5%, respectively, in groups A and B compared to group C (p < 0.05) and trend to reduction of 1-year, 2-year and 3-year mortality at 17.1% and 14.3%, 10.5% and 13.6%, 10.1% and 17.1%, 1-year and D treatment increased (%) (RF) FAC at 28.5 and 27.2, TAPSE at 40.2 and 40.1, PA ET at 17.8 and 16.2, PV SC at 40.2 and 40.1, RA Fl at 34.8 and 40.6, and LA Fl at 43.6 and 45.4, PV S/D at 35.2 and 33.4, decreased Ar-A at 82.7 and 79.1, levels of NT-pro-BNP at 36.1 and 34.9 and hsCRP at 40.1 and 39.9 (p < 0.05 for all). Reduction of NT-pro-BNP, hsCRP<40% and HR<25% was associated with significant improvement of morbidity compared to decrease of NT-pro-BNP, hsCRP<25% and HR<15% (RR 0.35, 0.33 and 0.32, p<0.05, respectively). Similarly, changes of RA and LA Fl, PV S/D<50%, PAET<80%, Ar-A<80% were associated with significant improvement of hospitalization compared to changes of RA and LA Fl, PV S/D<30%, PAET<15% and Ar-A<60% (RR 0.37, 0.36, 0.35, 0.34, and 0.33, p<0.05, respectively).

Conclusions: 1) Changes of Ar-A≥80%, RA and LA Fl, PV S/D<50%, NT-pro-BNP, hsCRP≥40, PAET and H<25% identified pts with hospitalization risk reduction. 2) I and D use associated with significant reduction of morbidity and trend to reduction of mortality due to significant improvement of RF, LA and RA functional parameters, neurohumoral and inflammation status and HR reduction.

Poster session 3 413

P1705
Results of a single center experience on 200 consecutive patients treated with Entresto (sacubitril/valsartan)

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Background: Guidelines for the treatment of chronic heart failure (HF) currently recommend Entresto as replacement of ACE-I or ARB in patients with HFREF who remain symptomatic despite optimal treatment to reduce the risk of HF hospitalization and cardiovascular death. However, the detail of the improvement sequence of patients treated by angiotensin receptor neprilysin inhibitor remains unknown due to the lack of data during the run in period before the randomization in the PARADIGM trial.

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Objective: We report the results of our monocentric cohort of 200 consecutive sys-
tolic HF patients treated with Entresto. Between October 2015 and September 2016, 200 patients were evaluated, 180 were evaluated one month after introduction, 157 three months after, and 99 after six months of follow up.

Results: All patients were in stable hemodynamic condition with an optimized phar-
macological therapy at baseline (95% were treated with ACE-I or ARB, 93.5% with beta-blocker and 80% with MRA), 81% were men, mean age was 59 years old. 51% of patients had ischemic HF and the median duration of HF was 8.5 years. 2.5% of the patients were in NYHA class I (but with poor prognosis factor such as elevated BNP level), 68% were in class II, and 29.5% in class III. During the follow-up period, 8.5% patients discontinued treatment for adverse events, 6% were heart trans-
planted, and 6% died of cardiovascular causes. Entresto was initiated at half dosage or less depending on the fragility of the patient, (78% at 49 mg/51 mg twice daily and 22% at 24 mg/26 mg twice daily). Patients attended a first follow-up appointment after one month of treatment. If tolerance was good, dosage of sacubitril/valsartan was increased. At 3 months, 82% of patients received the target dose of 97 mg/103 mg, 14% the half dose (49/51 mg) and 4% the low dose (42/46 mg). After 1 month of treatment, functional class improved significantly with 4.5% NYHA 1, 81% NYHA 2, and 14.5% NYHA 3 (p < .0001), as the 6 minutes walk distance (511 vs 461 m, p < .0001). These improvements occurred from the first month of treatment with the half dosage of sacubitril/valsartan and were still significantly present after six months of follow up. Regarding tolerance, systolic blood pressure decreased (105 vs 99 mmHg, p < .0001) and serum creatinine increased significantly after one month of treatment (1.17 vs 108 µmol/L, p < .0001). After six month of treatment, the dose of furosemide decreased (114 mg vs. 74 mg, p < .0001) and the BNP did not significantly change (587 pg / ml vs. 709, p < .0001). The results of this “real life” cohort confirm the benefits of the treatment of Entresto in stable systolic heart failure patients. These changes seem to significantly change (587 pg / ml vs. 709, p < .0001).

Discussion: We can see that medication management of HF wasn’t perfect. Most of patients that was free from any diuretic therapy at 3 months was free from any diuretic therapy at 3 months was 45% versus 62% in the high versus low chloride concentration group (P-value=0.265). Successful loop diuretic down-titration could be performed in 3 out of 4 euvolemic CHF patients, irrespective of urinary chloride concentration on spot samples collected after diuretic intake. The need for long-term diuretic use may be reduced in patients with low urinary chloride concentrations.

Conclusion: Loop diuretic down-titration in stable chronic heart failure: role for spot urinary chloride analysis? FH Frederik Hendrik Verbrugga1, P Martens1; L Boonen1; P Nijs1; D Verhaert1; P Noyens1; P De Vusser1; M Dupont1; WMW Tang1; W Mulens1

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Background: Loop diuretic efficiency, defined as natriuresis per dose of loop diure-
tics administered, is a powerful predictor of clinical outcome in chronic heart failure (CHF), irrespective of underlying renal function. A poor natriuretic response to loop diuretics may indicate either true diuretic resistance, which is associated with resid-
ual congestion and poor clinical outcome, or alternatively thorough decongestion and relative sodium depletion. Therefore, a preserved natriuretic response to loop diuretics in CHF may indicate subclinical congestion or high salt intake, indicating the need for continued diuretic treatment.

Purpose: This study investigated spot urinary chloride concentration, assessed with a simple point-of-care test strip, in euvolemic CHF patients after intake of mainte-
nance loop diuretics. It was hypothesized that lower urinary chloride levels would predict successful down-titration. Urinary chloride instead of sodium concentration, measured from one point-of-care test is available for sodium and both uri-
inary sodium and chloride are strongly correlated.

Methods: This prospective cohort study included 50 ambulatory CHF patients on maintenance loop diuretic therapy without recent (< 3 months) hospital admission, clinical signs of volume overload, or recent adjustment in neurohumoral blocker or diuretic therapy. Spot urinary samples were collected immediately after loop diuretic intake. Subsequently, maintenance loop diuretic dose was reduced with 50% or stopped if ≤40 mg furosemide equivalents. Successful down-titration was defined as persistent dose reduction after 7 days, without body weight increase >1.5 kg. Patients were followed for up to 30 days.

Results: Urinary chloride concentration was 3.045 ± 1.271 mg/L, overall. Patients with a higher versus lower urinary chloride concentration showed not differences in baseline characteristics, took the same dose of loop diuretics (40 mg [20 mg] furosemide equivalents; P-value=0.509) and had similar plasma NT proBNP lev-
els [1,179 ng/L (311 2,195 ng/L) versus 900 ng/L (255 1,622 ng/L), respectively; P-value=0.461]. Down-titration was successful in 72% versus 76% in both groups, respectively (P-value=1.000). At 30 days, loop diuretic dose remained reduced in 59% versus 76% of patients, respectively (P-value=0.238). The proportion of patients that was free from any diuretic therapy at 30 days was 45% versus 82% in the high versus low chloride concentration group (P-value=0.265).

Conclusion: Successful loop diuretic down-titration could be performed in 3 out of 4 euvolemic CHF patients, irrespective of urinary chloride concentration on spot samples collected after diuretic intake. The need for long-term diuretic use may be reduced in patients with low urinary chloride concentrations.

Conclusion: This collaboration is a complete success, physicians and pharmacists will continue to work together to medication management of HF and others stud-
ies about therapeutic education are in progress.
The aim of the study was to investigate features of congestive heart failure in patients with post-MI one year after with distinct methods in the acute period. Methods: 103 patients with acute myocardial infarction with ST-segment elevation were enrolled in the study. Their congestive heart failure clinical signs were assessed as well as their exercise tolerance and level of NT-proBNP at hospital discharge and one year after. Mean age was 56 ± 9, 59 years, with 81.9 ± 9 % of men. All the patients depending on availability and revascularization method in acute myocardial infarction were divided into 3 groups: Group 1 (n = 28, 27.7 %) consisted of patients who underwent thrombolytic therapy (TLT), Group 2 (n = 42, 41.6 %) of patients with percutaneous coronary intervention (PCI), and Group 3 included patients without myocardial revascularization (n = 31, 30.7 %).

Results: Analysis of the results revealed NT-proBNP level exceeding the threshold. NT-proBNP >125 µg / ml was found in 76.2 % of patients in Group 1, in Group 2 - in 69 % of cases, in Group 3 in 85 % of patients. The average concentration of NT-proBNP was significantly lower in patients who underwent PCI (150±10, 1 pg / ml), compared with an average level of NT-proBNP 470 ±117, 6 pg / ml in patients without repertusion (p = 0.000). In addition, there is a clear tendency towards accuracy by comparing the average NT-proBNP level of Groups 1 and 2 (p = 0.072) with the lowest value in patients with a history of PCI. Analysis of CHF clinical manifestations showed that in patients of Group 1 and 2 after a year of observation there was a significant decrease in the average score on the rating scale of clinical stage by 24 % (p = 0.000) and 30 % (p = 0.000) respectively and an increase in the average distance in the six-minute walk test (SMWT) in Group 1 by 10.5 % (p = 0.000), in Group 2 - by 11.7 % (p = 0.000). This indicates a reduction in the severity of CHF-symptoms and enhanced exercise tolerance. However, in patients of Group 3 there was observed deterioration in exercise tolerance (p = 0.021) and more pronounced CHF symptoms (p = 0.022) over time. Conclusion: Patients with PCI had a lower NT-proBNP level as well as less pronounced congestive heart failure as compared with the values in the experimental groups. Thus, it can be argued that there is a positive effect of the invasive strategy on congestive heart failure development and progression.

Poster session 3

P1710
Heart failure with recovered ejection fraction: clinical characteristics, determinants and prognosis.
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Background: The magnitude and the prognostic impact of recovering left ventricular ejection fraction (LVEF) in patients with heart failure (HF) and systolic dysfunction is unclear.

Purpose: The aim of our study was to evaluate the clinical characteristics and prognosis of patients with HFpEF in a HF population.

Methods: We selected 449 consecutive patients with the diagnosis of HF and evaluation of LVEF in the previous 6 months, who were referred to two HF units. Patients with systolic dysfunction were only considered if a second echocardiogram was performed during the follow-up.

Results: At the time of diagnosis, 207 patients had LVEF >40% (HFpEF) and 242 had LVEF <40% (HFpEF). After 1 year, the LVEF was re-evaluated in all 242 patients with a LVEF >40%: In 126 (52%), the second LVEF was >40% (HFpEF); and the remaining 116 (48%) had LVEF <40% (HFpEF). After 58 ± 27 months of follow-up patients with recovered LVEF had a significantly lower mortality rate (HFpEF vs. HFpEF2): Hazard Ratio (HR) = 0.86, 95% confidence interval (95%CI) 1.26–1.45, p = 0.0196; HFpEF vs. HFpEF2: HR=2.22, 95%CI, 1.18–4.186, p = 0.031) and hospitalization rate (HFpEF2s vs. HFpEF2: HR=1.411, 95%CI, 0.164–1.903, p = 0.022; HFpEFs vs. HFpEF2: HR=1.388, 95%CI, 1.02–1.824, p = 0.049). The following are predictors of LVEF recovery: younger age, lower functional class, treatment with renin-angiotensin-aldosterone system inhibitors and beta-blockers, absence of diabetes (respectively 46.1% and 29.5%), chronic obstructive pulmonary disease (respectively 42.1% and 23.6%), and with beta blockers (respectively 76.3% and 69.6%).

Conclusions: The patients approximately half of the patients with HF and reduced LVEF who were re-evaluated after one year showed significant improvement in their LVEF, having a more favourable prognosis than HF with preserved and reduced ejection fraction.

P1711
Prognostic value of different cardiomyopathic syndrome variants during the chronic heart failure.
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The aim of the study was to assess the influence and prognostic values of different variants of cardiopathic syndrome (CHS) during the chronic heart failure (CHF). Design and method: A prospective analysis of the main symptoms and signs of CHF within 1 year in 86 patients were done (35 female (40.7%), 56.5 ± 15.7 years (95% SD)). 52 patients with essential arterial hypertension (AH), 38 with atrial fibrillation (AP), 18 with myocardial infarction in anamnesis. Only ALT and/or AST increase were considered as hepatocellular CHS. 42 patients with diagnosis on congestive heart failure development and progression.

Results: CHS was observed in 76 (91.9%) patients, mixed CHS prevailed in patients (61 patients (67.1%); less was cholestatic CHS - 23 patients (30.3%), only 2 patients were identified hepatocellular CHS (2.6%) presented. Cholestatic CHS more often than mixed CHS developed in obese patients (respectively 63.2% and 25.8%), in patients with diabetes (respectively 46.1% and 29.5%), chronic obstructive pulmonary disease (respectively 42.1% and 23.6%). However, in patients with mixed CHS worse than hepatocellular CHS was myocardial contractility (ejection fraction decrease, respectively: 60.4% and 37.2%). Manifestations of CHF associated not only with systemic congestion but also with peripheral edema more likely were observed in patients with hepatocellular CHS. Violations of the functional state of the liver were most significant in mixed CHS in comparison with cholestatic CHS and hepatocellular CHS. They characterized by more significant AST increase (respectively: 42.8 ± 2.4, 22.5 ± 2.1, 36.8 ± 2.7 U / l, ALT (respectively: 49.4 ± 4.8, 32.8 ± 1.7, 20.8 ± 1.8 U / l, DB (respectively: 10.8 ± 2.2, 8.2 ± 0.4, 4.4 ± 2.0 mmol / l) and TB (respectively: 29.8 ± 1.3, 26.4 ± 2.0, 14.4 ± 1.7 mmol / l). Also mixed CHS it was worse than cholestatic and hepatocellular CHS coagulation and blood parameters (prothrombin index, respectively: 69.8 ± 2.4, 78.2 ± 3.6, 82.5 ± 4.3%) and hypoalbuminemia (respectively: 36.8 ± 1.8, 47.2 ± 2.1, 43.4 ± 1.7 g / l).

Indicators CHF markers - NT-proBNP were worse in patient with mixed CHS than cholestatic CHS (respectively: 879 ± 154.22 ng/ml vs 407 ± 117, 6 pg / ml in patients without repertusion (p = 0.000). In addition, there is a clear tendency towards accuracy by comparing the average NT-proBNP level of Groups 1 and 2 (p = 0.072) with the lowest value in patients with a history of PCI. Analysis of CHF clinical manifestations showed that in patients of Group 1 and 2 after a year of observation there was a significant decrease in the average score on the severity of CHF-symptoms and enhanced exercise tolerance. However, in patients of Group 3 there was observed deterioration in exercise tolerance (p = 0.021) and more pronounced CHF symptoms (p = 0.022) over time. Conclusion: Patients with PCI had a lower NT-proBNP level as well as less pronounced congestive heart failure as compared with the values in the experimental groups. Thus, it can be argued that there is a positive effect of the invasive strategy on congestive heart failure development and progression.

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and significantly worse functional state of the liver that is associated with higher levels of NT-proBNP.

P1712 Validation of the seattle heart failure model (SHFM) in an Iranian heart failure population
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Background: The accuracy of Seattle Heart Failure Model (SHFM) in Iranian heart failure patients is unclear. This study aims to validate SHFM for Iranian heart failure patients.

Methods and Results: We evaluated SHFM for 176 ambulatory patients with systolic heart failure (ejection fraction ≤40%), who presented to a Heart Center clinic in Iran. The mean age of participants was 58.2 ± 10.5 years and 119 (67.6%) were male. The mean ejection fraction was 24.7 ± 6.1. Etiology of heart failure in 61% of the patients was ischemic and 123 patients were in NYHA class II. Eight patients died during one year follow up. Sensitivity of the model for our population was 97% and specificity was 87.5%. The positive predictive value was 95.6% and negative predicted value was 20%. The overall accuracy of the model was 73.2%.

Conclusion: The SHFM can predict the one-year survival of Iranian heart failure patients reasonably accurate. However, the mortality prognostic ability of the model is poor in our population.

P1713 Frailty conferred incremental prognostic significance in Chinese heart failure patients with advanced heart failure
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Background: Despite increased emphasis on comprehensive management of heart failure (HF), current assessment of HF focuses solely on disability. Frailty has been increasingly recognized as an important indicator of adverse prognosis in HF patients. Recipients of heart transplants or ventricular assist device (VAD) are the best population to assess for potential improvement of HF-related frailty. Frailty among advanced HF in Chinese patients is unknown.

Method: Patients referred for consideration of heart transplantation or left ventricular assist device (LVAD) from May 2015 to Oct 2016 underwent frailty assessment. Physical frailty was defined as a positive response to 3 or more of the following 5 components: weak hand grip strength, 6-minute walk test, gait speed, low physical activity and exhaustion. Cognitive assessment (Montreal Cognitive Assessment-Hong Kong version) and depression screening (Hospital Anxiety and Depression Scale) were also performed with positive response being MoCA score <22 and depression score ≥8 respectively. Total frailty score ranges from 0-7. All patients were prospectively followed for clinical outcomes.

Results: Fifty patients (mean age 58.4 ± 10.4 years; left ventricular ejection fraction 21.1 ± 13.6%); 54% New York Heart Association Class IV; 42% required isotropic support) underwent frailty assessment. Physical frailty could be identified in 27 (54%) pts while 17 (34%) pts obtained total frailty score ≥4. Overall frailty score ≥4 was associated with positive clinical events (p < 0.041) including death (n=2), LVAD implantation (n=7), heart transplant (n=4) and left ventricular reduction surgery (n=2).

Conclusion: Frailty is prevalent among non-elderly younger Chinese patients with advanced heart failure referred for heart transplantation or LVAD implantation. It provides added prognostic value in HF pts at risk for poor outcomes and high medical consumption.

P1714 Is serum uric acid level an independent predictor for prognosis in advanced systolic heart failure patients with diabetes mellitus?
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Heart failure (HF) is a major public health problem responsible for high morbidity and mortality rates. Therefore, the importance of survival predictors in directing the treatment of HF is gradually increasing. Serum uric acid levels elevated in patients with heart failure. 30-40% of patients with HF has diabetes mellitus. Our objective was to evaluate the association between levels of uric acid and mortality in advanced HF patients with diabetes mellitus.

Study Design: 250 patients (mean age 67 ± 10 years, 151 male, 99 female, mean ejection fraction [EF] 29 ± 9%) with advanced systolic heart failure and diabetes mellitus were included to the study. Clinical, echocardiographic, and biosocial parameters were measured at baseline, and all patients were followed. Cardiac death was established as the end point of the study.

Results: 121 patients (48 %) of the cohort died during a median follow-up duration of 52 months. Serum uric acid levels were significantly higher in the deceased patients compared to the patients who survived in advanced HF patients with diabetes (8.4 ± 2.3 vs. 7.0 ± 1.8 mg/dl, p < 0.001).

After adjusting for multiple confounders multivariate Cox regression analysis showed that the serum uric acid level was the strongest parameter predicting prognosis (HR-1.21, 95% CI 1.11–1.31, p < 0.001) in the patient group.

Conclusion: Serum uric acid level is a very important predictor to determine mortality in advanced systolic HF patients with diabetes mellitus.

P1715 The history of syncope as a risk factor for hospitalization and mortality - A robust predictor for all heart failure patients
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Introduction: Data from small cohorts suggested that a history of syncope (HoS) of any origin is associated with a higher risk for sudden death in patients (pts) with advanced heart failure (HF). It is known that among HF pts with a HoS left-ventricular (LV) systolic dysfunction is more prevalent than in those without HoS. However little is known about the role of syncope in pts with HF with preserved EF (HFpEF) despite approximately 50% of HF pts account for HFpEF. We aimed for the differences between the HF entities and the prognostic effect in a large pooled patient cohort.

Methods: We pooled data from 4659 subjects from several heart failure trials of the competence network HF. Excluding insufficient follow-up details we evaluated 4256 pts (1576 HFrEF, 584 HFpEF). HFrEF was defined as LVEF <40% and in HFpEF pts (p < 0.001). After adjustment for age, gender, NYHA Class, medication, co-morbidities, device therapies, lab work and echo parameters plus HoS with a logistic regression model.

Results: 13.2% of the pts reported a HoS. We learned that pts with HoS took more often distinct medication (diuretics, antithrombics and glycosidics), were more often female, older, hypertensive, anemic and suffered from both CKD and structural heart disease. NYHA classes were positive correlated with syncope. Our data confirms that the HoS was more prevalent in HFrEF than in controls (p < 0.001) and in HFpEF pts (p = 0.029). In contrast, in HFpEF pts, it was not different from healthy controls (p = 0.129). After adjustment for age, gender, NYHA Class, medication, device therapy, history of CAD or AMI, present anemia and depression, our results remained consistent and showed that HoS is independent from these confounders. Pts with HoS at baseline were more likely to suffer from syncope during follow-up regardless of HF entity (HR-p < 0.004), HFpEF [p < 0.001], HFrEF [p < 0.001], HFrEF [p < 0.001].

Discussion: Taking into account the lower prevalence of HoS in HFpEF pts the explanation for syncope in HFrEF pts the explanations with arrhythmia and sudden cardiac death. This explains the high numbers of ICDs, RN and LV pacemakers and antithrombics drugs in our HFpEF data. The idea of arrhythmic episodes leading to hemodynamic instability among the HFpEF population is as an explanation for both HoS and worse outcome is confronted with the statistical adjustment for ICD therapy in these pts which did not reduce the effect of HoS. In conclusion, the pathophysiology remains undefined and further assessment of HoS as a highly promising tool in the setting of HF in prospective trials is required.

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**P1716**

Endothelial progenitor cells and apoptotic endothelial cell-derived microparticle as biomarker of chronic heart failure phenotype

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**Background:** Chronic heart failure (HF) remains a leading cause of cardiovascular (CV) mortality and morbidity worldwide. The aim of the study was to investigate whether the pattern of angiogenic endothelial progenitor cells (EPCs) and apoptotic endothelial cell-derived microparticles (EMPs) was able to discriminate HF with reduced (HFrEF) and preserved (HFpEF) ejection fraction.

**Methods:** One hundred sixty four chronic HF subjects met inclusion criteria. Patients with global left ventricular ejection fraction ≥50% were categorized as the HFpEF group (n=79) and those with <45% as the HFrEF group (n=85). Therefore, to compare the circulating levels of biological markers 35 control subjects without HF were included in the study. All control individuals were age- and sex-matched HF patients. The serum level of biomarkers was measured at baseline. The etiology (previous myocardial infarction), cardiovascular risk factors (obesity, type 2 diabetes mellitus) we found that NT-proBNP (OR 1.08; 95% CI 1.03 – 1.12; P=0.001) and CD31+/annexin V+ cells ratio (OR 1.06; 95% CI 1.05 – 1.12; P=0.002) were independent predictors of HFpEF.

**Conclusion:** We found that CD31+/annexin V+ EMPs to CD14+CD309+ cells ratio added to NT-proBNP clinical data, and cardiovascular risk factors has exhibited the best discriminate value and higher reliability to predict HFpEF compared with NT-proBNP and clinical data / cardiovascular risk factors alone.

**P1718**

Low serum chloride levels in patients with heart failure: clinical associations and prognostic significance

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**Background:** Low serum chloride levels might be common in patients with chronic heart failure (CHF). It may be a consequence of treatment or a marker of disease severity.

**Aim:** We assessed the prevalence, clinical associations and prognostic significance of low serum chloride in patients referred to a heart failure (HF) clinic with suspected HF.

**Methods:** Patients with baseline echocardiogram and serum chloride were evaluated (n=5613). CHF was defined as the presence of signs or symptoms compatible with the diagnosis and either left ventricular systolic dysfunction (LVSD), defined as heart failure with reduced ejection fraction (HFRE), or LVSD absent or at most mild and NT-proBNP >125 ng/L, defined as heart failure with normal ejection fraction (HFNEF). Hypochloraemia was defined as less than 2 standard deviations below the mean chloride level in normal distribution (<96 mmol/L).

**Results:** Of the 5613 patients, 908 patients did not have HF, 1988 had HFREF, and 2717 had HFNEF (table 1). The prevalence of hypochloraemia in patients with HF was 10.7%. It was more common in HFREF (12.6%) than in HFNEF (9.3%) (P<0.001). Compared to those in the higher quartiles, patients in the lowest quartile of serum chloride (median 96 mmol/L, range 76-99 mmol/L) had higher NT-proBNP and were more breathless and congested on assessment. The annual mortality rate for HFREF and HFNEF was 12.9% and 9.4% (P=0.001) respectively. Chloride predicted both all-cause mortality (ACM) hazard ratio (HR) 0.97 (95% confidence interval [CI] 0.95-0.99), P=0.001 for HFREF and HR 0.97 (95% CI 0.95-0.98), P=0.001 for HFNEF and the combined end-point of mortality or heart failure hospitalisation (HR 0.97, 95% CI 0.96-0.99), P=0.006 for HFREF and HR 0.96 (95% CI 0.95-0.98), P<0.001 for HFNEF.

**Conclusions:** Low serum chloride levels are independently associated with increased all-cause mortality and hospitalisation for heart failure in patients with CHF, regardless of left ventricular ejection fraction.
Background: Estimation of the risk of heart failure (HF) hospitalizations has been historically much more difficult than predicting the risk of death. The BCN-Bio-HF-calculator incorporating NTproBNP (marker of myocardial stretch), high-sensitivity cardiac troponin T (marker of myocyte injury), and soluble ST2, reflective of myocardial fibrosis, remodeling and inflammation) was developed 3 years ago for better estimating the risk of death up to 3 years.

Methods: Several clinical and routine laboratory data with biomarkers reflecting different pathophysiological pathways might also improve the prediction of HF-related hospitalizations.

Methods:
- Several clinical and treatment variables and extension of prediction to 5-year was performed in order to assess 1-, 2-, 3-, 4- and 5-year risk of all-cause death, HF-related hospitalization and the composite end-point all-cause death/HF-related hospitalization. Model performance was evaluated using discrimination, calibration, and reclassification tools.

Results: The BCN-Bio-HF-calculator was derived from 864 consecutive outpatients (72% men) with mean age 68.2 ± 12 years (65.5% HFpEF, 26.2% NYHA class II/III, LVEF 36%). The follow-up for the present up-graded version was 5 years for the alive patients. During follow-up 363 deaths and 210 HF-related hospitalizations were observed. 430 patients suffered at least one event of the composite end-point. Three new clinical variables (duration of HF in months, number of HF-related hospitalizations and HErEF) were added to the previously included variables. Beta-values for ARNI treatment were derived from the benefit observed in the Paradigm Trial. As with the former BCN-Bio-HF-calculator, eight independent models were developed and the calculator may run with the availability of none, one, two, or the three biomarkers. The calculated risk of all-cause death, HF-related hospitalization, and the composite end-point significantly improved by additive biomarker data. The average C-statistic for the model with the 3 biomarkers using the “sky” Somers rank correlation which incorporates information from censored data (time-to-event outcome) was 0.78 for all-cause death, 0.73 for HF-related hospitalization and 0.76 for the composite end-point, while the AUC at 5 years considering each event as a binary outcome (logistic regression models) were 0.85, 0.76 and 0.84 respectively.

Conclusions: A new version of the BCN-Bio-HF-calculator that incorporates some new clinical variables together with 3 biomarkers reflecting different pathophysiological pathways better allowed individual prediction of all-cause death, HF-related hospitalization and the composite end-point at 1, 2, 3, and 4 and 5 years.

Background: Controversy exists as to whether patients with heart failure with mid-range ejection fraction (HFmEF), defined as ejection fraction (EF) 40-49%, represent a distinct heart failure (HF) subtype.

Purpose: To analyze baseline characteristics and outcome of patients with HFlmEF compared to patients with preserved (HFpEF, EF≥50) and reduced (HFReF, EF<40%) ejection fraction.

Methods: Prospective observational study of HF patients followed up at 4 university hospitals with a dedicated Heart Failure Unit. Baseline characteristics and outcomes were recorded.

Results: Fourteen percent (n = 504) of the 3580 patients included had HFlmEF. In this group mean age was 68 ± 13 years (compared with 66 ± 13 years in HFlmEF and 74 ± 11 in HFReF, p < 0.001) and 40% were female (30% in HFlmEF and 57% in HFReF, p < 0.001). Functional class (NYHA III-IV) was similar between HFlmEF and HFlmEF (34% and 33% of patients, respectively), but worse in HFlmEF (44%), p < 0.001. NTproBNP was highest in HFlmEF (median 1689 [769-4465] ng/L) and decreased as EF increased (1484 [532-3966] ng/L in HFlmEF and 1320 [635-2818] in HFReF), p < 0.001. The main etiology for HF was ischemic in HFlmEF and HFlmEF (52%) whereas it was hypertensive in HFlmEF (42%). As expected, use of beta blockers, ACEI and MRA were higher in HFlmEF, and its use decreased in HFlmEF. Median follow-up was 3.66 [1.69-6.04] years. In the whole cohort, all-cause death, HF hospitalization and the composite end-point were 47%, 36% and 59%, respectively. Outcomes were worse in HFlmEF, without differences between HFlmEF and HFReF (Figure 1). However, after multivariate analysis, no differences in outcomes were seen between the three groups.

Conclusions: Patients with HFlmEF have a clinical profile in between HFlmEF and HFReF. There were no differences in all-cause mortality and HF hospitalization between the three groups.
P1723
The importance of heart rate as a predictor of cardiac functional recovery in newly diagnosed heart failure

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Background: Left ventricular ejection fraction (LVEF) predicts outcomes in HF patients. In patients with HF and reduced LVEF, rates of LV recovery (LVR) range between 19% and 50%, but factors predictive of LVR remain unclear.

Methods: Review of the electronic medical record identified between 2006 and 2016 224 consecutive patients aged > 18 years, new HF diagnosis and a LVEF ≤ 35% who received guidelines-directed medical therapy (GDMT) and were followed ≥ 1 year. LVR was defined as a rise in LVEF ≥ 40%. Stress-induced cardiomyopathies were excluded. After determination of LVR rates, patients with LVR were compared with those with persistent LV dysfunction (LVD) in terms of clinical characteristics and the composite outcome of death and HF hospitalization using the log-rank test. Multivariate logistic regression analysis was utilized to identify baseline clinical variables predictive of LVR. LVEF was serially measured by echocardiogram. GDMT target doses were per published guidelines.

Results: Population characteristics were: age = 63 ± 13; 38.5% female; 83.2% Caucasian; 38.1% ischemic HF; baseline LVEF = 23% ± 6%; baseline heart rate (HR) = 70 bpm. Background GDMT: ACE inhibitors (ACEi) = 74.3%; Angiotensin receptor blockers (ARB) = 19.7%; Beta blocker (BB) = 95.4%; Aldosterone antagonist (AA) = 34.0%; the % of patients achieving target doses of ACEi and BB were, respectively, 33.7 and 40.2. LVR occurred in 154/224 patients (63.1%), and the median time to LVR was 9.6 months (IQR = 4.5-19.0). Average final EF in LVR patients was 49% ± 6%. Compared to LVD, LVR included fewer patients with ischemic HF (64.4% vs. 28.6%, p < 0.001) and CKD (3.9% vs. 11.1%, p = 0.028), and more subjects on ACEi (67.4% vs. 80.3%, p = 0.025) and target BB doses (30.9% vs. 46.1%, p = 0.029). By multivariable analysis baseline heart rate < 70 bpm was the only independent predictor of LVR (OR = 3.39, 95% CI = 1.5-7.5, p = 0.003); hypertension, segmental wall motion abnormalities, and ICD were negative predictors of LVR (P[3]). Presence or absence of ARB or AA and target doses of ACEi, ARB, or AA did not predict LVR.

Time to HF hospitalization or death was significantly longer in LVR than LVD subjects (105.5 ± 3.8 days vs. 90.2 ± 4.2 days, p = 0.04). This composite endpoint was less frequent in those who achieved target BB doses (6.4% vs. 16.7%, p = 0.027). Time to all-cause mortality was longer for LVR than LVD patients (115.8 ± 2.6 days vs. 96.4 ± 5.5 days, p = 0.001).

Conclusions: LVR rates in contemporary HF patients are higher than previously reported. Whereas hypertension, segmental wall motion abnormalities and ICD decrease the likelihood of LVR, a baseline HR ≤ 70 bpm is the sole independent predictor of LVR. These findings suggest that early modulation of heart rate in de-novo HF patients may facilitate LVR.

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P1724 Prognostic implication of right and left-sided hemodynamic congestion in patients with heart failure
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Introduction: Hemodynamic congestion remains a key prognostic factor in heart failure (HF). Recent findings from ESCAPE trial suggest a congestive burden (CB), taken as a sum of right atrial (RA) and pulmonary capillary wedge pressure (PCWP) be of prognostic value in HF. However, the relative association of RA and PCWP with prognosis and with other typical prognosticators remains poorly understood.

Aim: We sought to investigate the separate association of RA and PCWP with prognosis at different levels of global congestion as represented by CB and to compare them with traditional risk factors.

Material & methods: 239 HF patients (age: 52 ± 10 years, female: 14%, NYHA: 2.9 ± 0.9, LVFV: 25 ± 11%) were entered in the hospital for right-sided catherization as part of heart transplantation work-up. All were on best tolerated medical therapy and received electrical interventions according to current guidelines. Using Swan-Ganz catheter and thermodeletion technique we measured right- and left sided pressures. In each patient we have calculated CB and RA/PCWP (Ratio). All patients were allocated to 1 out of 4 groups according to median value of CB (21 mmHg) and RA/PCWP (0.33); 1 – both CB and Ratio bellow medians, 2 – low CB and high Ratio, 3 – High CB and low Ratio, 4 – both CB and Ratio above medians. During 3 years of follow-up 84 (35%) patients died (all-cause). We compared Kaplan-Meier survival curves for each group. Cox method and was used to estimate adjusted relative risk of death for groups taking as a reference the group with best survival on Kaplan-Meier.

Results: Kaplan-Meier analysis showed best survival in group 3 (log rank p = 0.02). The risk of death in groups with high Ratio remained significant after adjustment for powerful prognosticators (Table 1).

Conclusion: The high RA/PCWP is associated with poor prognosis, the reason for the elevated ratio may be attributable either to high RA or low PCWP.

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<td>% Death</td>
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<td>Hazard ratio ± 95% CI, p-value</td>
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<td>Unadjusted for age and sex, p=0.98</td>
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<td>NTproBNP/MVO2</td>
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P1725 Prognostic value of presence, amount and location of myocardial fibrosis detected by contrast-enhanced cardiac magnetic resonance in patients with heart failure
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Background: Myocardial fibrosis detected by contrast-enhanced cardiac magnetic resonance (CECMR) has been related to adverse clinical outcomes in patients with idiopathic dilated cardiomyopathy (DCM), but there are few data about the association between the amount and location of myocardial fibrosis and prognosis.

Purpose: the aim of our study was to evaluate the prognostic role of the presence, the amount and the location of late gadolinium enhancement (LGE) in patients with DCM and left ventricular systolic dysfunction.

Methods: We enrolled retrospectively patients suffering from DCM with left ventricular ejection fraction (LVEF) ≤45% underwent CE-CMR followed at our HF Department from January 2012 to December 2015. We evaluated demographic, labora-
toristic and imaging parameters (presence of LGE, as indicator of fibrosis, LVEF, left ventricular ejection fraction, ventricular volumes and myocardial mass). The amount of LGE was calculated by manual planimetry at each left ventricle short axis section. We considered the 17-segments model of the American Heart Association to evaluate the localization of fibrosis. The composite endpoint was death from any cause and hospitalization for arrhythmic causes or heart failure.

Results: We enrolled 179 pts (71% male, mean age 55 ± 15 years), 90 pts (50.3%) showed left ventricular LGE. At univariate analysis, atrial fibrillation (p = 0.005), diabetes (p = 0.006), chronic kidney disease (p = 0.005), presence of LGE (p = 0.001), LVEF (p = 0.003), right ventricular ejection fraction (p = 0.006) and myocardial mass (p = 0.002) were predictive of events. At multivariate analysis, only the presence of LGE confirmed its prognostic value (HR 4.97; IC 95% 2.167–9.749; p = 0.0001), LGE area and the number of myocardial segments involved by LGE were both associated with the composite endpoint (trend p = 0.03 and 0.05 respectively). Septal localization was significantly associated with hospitalizations for ventricular arrhythmias (p < 0.001) compared to other localizations, while lateral wall localization was associated with hospitalizations for heart failure (p = 0.001).

Conclusions: Myocardial fibrosis is an independent predictor of death and hospitalization for heart failure and arrhythmias and its negative prognostic value raises with increasing amount of fibrosis. Septal and lateral wall LGE was associated with a significantly worse prognosis compared to other localizations.

P1726 Characteristics of heart failure patients in indonesia
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Introduction: Heart failure remains the major problems worldwide. Most of it caused by coronary artery disease. The more prevalence of metabolic disease, the more prevalence of coronary artery disease which ends up with heart failure is increased.

Methods: The descriptive study design was consecutively conducted in 104 patients with heart failure who were admitted to the Hospital from January – April 2016. All clinical data were collected, including gender, age, symptoms, echocardiography, treatment, and device implantations.

Results: All 104 patients during period January-April 2016, predominantly male (52.9%) comparing with female (47.1%). Range of age 56-64 years old was dominated the event of heart failure in Indonesia, 69% patients had average systolic blood pressure 100-140 mmHg, most frequent symptoms was dyspnea on effort (66%), fatigue (35%), orthopnea (33%), dyspnea at rest (21%), decreased exercise tolerance (20%), and peripheral edema (16%). Most of the patients have New York Heart Association (NYHA) class II (53%) with the sign of elevated jugular venous pressure (14.4%). Echocardiography examination on heart failure revealed reduced ejection fraction below 30% (21%) and preserved ejection fraction above 50% (36%). Ischemic heart disease is the main cause (76.9%) of heart failure and most of the patients have comorbid hypertension (59%), diabetes (29%), valvular heart disease (14.4%), and atrial fibrillation (9.6%). Almost all of heart failure patients consume diuretic (95.2%) if there were congestion, followed by a beta blocker (92.3%), ACE inhibitor (59.6%), mineralocorticoid receptor antagonist (59%), and ARB (38%). Device Implantation was conducted in 3.8% eligible patients during January-April 2016.

Conclusions: Characteristics of heart failure patients are varied. Ischemic heart disease is a predominant cause and optimal medical treatment and device implantation, if indicated, are very beneficial to improve symptoms.
Methods: It was a prospective, observational study comparing patients of HFrEF (LV EF ≤ 40%) with patients of HfPEF (LV EF > 40%). Serum BNP was estimated in all patients.

Results: 204 patients were studied, 101 patients in HFrEF group and 103 in HfPEF group. Female patients, 80 in number more often had HFrEF than HfPEF (53.5% vs 26.2%, p < 0.001). HFrEF patients were older than patients with HfPEF (68.5 years vs 66.2 years, p = 0.038). Hyper tension (68.3% vs 41.7%, p < 0.001) and COPD (13.9% vs 3.89%, p = 0.012) were more common in patients with HFrEF whereas obesity (36.6% vs 45.7%, p = 0.004) was more common in HfPEF group. Other conditions like coronary artery disease, atrial fibrillation, chronic kidney disease and acute kidney injury were similar in both groups. BNP was significantly higher in HFrEF group (921.4 units vs 1204 units, p = 0.003) and in those who died. Beta blockers (35.4% vs 79.6%, p < 0.001), loop diuretics (53.5% vs 82.5%, p < 0.001) and digoxin (6 vs 14.6%, p < 0.001) were more commonly used in HfPEF patients. Antiplatelets, statins, ACE inhibitors/ARBs, ARNI, nitrates were used equally in both groups. ICD was implanted more commonly in HfPEF. 1% vs 8.7%)

Repeat hospitalisation rates at 6 months were similar between the two groups. There were no significant differences in mortality at 6 months between the two group. (9.9 % in HfPEF and 13.6% in HfPEF (p = 0.187).

Conclusion: HfPEF patients were older. HfPEF was more frequently seen in female patients. Hypertension and COPD were more frequent in HFrEF patients than in HfPEF patients. HFrEF patients were more often male patients. Surprisingly BMI was higher in patients of HfPEF. Serum BNP was significantly higher in HFrEF group than HfPEF group. Higher serum BNP values at diagnosis indicated a poor prognosis. BNP is a useful test at diagnosis but should be significantly high in HFrEF group than HFpEF group. Higher serum BNP values in HFpEF patients were older. HFpEF was more frequently seen in female patients. Antiplatelets, statins, ACE inhibitors/ARBs, ARNI, nitrates were used equally in both groups. ICD was implanted more commonly in HfPEF.

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Conclusions: The additional use of sildenafil for 6 months significantly enhances the EF RV is accompanied by a decrease in the size of the LA and serum levels of CRP, including good tolerance of physical activity.

P1731
Insulin resistance evaluation in patients with coronary artery disease and chronic heart failure without evident disorders of carbohydrate metabolism

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Background: Insulin resistance (IR) promotes to development of coronary artery disease (CAD), chronic heart failure (CHF) and type 2 diabetes mellitus (T2DM), along with other risk factors. Affiliation of T2DM to CHF impairs prognosis and enhance mortality. Early detection of IR and carbohydrate metabolism disorders (CMD) seems to be relevant.

Study purposes: to evaluate the IR in patients with CAD and CHF without evident CMD. Study methods: we examine 174 patients with CAD and CHF III-IV (NYHA) without treatment for diabetes, hypertension and chronic heart failure. IR was revealed in all patients, without reference to CMD availability. The largest number of FINDRISC points was observed in group with newly diagnosed T2DM (p < 0.000) compared with patients with IGT and without CMD. Insulin concentrations were increased in each study groups with CAD and CHF, but was significantly higher in patients with CMD compared with patients without CMD (p < 0.000). IR was identified in all patients with CAD and CHF, what is more, its level increased with the growth of CMD explicitly and was highest in T2DM group compared with IGT and without CMD groups. Elevated levels of NT-proBNP had a linear relationship with CHF severity. Aldosteron levels increased in all patients with CHF regardless of the CMD presence. Correlation analysis determined strong inter-relation between IR and: BMI, FINDRISC points, fasting and postprandial blood glucose levels, HbA1C, IGF profile, estimated GFR, daily praexuena, HF-proBNP, aldosterone and insulin concentrations with assessment of HOME-IR, standard oral glucose tolerance test (OGTT) was conducted.

Results: Among 174 patients with CAD and CHF III-IV (NYHA) using OGTT, in 50.5% patients was revealed latent CMD: 59 (33.9%) patients had impaired glucose tolerance (IGT), in 29 (16.7%) – T2DM was newly diagnosed, 86 (49.4%) patients were without CMD. The largest number of FINDRISC points was observed in group with newly diagnosed T2DM (p < 0.000) compared with patients with IGT and without CMD. Insulin concentrations were increased in each study groups with CAD and CHF, but was significantly higher in patients with CMD compared with patients without CMD (p < 0.000). IR was identified in all patients with CAD and CHF, what is more, its level increased with the growth of CMD explicitly and was highest in T2DM group compared with IGT and without CMD groups. Elevated levels of NT-proBNP had a linear relationship with CHF severity. Aldosteron levels increased in all patients with CHF regardless of the CMD presence. Correlation analysis determined strong inter-relation between IR and: BMI, FINDRISC points, fasting and postprandial blood glucose levels, HbA1C, insulin concentrations, but not with ejection fraction, NYHA class and CHF duration.

Conclusions: In 50.6% patients latent CMD were determined, from IGT to newly diagnosed T2DM. IR was revealed in all patients, without reference to CMD availabil-

P1732
The role of anti-oxidants in the treatment of congestive heart failure

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Introduction: Congestive heart failure and oxidative stress are strongly connected, creating a medical “vicious” circle among each other.

Purpose: Our goal was to examine whether the decrease of the oxidative stress levels via use of antioxidants was connected with a subtler presentation of CHF symptoms.

Methods: We studied two groups of men with stage I CHF (65 to 85 years old). All of them were previous smokers (having quitted for at least two years, suffering from CHF and hypertension. None of them suffered from diabetes, COPD or ischemic heart disease. We measured serum malonyl diadehyde (MDA) levels and serum carbonyl products (CP) in all our patients twice (at the start of the study and once a whole year) with the difference between the two groups had to do with the addition of vitamin E to their treatment. Group A (consisting of 32 men) patients received ACE or AT inhibitors, statins, calcium channel blockers, beta blockers and a daily intake of 300mg of vitamin E was added to their treatment. On the other hand, group B (31 men) patients received similar treatment with the addition of vitamin E.

Serum MDA and CP were similar in both groups at the start of the study whereas after a year, both oxidative biomarkers were higher in group B (p < 0.01 for MDA and CP as well, depicting a much heavier oxidative stress burden in group B (the ones not receiving vitamin E) patients.

Conclusion: The daily intake of antioxidants definitely decreases the oxidative stress in CHF. The positive role of such a decrease in the patient’s quality of life needs yet to be furtherly discussed.

P1733
Heart failure hospitalization: a decade-long trend overview in a Tertiary Care Center

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Background: Heart failure (HF) is among the most common reasons for hospital admission in the Western World. Investigation of epidemiological tendency represents a fundamental feedback about how we cured in the past to better improve what we would care in the future.

Objectives: This retrospective analysis would focus on decade-long trends in HF hospitalization, length of stay (LOS), in-hospital mortality and Case mix index (CMI) as standard indicator of hospital disease severity in a Tertiary Care Center.

Methods: We retrospectively collected all HF hospitalization in the period 2004-2013, analyzing LOS, CMI, in-hospital mortality, age and comorbidities as diabetes, hypertension, dyslipidemia, renal disease and atrial fibrillation.

Results: We examined 2,020 hospitalizations in a decade-long period. We observed a progressive increase of HF hospitalization prevalence (from 229 to 507 patient/year, p < 0.01). There was a significant increasing in LOS (from 5.22 ± 4.61 to 7.49 ± 7.37 days; p < 0.05), CMI (from 1.57 ± 1.22 to 2.13 ± 2.17; p < 0.05), atrial fibrillation prevalence (from 22.7% to 32.7%; p < 0.05) and renal disease prevalence (from 4.4% to 7.3%; p < 0.05). There was a slight increase in mean age at admission (from 71.4 ± 12.6 to 74.3 ± 13.3 years) and in-hospital m-

Conclusions: Our retrospective analysis shows an increased burden in heart failure hospitalization, together with a greater case complexity. This finding underlines the urgency to improve health care plan management after discharge with involve-

HF hospitalization, LOS and CMI
P1734 Predictors of non-response to physical rehabilitation in patients with chronic heart failure
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Introduction: In the world practice physical training is widely used in CHF patients. But in most cases, it is not taken into account the influence of the initial clinical status of patients (gender, age, CHF functional class, peak oxygen uptake, comorbidity) on the results of physical rehabilitation.

Purpose: To evaluate aerobic physical exercise efficiency, selected on the basis of lactate threshold during CPET, and to reveal the most significant predictors of inadequate response to physical rehabilitation in CHF patients.

Methods: 77 patients, CHF NYHA II-II were randomized into two groups - primary aerobic training and control (standard treatment of CHF). Main group - 64 patients, mean age 54 ± 12.5 years, body mass index (BMI) 26.46 ± 6.4 kg/m2, among them 46 patients (72%) had III CHF functional class and 18 patients (28%) - II CHF functional class. The control group - 13 patients, age 53 ± 17 years, BMI was 25.4 ± 6.8 kg/m2, 12 patients had III CHF functional class, 1 patient - I. The original estimated patient's initial clinical status. CPET, quality of life (QOL), exercise tolerance (ET) was assessed at baseline and after 1.3, 6 months of follow-up. The CPET served on treadmill using hardware "Oxycon Pro", Jaeger, Germany. Echocardiography (Echoc) were performed at baseline and after 6 months. The statistical were statistically processed using software packages "Statistica, 6.0".

Results: In the main group after 6 months of training EF increased by 7.5 ± 0.5% and End-diastolic volume decreased by 6 ± 2.0 ml from baseline, QOL was changed by 17.5 ± 8 points (significant regression of symptoms), ET increased by 9.1 ± 6.2 points and VO2 peak increased by 4.4 ml/min/kg. In the control group showed an increase ET 4 ± 1.1%, End-diastolic volume decreased by 68 ± 14.8 ml, the change of QOL 1.4 ± 7.2 points, the increase in ET at 1.5 points. VO2 peak decreased by 1.7 ml/min/kg. Revealed a strong positive correlation between the initial values of VO2 peak and EF (rEF=0.4, p < 0.05) and between baseline levels of sodium, hemoglobin and the of physical rehabilitation efficiency (rNa=0.41, p0.05; Hb=0.45, p=0.05). There was a positive impact of the initial content of red blood cells (rHb=0.5, p=0.02), sodium (rNa=0.4, p=0.05), LV EF (rEF=0.5, p=0.05) and level VE at the peak of exercise load (rVE=0.5, p=0.01) on training efficiency. BPN level and a long history of CHF had a negative effect on the result of physical training (rBP=0.7, p=0.05; rCHF=0.6, p=0.05). Significant differences in training performance between patients II and III functional class were not received.Conclusion: Aerobic physical exercise in CHF patients, selected on the basis of lactate threshold achievement during the CPET, is effective in improving values of CPET, Echoc, QOL and increasing exercise tolerance. Age, BNP and uric acid levels can be considered as most significant predictors of inadequate response to physical rehabilitation in CHF patients.

P1735 sST2 and copeptin activity closely associated with E/E′ changes during NT-proBNP guided therapy in high risk patients with chronic heart failure after acute decompensation
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Objective: to evaluate the biomarkers activity changes and their association with filling pressure during NT-proBNP guided therapy in CHF patients (pts) at high risk after acute decompensation (ADHF).

Methods: In the prospective single-center trial were included 105 hospitalised pts with ADHF III-IV NYHA and LV systolic dysfunction due to coronary artery disease, arterial hypertension and dilated cardiomyopathy. After HF symptoms compensation, at discharge, high risk pts (discharge NT-proBNP 1400 pg/ml) were randomized into group of therapy guided by NT-proBNP (group 1) and standard HF therapy (group 2). Pts in both groups didn’t differ by the main clinical characteristics. The goal of treatment was to reduce NT-proBNP concentration of < 1000 pg/ml, or at least 50% of the initial before discharge. At discharge, median NT-proBNP concentration was 3651 (2191.5; 6613.0) pg/ml in group 1 and 2862.0 (2015.0; 4761.5) pg/ml in group 2, p = 0.05. Blood sampling to determine the biomarkers concentrations (NT-proBNP, soluble ST2, copeptin, galectin-3, htnF and NGAL) were collected at discharge from the hospital, and 3 and 6 months after. Filling pressure was assessed by E/E′.

Results: At the end of the study all pts in groups 1 and 2 have been treated by recommended combination of ACE/ARB + beta-blocker + MRA (100%), but the mean doses up-titration of ACE/ARB and beta-blockers at the 6 months of treatment were significantly higher in NT-proBNP guided group, p < 0.05. After 6 months of treatment, median NT-proBNP concentration significantly decreased to 585.5 (875.6;2125.3) pg/ml (Δ= -53.1%) in group 1 pts, whereas in group 2 only to 2450.0 (2208.8; 3328.0) pg/ml (Δ= -11.1%), p = 0.024. The same more pronounced biomarkers activity reduction were found in group 1 pts for sST2 (Δ = -37.1% vs -10.4%, p = 0.0001) and copeptin concentration (Δ= -29.9%, p = 0.003). Concentration of galectin-3, htnF and NGAL significantly decreased only in group 1. Ak = respectively, -16.8%, -26.5% and -15.1%, p < 0.01 for all. E/E′ significantly decreased only in group 1 from 21.2 ± 4.1 to 14.2 ± 2.8 (Δ = -30.7%, p < 0.001), vs -11.1% in group 2. In all pts Δ = of sST2 and Δ = of copeptin as Δ % of NT-proBNP concentration very closely correlated with each other, and significantly associated with Δ = E/E′ (relatively r=0.63, r=0.7, r=0.67, p = 0.01 for all), compared with other biomarkers.

Conclusion: sST2 and copeptin as NT-proBNP activity are more sensitive and closely associated with E/E′ changes during long-term NT-proBNP guided therapy in high risk patients with chronic heart failure after acute decompensation, compared with other biomarkers.

P1737 Galectin-3, longitudinal strain and left ventricular remodelling in patients with aortic stenosis
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Background: Aortic stenosis (AS) characterized by a progressive narrowing of the aortic valve triggering left ventricular overload and, consequently, changes in ventricular geometry and in longitudinal myocardial strain. New proinflammatory molecules such as galectin-3 could mediate valve calcification in AS.

Purpose: In the current study, we aimed to assess the relationship between left ventricle remodeling parameters, global longitudinal myocardial strain and new proinflammatory molecules in patients with AS.

Methods: We conducted a prospective study on forty two patients with severe AS [mean age 73.6 years, 23 men] and forty two healthy volunteers matched by age, gender, and body surface areas measuring galectin-3 and NT-proBNP serum levels and specific echocardiographic parameters. Left ventricular remodeling was assessed by left ventricular mass index and relative wall thickness.

Results: Most patients with SA had concentric ventricular remodelling. When compared with healthy volunteers, patients with SA have lower global longitudinal strain (-20.5 ± 0.6 vs. -14.8 ± 3.8%, p < 0.001), which is correlated with higher left ventricular mass index (r = 0.419, p < 0.001), relative wall thickness (r = 0.677, p < 0.001), left atrium volume indexed (r = 0.757, p < 0.001), NT-proBNP levels (r > 0.709, p < 0.001) and galectin-3 (r = 0.718, p < 0.001). Relative wall thickness was strongly correlated with levels of galectin-3 (r = 0.612, p < 0.001) and NT-proBNP (r = 0.456, p < 0.001).

Conclusions: In patients with SA, markers of left ventricle remodeling such as increased left ventricular mass indexed and higher relative wall thickness are associated with decreased longitudinal myocardial strain assessed by two-dimensional speckle-tracking imaging.

Background: Heart failure (HF) is a chronic, debilitating, and progressive disease associated with significant mortality and morbidity and represents a burden to the health-care system and it is one of the most important public health problems.

Purpose: To evaluate HF hospitalization during eleven years.

Methods: Study based on the minimum basic hospital discharge data from all hospitals in the Region of Murcia between 2003-2013. Were studied: age, gender, and body surface areas measuring galectin-3 and NT-proBNP serum levels.

Results: In the current study, we aimed to assess the relationship between left ventricular mass index and relative wall thickness.

Conclusions: In patients with SA, markers of left ventricle remodeling such as increased left ventricular mass indexed and higher relative wall thickness are associated with decreased longitudinal myocardial strain assessed by two-dimensional speckle-tracking imaging.

Background: Heart failure patients experience diminished functional capacity which may impair their quality of life (1, 2). However it is not known which parameter best predicts Quality of Life in the heart failure population and if this differs in patient subgroups.

Purpose: We evaluated if correlations exist between indices of cardiac function and HRQoL in all chronic stable heart failure patients surveyed and in different subgroups.

Methods: 158 clinically stable heart failure patients, whose weight, condition and medications were stable for the previous 3 months, participated. Functional capacity was evaluated via 6-minute walk testing (6MWT), New York Heart Association (NYHA) class and 3 day-accelerometer measuring daily step count (Fitbit). Other indices of cardiac function were also recorded including ECG (rhythm, rate), Echocardiography (LV size, ejection fraction), and biochemical measures (NT proBNP, Hb, renal function).

Results: Univariate analysis demonstrated significant correlations between HRQoL and measures of functional capacity; 6MWT (Spearman ρ = 0.36, p < 0.001); NYHA Class (p = 0.31, p < 0.001) but not with daily step count (Fitbit). In addition, this also revealed significant correlation between HRQoL and Hb (p = 0.35, p < 0.001). No other statistically significant univariate correlations were revealed in relation to ECG, Echocardiography or biochemical measures and HRQoL. In a multivariate analysis of significant univariate correlates, 6MWT distance (p = 0.012), NYHA Classification (p = 0.037) & Hb (p = 0.001) were revealed to be independent predictors of HRQoL.

Conclusion(s): Improving patients HRQoL is essential in HF management. This study highlights that 6MWT, NYHA Class and Hb are the best surrogate markers of HRQoL.
compared to other indices of cardiac function. Utilizing GMWT or NYHA Class in clinical assessments of HF patients may therefore be the best way to tailor medication and/or device therapy, in order to optimize patients HRQoL.

P1740
Xanthine metabolism in patients with chronic heart failure and concomitant chronic kidney disease.

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Background: Patients with chronic heart failure (CHF) and asymptomatic hyperuricemia have higher risks of cardio-vascular death, and all-cause death or rehospitalization due to worsened heart failure. However, the role of hyperuricemia as a risk factor for both renal and cardiovascular outcomes and in the context of the well-established interrelationship between cardiovascular disease and chronic kidney disease (CKD) is debated.

Purpose: The aim of this study was to examine the association between renal function, serum uric acid level and xanthine oxidase activity (XO) in patients with chronic heart failure and chronic kidney disease.

Methods: The study population consisted of 112 patients (51 men, 61 women) aged (72.3 ± 6.6) years. Depending on a presence of concomitant CKD all patients with CHF were divided into 2 groups: CKD patients (n=40) and non-CKD (n=72) participants. XO activity was determined by a coupled enzyme assay, which results in a colorimetric (570 nm)/fluorometric (lex=336/nm-em=587 nm) product, proportional to the hydrogen peroxide generated. XO activity is reported as nmole/min/mL=milliunit/mL, where one milliunit (mU) of XO is defined as the amount of enzyme that catalyzes the oxidation of xanthine yielding 1.0 mmole of uric acid and hydrogen peroxide per minute at 25°C.

Results: The mean serum uric acid level and XO activity for CHF patients with CKD as compared with non-CKD patients was 7.3 ± 0.27 mg/dL (95% confidence interval CI: 6.79 – 8.10) vs. 6.2 ± 0.39 mg/dL (95% CI: 5.67 – 6.82; p=0.039) and 7.51 ± 1.15 mmol/L (95% CI: 6.03 – 9.99) vs. 6.49 ± 1.16 mmol/L (95% CI: 5.26 – 5.33; p=0.032), respectively. The mean values of estimated glomerular filtration rate (eGFR) in patients with asymptomatic hyperuricemia and without hyperuricemia were 59.9 ± 2.95 mL/min/1.73 m2 and 77.6 ± 6.05 mL/min/1.73 m2 (p<0.005), respectively. Patients with eGFR ≤ 60 mL/min/1.73 m2 have significantly higher serum uric acid levels and XO activity, compared to those with eGFR = 60 mL/min/1.73 m2 (p<0.005). We find out the significant correlations between eGFR and serum uric acid level (r=-0.3, p<0.05), as well as XO activity (r=-0.5, p<0.001) and serum uric acid level (r=-0.4, p<0.05) and serum uric acid level (r=-0.3, p<0.05). Patients with eGFR and XO activity were lower in CHF patients with CHF compared to CHF patients without CHF, Reduced eGFR in patients with CHF was associated with switching of xanthine metabolism towards oxidase pathway and increased xanthine oxidase activity.

P1741
Prevalence geriatric syndromes among outpatients with and without chronic heart failure.

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Introduction: The prevalence of heart failure as well as geriatric syndromes increases with age.

Purpose: The aim of our study was to investigate the prevalence of geriatric syndromes in outpatients with and without chronic heart failure (CHF).

Methods: The study includes 356 patients 65-93 years old. Average age was 74.8 ± 6.1 years old, 80.4 % women, 54.8% of them with higher education and 9% still continue to work. Research was conducted in Filosofov polyclinic from November 2014 to May 2015. The diagnosis of CHF was determined from medical records. Based on international experience, we have created a 7-item Questionnaire to reveal main geriatric syndromes - weight loss, reduced vision or hearing, causing limitations in daily life, falling, mood disorders, cognitive impairment, urinary incontinence and walking difficulties. For each positive response was given 1 point. Frailty and pre-frailty was diagnosed by Fried criteria.

Results: One hundred forty-two patients (39.9%) had a diagnosis CHF. The prevalence of frailty and pre-frailty among patients with CHF was higher [frailty 12.4% vs. 8.4%, pre-frailty 66.7% vs. 40.3%, p<0.005]. The middle score on the Questionnaire was higher among patients with CHF (3.3 ± 1.6 vs. 2.7 ± 1.5, p<0.005). Significant differences in the responses were obtained for issues about reduced vision or hearing, causing limitations in daily life [66.2% vs. 44.7% p<0.005] and difficulty in movement [92.9% vs. 38.3% p<0.005].

Conclusion: CHF among elderly outpatients is associated with a higher prevalence of geriatric syndromes – frailty and pre-frailty, reduced vision or hearing and walking difficulties.

P1742
Wall motion score index evaluating myocardial performance to assess left ventricular function appropriate to be use at the bedside

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Background: Despite the availability of several, up-to date and fast methods to obtain left ventricular ejection fraction (LVEF) values, the subjective impression still the closest one to the physician needing a help number to evaluating their patients than we show a cardiac formula using the wall score system (WS) to evaluate the LVEF.

Purpose: Evaluate a process to offer to intensivist an archetypa number of left ventricular function near to real, because is appropriate to be used in handheld machines at bedside.

Methods: The sample population consisted of 70 hypertensive patients (52.3 ± 10.3 years old , 65% male) with ischemic heart disease with and without failure. We determined the classic wall score system using 17 segments and the LVEF using four different methods (3D, Eyeball, Teichholz and Simpson Method ). 3D measurements were recorded using a GE E9 with V4 transducer and IE33 and portable Philips CX50 system equipped with a 3.5 MHz transducer and images analyzed by two different observers. The average LVEF was 45 ± 16%. By Teichholz and 35 ± 15% by Simpson Method, Mean Wall Score was 1.7. By regression analysis, we determined a formula that yielded EF calculation using Wall Score system closely resembling the EF obtained by Simpson rule. The regression equation was Index = 9.05 – 0.05 WS. This formula was further simplified to LVEF=WS divided by 69. Recently we did the same Index in 21(30%) patients comparing with LVEF obtained by ET3D with better correlation(P<0.001).

Results: In 70% of patients the last simple formula Index = 9.05 – 0.05 WS divided by 69. We did not find any index that predict the LVEF obtained by ET3D with better correlation(P<0.001).

Conclusion: Calculation of LVEF using wall score is feasible and yields reliable values that can be used in everyday bedside clinical practice with handheld machines without up-to date softwares. Another advantage of this method is that we only use the left ventricle segments which are adequately seen.

P1743
Heart failure with mid-range ejection fraction - an ecochocardiographic finding or a clinical phenotype?

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Background: Clinical and prognosis for patients with heart failure (HF) with preserved ejection fraction (HFpEF) and reduced ejection fraction (HFrEF) are notably
different. The 2016 ESC Guidelines for HF added a new term – heart failure with mid-range ejection fraction (HFrEF) to designate patients with EF 40–49% and to bolster the research.

Purpose: The objective of our study is to highlight the features of these patients and to analyze the differences between patients with HFrEF, HEMF and HFpEF.

Methods: Our study group included 278 patients (p) with NYHA class II-IV (mean age 66±12) admitted in the Cardiology Department of CCEH after they signed an informed consent. Clinical exam, echocardiography and lab tests were performed for each patient. Based on the ejection fraction (EF), patients were assigned to three groups: A) 93 p with HFrEF, B) 89 p with HEMF and C) 96 p with HFpEF. Study design was approved by the Ethics Committee. Statistical analysis was performed using SPSS 20.

Results: There were no statistically significant differences between groups regarding duration of hospitalization, gender, age and comorbidities (obesity and diabetes). Ischemic heart disease was less frequent (22.4% vs 41%, p<0.01) and 22.4% vs 43.5%, p=0.006) and hypertension was more frequent in group A compared to group B and C (17.1% vs 71.1%, p<0.02 and 71.1% vs 60%, p=0.006). The most frequent cause of decompensation was atrial fibrillation in group B (p<0.001), hypertension in group A (p<0.001) and ischemia in group C (p<0.001). Echocardiography showed that left atrial size (33.9±5.2, 21.3±3.0, p=0.01; 33.9±21.2 vs 22.8±19.3, p=0.04), systolic pulmonary artery pressure (43.9±15.1 vs 31.5±12.4, p=0.002; 43.9±15.1 vs 19.4±15.1, p=0.02) and left ventricular diastolic diameter (53.7±17.9 vs 36.7±23.1, p<0.001). Echocardiograms showed significant difference in group B in relation to group A or B. Beta-blockers doses at discharge were significantly higher in HFpEF patients (32.9±4.99; 24.1±4.15, p=0.02) and also in HFpEF patients (39.0±37.9 vs 25.9±34.88, p=0.019), but not in those with HFrEF (31.3±9.7 vs 21.9±8.9 vs 31.75, p=0.138). Spironolactone doses were significantly higher at discharge compared to admission in HFrEF (23.3±2.3 vs 24.1±8.8 vs 23.5±4.3, p=0.022) and HEMF patients (30.8±18.3 31.9±10.9 vs 19.21, p=0.001), but not in those with HFpEF (19.1±2.44 vs 16.3±2.5 ±0.024). We found no significant difference between ACE-inhibitors/angiotensin-receptor blockers doses at discharge compared to admission.

Conclusions: The treatment strategy for patients with HFrEF suffered only minor changes during hospitalization compared to those with HEMF or HFpEF, although they had significant clinical and echocardiographic differences. Future studies involving more patients will provide significant data in this "gray area" regarding phenotype, pathophysiology, prognosis and targeted therapies.

P1744
The frequency of heart failure after acute coronary syndrome in patients with nonobstructive coronary atherosclerosis
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The aim of the study was to evaluate the frequency of heart failure during 6 months after acute coronary syndrome in patients with nonobstructive coronary atherosclerosis.

Material and methods: It is a non-randomized open controlled investigation. The study was approved by the local Bioethics Committee. It included 1312 patients (p) with acute coronary syndrome admitted to Tomsk Cardiology Department of Tomsk National Research Medical Centre in 2015-2016. Patients were divided into two groups: PC group and AC group. The AC group was subdivided into those not known to the hospital (236 patients) and those under the community team (88 patients). The exclusion criterion was severe hemodynamic instability requiring inotropic treatment (DIU). After the suppression of ID and DIU and verifying normal preload, we performed baseline measurement of the right heart pressure in the PC group and also in the AC group on admission. Then we performed ambulatory measurement of pressure in the AC group to exclude patients with uncontrolled hypertension and heart failure.

Results: Among 193 people who were hospitalized with acute coronary syndrome at the Emergency Department of Cardiology in 2015 - 2016 4.8% (44) patients had nonobstructive coronary arteriosclerosis confirmed by coronary angiography. We present the results of subanalysis this investigation including 23 patients of 44. Ten patients died. Twenty two patients were underwent cardiac MRI. Primary outcomes were hospital mortality, incidence of recurrent ischemia, stroke, and as final diagnosis acute myocardial infarction, unstable angina, Takotsubo syndrome, and myocarditis. Secondary outcomes were death, recurrent myocardial infarction, stroke, the development of heart failure during 6 month after presence of acute coronary syndrome. During 6 months after discharge was hold telephone monitoring for assessment secondary outcomes. Descriptive statistics was used for analysis of data. Conclusion: The proportion of patients with nonobstructive coronary artery disease among patients with ACS in 2015-2016 was 4.8%. Heart failure occurred in half patients in 6 months after acute coronary syndrome.

P1745
The impact of a specialised community service on heart failure admissions
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Background: Heart failure (HF) admissions are predicted to rise over the next decade, placing increased pressure on healthcare systems. Studies indicate specialisation follow up by a multidisciplinary team reduces hospitalization and possibly mortality.

A nurse-led supported community heart failure service commissioned by our local Clinical Commissioning Group was introduced in our hospital’s catchment area in 2014. The team receives referrals from general practitioners, hospitals and tertiary centres and has advantages of earlier follow up, satellite clinics and home visits. It serves a diverse local population and allows greater flexibility in management.

Purpose: To evaluate the impact of this service on emergency heart failure admissions, length of stay (LOS), readmission and mortality.

Methods: We conducted a retrospective study of emergency admissions to our hospital with a primary diagnosis of heart failure between May 2013 to April 2014 (pre community service, PC group) and May 2015 to April 2016 (after community service, AC group). Our database identified 382 admissions of 271 patients in the PC group and 408 admissions of 319 patients in the AC group.

The AC group was subdivided into those not known to the community team (82 patients) and those under the community team (99 patients). We also stratified patients by New York Heart Association (NYHA) functional classes and ejection fraction (EF) on echocardiography.

Results: There was a significant reduction in average number of admissions per patient from 1.41 in the PC group to 1.28 in the AC group (p<0.01). Percentage of admissions with codes for complication and comorbidity increased significantly (44.5% to 64.7%, p<0.01). However, there was no significant change in average LOS per patient (19.9 vs 17.3 days) and in-hospital mortality (19 vs 23 patients).

Comparing admissions by NYHA class and EF, there was a significant reduction in average number of admissions per patient only in patients classed as NYHA II (1.52 to 1.19, p<0.01) and patients with severely reduced EF (1.53 to 1.25, p<0.03).

Within the AC group, patients known to the community team had a longer average LOS per patient (23.4 vs 16.8 days, p<0.01). However, these patients had generally more severe disease as reflected by higher percentage classed as NYHA III and IV.

Conclusions: In conclusion, a nurse-led specialised community heart failure service can be effective in reducing emergency heart failure admission rates, likely more so in patients with less severe disease and fewer comorbidities. This is especially relevant with the increasing demand for inpatient beds. Hence, future studies looking at long term follow up and cost effectiveness of such services would be extremely useful.

P1746
Sarcubitril–valsartan first treatment after inotropic therapy in Stage D Heart failure patients
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Purpose: To 1) evaluate clinical utilization of Sarcubitril–Valsartan (SVA) like first treatment in patients (p) with Stage D systolic heart failure after de use of inotropic and diuretics drugs. 2) to evaluate the clinical evolution in 60 days follow up.

Methods: We enrolled p ischemic cardiomyopathy(IC) and ejection fraction(EF) less than 35% admitted for decompensated heart failure between June and October 2016.Inclusion criteria: IC, age ≥ 18 years, systolic blood pressure >90 mmHg without vasoressors. Were excluded p with infections, renal failure, anemia, cancer or in mechanical ventilation support. Hemodynamic monitoring was performed using Swan Ganz catheter (SG). All p required intra venous isotropic drugs (ID) and diuretic treatment (DIU). After the suppression of ID and DIU and verifying normal preload and cardiac index by SW (CI)>2.2 L/min/m2 and normal volemia (CVP>10;PCOP >15 mmHg).We start an oral dose of 5/4 mg each 12 hours. A 6 minutes walk test was performed 24 hs before and 60 days after hospital discharge checking clinical status, renal function parameters and NT-ProBNP.

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ADVANCED HEART FAILURE
Background:
Infection remains a major complication among heart transplant (HT) recipients. Invasive pulmonary aspergillosis (IPA) is a potentially lethal complication after HT. An early diagnosis and a promptly aggressive treatment initiation are the cornerstone for a better survival.

Methods:
Of 328 heart transplants in our center between 1998 and 2016, we identified 5 cases of IPA. Patient records were examined and clinical variables were extracted, including age, sex, primary cardiac diagnosis, date of transplant, immunosuppressant regimen, cytomegalovirus serological status, antifungal prophylaxis, known risk factors for IPA, radiographic features, serum galactomannan index, and antifungal treatment regimen. Table 1.

Results:
All patients survived after a mean follow-up period of 18 months. Invasive pulmonary aspergillosis was diagnosed within the first 30 days after heart transplantation. All patients survived after a mean follow-up of 18 months.

Conclusions:
Invasive pulmonary aspergillosis in heart transplant recipients: is mortality decreasing?

P1747
Global longitudinal strain and cardiopulmonary exercise testing predicts exercise capacity and correlates with previous rejection episodes in heart transplant recipients

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Background:
Orthotopic Heart Transplant (OHT) is the ultimate treatment option for patients with end-stage heart failure (HF). However, OHT recipients may not reach a normal level of exercise capacity. Exercise capacity data with cardiopulmonary exercise testing (CPET) in OHT recipients and the correlation with echocardiographically-measured left ventricular strain are limited.

Purpose:
We hypothesized that speckle-tracking echocardiography (STE) global longitudinal strain (GLS) correlates with exercise capacity measured by CPET in OHT recipients. We also postulated that the number of rejection episodes may have association with GLS.

Methods:
Seven OHT recipients following up at our advanced HF clinic 6-18 months after transplantation were recruited into the study. All subjects underwent maximal symptom-limited CPET, STE and RHC with endomyocardial biopsy either simultaneously or within a few days apart. Peak oxygen uptake (VO2) ventilatory efficiency, and other ventilatory parameters were obtained from CPET. Echo measurements included indices of ventricular systolic and diastolic function, systolic tricuspid annular tissue velocity (IVS’), and GLS. Medical history and ischemic time of the donors, number and types of rejection episodes of recipients were obtained by chart review. Spearman correlation was used to identify correlation between variables and p value < 0.05 was considered statistically significant.

Results:
The patient population consisted of younger males, age 38 ± 12 yrs [mean ± SD], BMI 27.1 ± 3.8 kg/m2. The time interval between OHT and echocardiography was 349 ± 94 days. During maximal effort CPET as indicated by peak exercise respiratory exchange ratio ≥ 1.0, OHT subjects had an impairment in their exercise capacity with a mean peak VO2 of 21.1 ± 7.6 ml/kg/min (55 ± 14% of predicted). Peak VO2 correlated with basal right ventricular (RV) dimension (r = 0.883, p = 0.02), mid RV dimension (r = 0.829, p = 0.04), and RV’ (r = 0.828, p = 0.04). GLS had a strong correlation with the Borg Rating of Perceived Exertion (RPE) (r = 0.894, p = 0.04) and peak minute ventilation (r = 0.771, p = 0.07) during CPET. GLS was also significantly associated with resting cardiac output measured by Fick method (r = 0.829, p = 0.04) and mid RV dimension (r = 0.80, p = 0.037). There was a trend towards lower GLS and number of prior episodes of low grade acute cellular rejection (ACR, 1R) (r = 0.77, p = 0.07). We did not find any relationship between GLS and ischemic time or cardiopulmonary revascularization time of the donors. There was no statistically significant correlation between GLS and peak VO2 (r = 0.7, p = 0.11).

Conclusion:
In our pilot study of carefully selected heart transplant patients, GLS “predicts” the peak exercise capacity and is negatively correlated with prior episodes of mild ACR. Indicators of RV parameters are associated with peak exercise capacity as measured by CPET.
exercise capacity after OHT. Future studies evaluating the association between mild ACR and exercise capacity in OHT recipients are warranted.

P1749
Effectiveness of palliative care in people with persistently symptomatic heart failure: a systematic review
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Background: People with advanced heart failure (HF) are symptomatic, have poor quality of life but, despite recommendations, they have little access to palliative care. The historical lack of evidence for palliative care use in HF patients is a barrier for access to palliative care.

Purpose: To identify the evidence in relation to palliative care for people with persistently symptomatic HF.

Methods: The following databases were searched: Medline, Cochrane database, CINAHL, PsychINFO, HMIC, Care Search Grey Literature. Reference lists, and citations were handsearched and experts contacted. Two independent reviewers screened titles, abstracts and retrieved papers against inclusion criteria. Data were extracted from included papers and studies were critically assessed using the Cochrane risk of bias tool.

Results: Seven phase 3 trials, one phase 2 trial, one quasi-experimental trial, five cohort studies, and one case-control study were included. Studies were heterogeneous in terms of population, intervention, comparator, and outcomes. However, the adequately powered studies, with lower risk of bias, using a multi-disciplinary specialist palliative care intervention showed statistically significant benefit for a variety of patient-reported outcomes such as symptom burden, depression, functional status, and quality of life, as well as resource use and costs of care. Benefit was not seen in studies with a single component/discipline intervention or methodological issues. Possible contamination of controls in some studies may have led to under-estimation of effect. There was no apparent effect on survival.

Conclusion: Results support the use of multi-disciplinary palliative care in managing patients with HF. Across all included studies, findings were inconsistent due to a variety of methodological issues. Further research is needed to identify which patients would benefit most from general and specialist palliative care and the barriers for their access.

P1750
Blood pressure response during cardiopulmonary exercise testing in patients with heart failure predicts failure of medical management
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The prognostic value of peak VO2 and VE/VCO2 slope measured during cardiopulmonary exercise (CPX) testing has been well established in patients with advanced heart failure (HF). Many of these patients also have a blunted blood pressure response (BP) during exercise. This analysis was designed to better understand the prognostic implications of this observation.

We retrospectively studied 166 consecutive ambulatory patients referred to clinic for consideration of advanced HF therapies. Patients underwent cardiopulmonary exercise treadmill testing using either Ekeland or Naughton protocols. Vital sign data was available for 151 patients, which was assessed every 3 minutes during exercise and recovery. Breath-to-breath gas analysis was obtained to measure respiratory exchange ratio (RER), maximal oxygen consumption (peak VO2), and minute ventilation/carbon dioxide production (VE/VCO2).

Patients were stratified into tertiles by change in systolic BP (<13, 13-26, and ≥27 mmHg) in response to exercise. Baseline demographics and medications were similar between the groups. Mean exercise times was longer in those with a higher BP response (5.1 vs. 6.0 vs 7.0, respectively, p = 0.001). Peak VO2 was lower (19.2 vs. 10.6 vs. 13.6, p = <0.001) and VE/VCO2 slope was higher (42.8 vs. 42.1 vs. 36.3, p = 0.033) in patients with a lower blood pressure response. Patients with a lower response also had significantly worse survival without transplant or mechanical circulatory support (41% vs. 31 vs. 28%). After multivariate adjustment, an increase in systolic BP up to 20 mmHg was associated with a lower hazard of medical failure (hazard ratio=0.95, p = 0.0001 for every 1mmHg increase; failure defined as requirement of left ventricular assist device (LVAD), transplant, or death). When adjusted for an RER > 1.05 (n = 93), tertiles showed similar progression to death or requirement of LVAD/transplant (42.9% vs. 35.7% vs. 21.4%). Hazard of failure in this subgroup showed a similar but non-significant trend (hazard ratio=0.98, p = 0.0946).

In conclusion, patients with smaller change in blood pressure in response to exercise were associated with higher rates of death, LVAD, or transplantation.

P1751
Elevated donor C-reactive protein impacts incidence of very early infections following heart transplantation
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Purpose: Heart transplantation (HTx) donors frequently have elevated C-reactive protein (CRP) and white blood cell counts (WBCC), predominantly due to systemic inflammatory response to a severe underlying clinical condition, however potentially also influenced by an ongoing infection that may yet not be microbiologically

Table P1747

<table>
<thead>
<tr>
<th>Case</th>
<th>Age/Sex</th>
<th>Days since transplant</th>
<th>Radiographic findings/Symptoms</th>
<th>Microbiology/Treatment Immunosuppression</th>
<th>Known risk factors for IPA</th>
<th>Fungal prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>59/male</td>
<td>5</td>
<td>Multiple micro-nodular densities/Asymptomatic</td>
<td>Aspergillus fumigatus/Amphotericin</td>
<td>Prednisone, Cyclosporine + Mycophenolate</td>
<td>Concurrent CMW infection: yes</td>
</tr>
<tr>
<td>2</td>
<td>70/male</td>
<td>12</td>
<td>Multiple micro-nodular densities/Productive cough</td>
<td>Aspergillus fumigatus/Voriconazole</td>
<td>Prednisone, Tacrolimus + Mycophenolate</td>
<td>Concurrent CMW infection: no</td>
</tr>
<tr>
<td>3</td>
<td>51/male</td>
<td>116</td>
<td>Multiple micro-nodular densities/Productive cough and fever</td>
<td>Aspergillus fumigatus/Voriconazole + Caspofungin</td>
<td>Prednisone, Tacrolimus + Azathioprine</td>
<td>Concurrent CMW infection: yes</td>
</tr>
<tr>
<td>4</td>
<td>61/male</td>
<td>189</td>
<td>Multiple micro-nodular densities/Asymptomatic</td>
<td>Aspergillus fumigatus/Voriconazole + Anidulafungin</td>
<td>Prednisone, Tacrolimus + Mycophenolate</td>
<td>Concurrent CMW infection: no</td>
</tr>
<tr>
<td>5</td>
<td>71/male</td>
<td>55</td>
<td>Ground-glass pattern/Chest pain</td>
<td>Aspergillus fumigatus/Amphotericin</td>
<td>Prednisone, Tacrolimus + Mycophenolate</td>
<td>Concurrent CMW infection: yes</td>
</tr>
</tbody>
</table>
Confirm we aimed to evaluate the potential consequences of elevated donor WBCC and CRP on recipient outcomes. **Methods:** We have retrospectively studied pre-explant donor WBCC and CRP for 166 consecutive HTx rcp (117 male, mean age 52 ± 13, median follow-up 31.2 ± 27.4 months) transplanted in our centre between January 2008, and December 2016, and their relation to rcp outcomes (infection, rejection, cardiac allograft vasculopathy, and survival). Per institutional protocol, all patients received meropenem + vancomycin prophylactically for a minimum of 7 days. **Results:** Very early infection occurred in 15 rcp (sepsis: 10 pts, pneumonia: 4 pts, UTI: 1 pt), with a significantly higher occurrence in rcp transplanted from donors with higher CRP. Other studied outcomes were not influenced by CRP values. No significant relation of elevated donor CRP to any of the studied outcomes was found. Positive donor cultures (urine/tracheal aspirate/sputum/blood culture) did not alter the outcomes. **Conclusion:** Donor CRP impacts incidence of very early post-HTx infections, and may influence long-term survival, thus warranting cautious donor selection and consideration of appropriate use of prophylactic antibiotics in the very early post-HTx period.

P1752

Ordinal interaction effect of pulmonary vascular resistance and pulmonary arterial wedge pressure on pulmonary RC time

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**Introduction:** The pulmonary RC time (the product of pulmonary vascular resistance (PVR) and pulmonary arterial compliance (Pca) represents the time constant of the mono-exponential pressure decay of pulmonary artery pressure after pulmonary valve closure and has been shown to be useful in the characterization of pulmonary circulation hemodynamics. Exceptions to the steadiness of pulmonary RC time have already been published. We aimed to assess if there is an interaction effect between two factors known to affect pulmonary time constant – pulmonary arterial wedge pressure (PAWP) and PVR.

**Methods:** This is a retrospective single institution study that included end-stage heart failure patients who underwent a right heart catheterization (RHC) study in the setting of evaluation for heart transplant between 2004 and 2012. RHC was performed via the femoral vein and pressure measurements were obtained using 7F balloon-tipped catheters. All pressure tracings were obtained at end-expiration and were manually reviewed by a heart failure specialist. Cardiac output was determined by the Fick method. PVR was calculated by the following formula: (mean pulmonary artery pressure – mean pulmonary artery wedge pressure) / cardiac output. Pca was calculated as the ratio of stroke volume by the pulmonary artery pulse pressure. Pulmonary RC time was calculated as the product of PVR and Pca.

**Results:** 107 patients (83 (78%) men, mean age 51 ± 12 years) were included. The main effect for PAWP yielded a F ratio of F(1, 103) = 80.2, p < 0.001, indicating a significant difference between patients with PAWP ≤ 15 mmHg (RC time 0.42 ± 0.15 s) and patients with a PAWP > 15 mmHg (RC time 0.27 ± 0.09 s). The main effect for PVR yielded a F ratio of F(1, 103) = 103, p < 0.001, indicating a significant difference between patients with PVR ≤ 0.09 s. The interaction effect – the effect of one variable on pulmonary RC time is not constant across the second variable. **Figure 1.** A. Interaction plots showing the mean of pulmonary RC time according to pulmonary vascular resistance (PVR) and pulmonary arterial wedge pressure (PAWP), non-parallel lines indicate an interaction effect – the effect of one variable on pulmonary RC time is not constant across the second variable. B. Scatter plot of pulmonary RC time according to PAWP and PVR. Each triangle represents a patient: 8 bright triangles = patients with PVR ≤ 0.09 s; 8 dark triangles = patients with PVR > 0.09 s; 8 blue triangles – patients with PAWP ≤ 15 mmHg; 8 red triangles – patients with PAWP > 15 mmHg. Horizontal line = mean of RC time. Statistical significance of the difference of RC time between each pair is displayed using ANOVA followed by Tukey’s tests.

**Figure 1**

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**Table 1.**

<table>
<thead>
<tr>
<th>CRP quartiles (mg/L)</th>
<th>Very early infection (&lt; 5 days) (n = 12)</th>
<th>Early infection(0-30 days) (n = 61)</th>
<th>Intermediate infection(31-180 days) (n = 37)</th>
<th>Late infection(&gt; 181 days) (n = 26)</th>
<th>Treated rejection (n = 24)</th>
<th>Vasculopathy (n = 22)</th>
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<tr>
<td>1. 0.5-37.8 (n = 35)</td>
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<td>32%</td>
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<td>2. 37.9-117.0 (n = 32)</td>
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<td>25%</td>
<td>24%</td>
<td>11%</td>
<td>29%</td>
<td>27%</td>
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<tr>
<td>3. 117.1-182.4 (n = 35)</td>
<td>25%</td>
<td>26%</td>
<td>22%</td>
<td>29%</td>
<td>29%</td>
<td>37%</td>
</tr>
<tr>
<td>4. 182.5-437.4 (n = 35)</td>
<td>50%*</td>
<td>24%</td>
<td>22%</td>
<td>29%</td>
<td>17%</td>
<td>18%</td>
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Donors Recipients

<table>
<thead>
<tr>
<th>CRP quartiles (x10 9)</th>
<th>Very early infection (&lt; 5 days) (n = 15)</th>
<th>Early infection(0-30 days) (n = 67)</th>
<th>Intermediate infection(31-180 days) (n = 40)</th>
<th>Late infection(&gt; 181 days) (n = 32)</th>
<th>Treated rejection (n = 24)</th>
<th>Vasculopathy (n = 22)</th>
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<tr>
<td>1. 3.8-10.2 (n = 41)</td>
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<td>26%</td>
<td>22%</td>
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<tr>
<td>2. 10.3-12.9 (n = 36)</td>
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<td>22%</td>
<td>13%</td>
<td>28%</td>
<td>25%</td>
<td>32%</td>
</tr>
<tr>
<td>3. 13.1-17.1 (n = 35)</td>
<td>40%</td>
<td>28%</td>
<td>37%</td>
<td>19%</td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td>4. 17.2-46.1 (n = 36)</td>
<td>13%</td>
<td>24%</td>
<td>28%</td>
<td>34%</td>
<td>17%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Incidences of observed outcomes in HTx rcp per quartiles of donor inflammatory biomarkers. *p = 0.024.
for PVR yielded a F ratio F(1,103) = 54.3, p < 0.001, indicating, also, a significant difference between patients with PVR ≤ 3 WU (RC time 0.28 ± 0.11 s) and patients with PVR > 3 WU (RC time 0.38 ± 0.15 s). The interaction effect was significant F(1,103) = 9.3, p = 0.003. This means that the effect of PAWP on pulmonary RC time depends on the level of PVR and vice-versa. The simple effects of PAWP on pulmonary RC time were lower at PVR ≤ 3 WU than at PVR > 3 WU. On the other hand, the simple effects of PVR were lower at PAWP > 15 mmHg than at PAWP ≤ 15 mmHg. Otherwise said, the effects of one variable are not constant across the different levels of the other variable; however, the relative ranking of one variable does not change at different levels of the other; being consistent with an ordinal interaction.

Conclusion: The recognition of an ordinal interaction effect of PVR and PAWP on pulmonary RC time may be important on clinical practice. If pulmonary RC time is used in studies aiming to assess the effect of therapeutic interventions (pharmacological or surgical) on right ventricular afterload, the result may be misleading.

ATRIAL FIBRILLATION

P1753
Catheter ablation of atrial fibrillation in heart failure patients: a first experience.
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Cardiovascular Institute of Buenos Aires (ICBA), Buenos Aires, Argentina; 2Central Hospital of Mendota, Mendoza, Argentina

Background: Atrial fibrillation (AF) and heart failure (HF) frequently coexist with a significant increase in morbidity and mortality. Rhythm control with pharmacological treatment has failed to keep patients in sinus rhythm (SR).

Purpose: The aim of this study was to assess the efficacy and safety of catheter ablation in patients with AF and HF, and to analyze NYHA functional classification (NYHA) and HF hospitalizations during post-procedure follow-up.

Methods: We retrospectively analyzed patients with AF and signs and symptoms of congestive HF or left ventricular ejection fraction (EF) less than 45%, refractory or intolerant to pharmacological treatment, who underwent catheter ablation of AF between July 2009 and March 2016. We excluded patients who did not complete one year of follow-up.

Results: Fifty-eight patients were included. Fifty-five completed at least one year of follow-up. At baseline, mean age was 62.1 ± 9.3 years, 72.4% were men, 67.2% hypertensive and 8.6% diabetics. As a pharmacological treatment, 86.2% were on beta-blockers, 80.7% on renin-angiotensin-aldosterone system inhibitors, 54.3% on diuretics, 40.1% on renin-angiotensin-aldosterone system inhibitors, 20.1% on 12.3%; CHA2DS2-VASc 2-3 (n = 234, 31.9%); and CHA2DS2-VASc ≥ 4 group were older (76.9 vs 64.11 vs 55.9 vs 9 years; p < 0.001). Conventional risk factors for thromboembolism were more represented in the higher CHA2DS2-VASc score groups: diabetes (51.7% vs 31.1% vs 7.4%; p < 0.001), hypertension (89.9% vs 75.7% vs 37.9%; p < 0.001) and dyslipidaemia (59.6% vs 59.9% vs 42.6%; p < 0.001); except for smoking (8.2% vs 33.2% vs 56.6%; p < 0.001). On admission patients with CHA2DS2-VASc ≥ 4 had more often anaemia (40.1% vs 20.1% vs 12.3%; p < 0.001), renal insufficiency (eGFR < 60 ml/min) (54.6% vs 19.5% vs 3.7%; p < 0.001) and three vessels disease (21.2% vs 17.5% vs 9.1%; p = 0.005). Left systolic ventricular dysfunction was more prevalent (59.1% vs 39.8% vs 36.4%; p < 0.001) in that group. During hospital-stay, patients with CHA2DS2-VASc ≥ 4 developed more often heart failure (52.4% vs 24.9% vs 16.9%; p < 0.001), new-onset atrial fibrillation (19.2% vs 11.1% vs 4.1%; p < 0.001), ilexicemic stroke (2.9% vs 0% vs 0.4%; p = 0.002) and respiratory tract infection (11.1% vs 3.0 vs 5.3%; p < 0.001). In-hospital (8.7% vs 2.4% vs 0.4%; p < 0.001) and 6-month overall mortality (16.7% vs 6.4% vs 2.5%; p < 0.001) were higher in patients with higher CHA2DS2-VASc score. In multivariate analysis and after adjusting for different baseline characteristic CHA2DS2-VASc score revealed to be an independent predictor of new-onset atrial fibrillation (OR = 0.043). Patients with CHA2DS2-VASc ≥ 4 were associated with higher risk of development of new-onset atrial fibrillation [OR 2.90, 95% CI (1.30 – 6.68), p = 0.012]

Results: Patients from CHA2DS2-VASc ≥4 group were older (76.9 vs 64.11 vs 55.9 vs 9 years; p < 0.001). Conventional risk factors for thromboembolism were more represented in the higher CHA2DS2-VASc score groups: diabetes (51.7% vs 31.1% vs 7.4%; p < 0.001), hypertension (89.9% vs 75.7% vs 37.9%; p < 0.001) and dyslipidaemia (59.6% vs 59.9% vs 42.6%; p < 0.001); except for smoking (8.2% vs 33.2% vs 56.6%; p < 0.001). On admission patients with CHA2DS2-VASc ≥4 had more often anaemia (40.1% vs 20.1% vs 12.3%; p < 0.001), renal insufficiency (eGFR < 60 ml/min) (54.6% vs 19.5% vs 3.7%; p < 0.001) and three vessels disease (21.2% vs 17.5% vs 9.1%; p = 0.005). Left systolic ventricular dysfunction was more prevalent (59.1% vs 39.8% vs 36.4%; p < 0.001) in that group. During hospital-stay, patients with CHA2DS2-VASc ≥ 4 developed more often heart failure (52.4% vs 24.9% vs 16.9%; p < 0.001), new-onset atrial fibrillation (19.2% vs 11.1% vs 4.1%; p < 0.001), ilexicemic stroke (2.9% vs 0% vs 0.4%; p = 0.002) and respiratory tract infection (11.1% vs 3.0 vs 5.3%; p < 0.001). In-hospital (8.7% vs 2.4% vs 0.4%; p < 0.001) and 6-month overall mortality (16.7% vs 6.4% vs 2.5%; p < 0.001) were higher in patients with higher CHA2DS2-VASc score. In multivariate analysis and after adjusting for different baseline characteristic CHA2DS2-VASc score revealed to be an independent predictor of new-onset atrial fibrillation (OR = 0.043). Patients with CHA2DS2-VASc ≥ 4 were associated with higher risk of development of new-onset atrial fibrillation [OR 2.90, 95% CI (1.30 – 6.68), p = 0.012]

Conclusion: CHA2DS2-VASc score revealed to be a strong predictor of new-onset atrial fibrillation.

P1755
Reduced LA strain predicts atrial fibrillation recurrence after catheter ablation: a systematic review and meta-analysis
G Gani Bajraktari1; IB y t y c i1; MY Henein2
1University Clinical Centre of Kosovo (UCC), Service of Cardiology, Pristina, Kosovo Republic of; 2Heart Centre and Department of Public Health and Clinical Medicine, Ulmea University, Ulmea, Sweden

Background and Aim: Despite the improved outcome of patients with atrial fibrillation (AF) who undergo catheter ablation, recurrence of the arrhythmia remains a concern. The aim of this meta-analysis was to assess the potential association between left atrial (LA) strain and AF recurrence after ablation.

Methods: We systematically searched PubMed-Medline, EMBASE, Scopus, Google Scholar and the Cochrane Central Register, up to December 2016 in order to identify clinical trial and observational studies, which assessed the predictive role of LA strain in AF recurrence after catheter-ablation. The search identified 898 papers form 10 studies, with paroxysmal AF (PAF) and persistent AF (PeAF).

Results: The pooled analysis showed that after a follow-up period of 11.8 ± 6.8 months, patients with AF recurrence had reduced LA strain compared with those without recurrence. Predictors of recurrence at one year

The primary success rate during the procedure was 90.92%. Fifty-five patients were analyzed during follow-up, 33 (80.9%) had recurrence of AF or atrial flutter after the ablation period. Second catheter ablation was performed in 18 patients and recurrence rate was 44.4%. Therefore, SR rate after two procedures increased to 72.2%. At follow-up, NYHA class in SR group improved significantly more than those in the recurrence group (63.6% vs 36.4%; p = 0.047). No patients in SR had HF hospitalizations, whereas 6 hospitalizations were observed in the recurrence group (6% vs 18.2%, p = 0.07).

Seven-six ablations were performed between first and second procedures. Eight complications were observed (10.52%, including 3 HF decompressions (3.95%), 2 cardiac tamponade with pericardiocentesis (2.63%), 2 vascular complications (2.63%) and 1 extreme bradycardia (1.32%). No stroke or procedural deaths were observed.

Conclusion: Catheter ablation of atrial fibrillation in heart failure patients refractory or intolerant to antithrombotic treatment is a safe procedure with an acceptable success, improving symptoms and decreasing heart failure hospitalizations.
without AF, with a weighted mean difference (WMD) -7.04% (95% CI -9.62 to -4.45, P < 0.0001). A subgroup analysis showed that LA size was reduced regardless of AF, with a WMD of -5.47% (95% CI -9.82 to -1.13%, P= 0.003) in PAF and -7.88% (95% CI -11.19% to -4.56%), P = 0.001 in PAF/PsAF, the difference between these two subgroups was not significant (Chi2=0.75, I2 =0.5%, p = 0.39), A cut off value of 21% (95% to 30%), was 79% (85-89%) sensitive and 77% (95% to 91%) specific for predicting AF recurrence.

**Conclusions:** Reduced LA strain significantly predicts recurrence of AF after ablation procedure, irrespective of AF type. This emphasizes the impact of LA wall remodeling on successful ablation.

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**P1756**

**Heart failure, left ventricular dimensions and ejection fraction are predictors of thromboembolism in non valvular atrial fibrillation patients treated with direct oral anticoagulants**

F Francesco Adamo1; N Saihi1; R Di Pietro1; E Pagliaroli1; S Monosilio1; I Cardillo1; G Benedetti1; M Marcone1; F Ferrante1; F Fedele1

**Background:** The CHA2DS2-VASc score does not always accurately assess the thromboembolic risk in patients with Non Valvular Atrial Fibrillation (NVAF) and, thus, it would be useful to have additional parameters, particularly in patients with CHA2DS2-VASc 1 in whom the need of anticoagulants is debated. We investigated whether the presence of heart failure (HF), left ventricular end-diastolic diameter (LVEDD) and left ventricular ejection fraction (EF) both assessed by 2D TTE are predictors of thromboembolic risk in patients suffering from NVAF treated with Direct Oral Anticoagulants (DOACs).

**Methods:** We evaluated CHA2DS2-VASc, presence of HF clinically assessed, LVEDD/BSA, EF and 1-year incidence of ischemic stroke, TIA or systemic embolism. We used odds ratio (OR), chi-square, linear regression and logistic regression analysis.

**Results:** Of 273 patients treated with DOACs (129 treated with apixaban, 120 with dabigatran and 24 with rivaroxaban), mean age was 73.1 ± 10.6 years and 152 (55.7%) were males. Mean CHA2DS2-VASc was 3.7 ± 1.7, 81 patients (29.7 %) had HF. Echocardiographic parameters were: LVEDD/BSA 27.6 ± 5.6 mm, EF 48.3 ± 10.6 %. After 1 year of follow up, 6 patients (2.19%) had a thromboembolic event. Of 6 patients, 5 had HF. A significant association between HF and thromboembolism was found (p = 0.008). OR of HF patients to have a thromboembolic event was 13.6 (p =0.008). Linear regression analysis showed significant correlations between CHA2DS2-VASc and both LVEDD/BSA (r =0.648; 95% CI 0.256 to 1.040) and EF (r = 0.208; 95% CI -2.727 to -1.289). No significant correlation was found between CHA2DS2-VASc and 1-year incidence of thromboembolism. Logistic regression showed significant associations between LVEDD/BSA, EF and 1-year incidence of ischemic stroke, TIA or systemic embolism (OR 1.15 for each unit increase of LVEDD/BSA, EF and 0.001 for each unit increase in EF). 

**Conclusions:** HF and echocardiographic data such as LVEDD/BSA and EF are predictors of thromboembolic risk in patients with NVAF and can be useful parameters in risk stratification, particularly in patients with CHA2DS2-VASc 1 where there is no clear indication to anticoagulation.

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**P1757**

**Clinical determinants of B-type natriuretic peptide levels in atrial fibrillation**

N Naoki Sato1; N Hatofi1; H Saka1; T Kunishima1; Y Hatori1

1Nippon Medical School, Tokyo, Japan; 2Kobayashi Hospital, Cardiology, Odawara, Japan, 3Sakai Clinic, Kawasaki, Japan; 4Kokusho Nihonmatsu Clinic, Kawasaki, Japan; 5Hatori Clinic, Kawasaki, Japan

**On behalf of: the ASSAF-K Investigators**

**Funding Acknowledgements:** The Kawasaki Physicians Association

**Background:** Plasma B-type natriuretic peptide (BNP) levels are elevated not only in atrial fibrillation (AF), but in non-cardiac conditions, e.g., renal dysfunction or obesity. However, it has not been clarified what determine BNP levels in the patients with AF.

**Purpose:** To examine determinants of BNP levels in AF.

**Methods:** The ASSAF-K registry, a multicenter, prospective, observational study, was performed to clarify the clinical features of patients with AF in Japan. From this database, 1156 patients were available for the present study. The enrolled subjects were divided two group, i.e., lower and higher BNP groups by the medium level of BNP at 120.8 pg/ml. The association between BNP levels and clinical variables was analyzed using binary logistic regression models.

**Results:** Clinical features were compared between two groups (Table). In multivariate regression analysis, age (odds ratio (OR) 1.045, 95% CI 1.03-1.06, P < 0.001), persistent AF (OR 2.97, 95% CI 2.20-4.02, P < 0.001), histories of heart failure hospitalization (OR 2.35, 95% CI 1.77-3.13, P < 0.001) and myocardial infarction (OR 1.76, 95% CI 1.03-3.03, P =0.04), hypertrophic cardiomyopathy (OR 5.86, 95% CI 1.97-17.39, P=0.001), and beta-blocker use (OR 2.05, 95% CI 1.54-2.75, P <0.001) were independent determinants for BNP levels.

**Conclusion:** Thus, the present study have demonstrated clinical determinants of BNP levels in the patients with AF, suggesting that interestingly the determinants except age are related to cardiac function.

**Table**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Lower BNP (n=579)</th>
<th>Higher BNP (n=578)</th>
<th>P-value</th>
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<td>Age (yrs)</td>
<td>71.5±10.1</td>
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<td>Pulse rate (l/min)</td>
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<td>75.7±17.1</td>
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<tr>
<td>eGFR (mL/min/1.73m2)</td>
<td>62.9±18.7</td>
<td>55.2±18.8</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>23.6±3.7</td>
<td>23.2±3.7</td>
<td>0.062</td>
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<tr>
<td>Persistent AF (%)</td>
<td>54.7</td>
<td>80.2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Heart failure hospitalization(%)</td>
<td>22.6</td>
<td>49.4</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Myocardial infarction(%)</td>
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<td>9.7</td>
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<td>Hypertrophic cardiomyopathy(%)</td>
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<td>5.0</td>
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<td>Digitalis(%)</td>
<td>16.4</td>
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<tr>
<td>Beta-blocker(%)</td>
<td>28.3</td>
<td>46.3</td>
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<td>Calcium channel blocker(%)</td>
<td>9.3</td>
<td>11.6</td>
<td>0.213</td>
</tr>
</tbody>
</table>

Plus minus values: mean ± standard deviation; BNP, B-type natriuretic peptide; eGFR, estimated glomerular filtration ratio; BMI, body mass index; AF, atrial fibrillation.

**Comparison of clinical features between lower- and higher-BNP groups**

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**P1758**

**LA diameter more than 40 mm predicts recurrence of atrial fibrillation after trans-catheter ablation: a systematic review and meta-analysis**

G Gani Bajraktari1; B Lytvyn1; MY Henein2

1University Clinical Centre of Kosovo (UCC), Service of Cardiology, Pristina, Kosovo Republic of; 2Heart Centre and Department of Public Health and Clinical Medicine, Umea University, Umea, Sweden

**Background and Aim:** Left atrial (LA) enlargement is associated with atrial fibrillation (AF) incidence and outcome. Trans-catheter ablation of AF has now become a conventional treatment of AF but its recurrence remains of clinical significance. The predictive role of LA size in AF treatment is still controversial, hence the aim of this meta-analysis was to analyze the potential association between LA diameter and AF recurrence after ablation.

**Methods:** We systematically searched PubMed-Medline, EMBASE, Scopus, Google Scholar and the Cochrane Central Registry, up to December 2016 in order to select clinical trial and observational studies, which assessed the predictive role of LA diameter in AF recurrence after catheter-ablation. 13.573 patients from 61 studies with paroxysmal AF (PAF), persistent (PsAF) or longstanding persistent AF (L-PsAF) were included.

**Results:** The pooled analysis showed that after a follow-up period of 19 ± 7.74 months, patients with AF recurrence had larger LA size compared with those without AF recurrence, with a weighted mean difference (WMD) 0.49 (95% CI 0.39 to 0.59, P < 0.001), irrespective of the type of AF. A subgroup analysis showed LA diameter to be different: WMD was 2.29 (95% CI 1.31 to 3.26), P = 0.001 in PAF and 1.51 (95% CI 1.10 to 1.93), P < 0.001 in PsAF/L-PsAF, the difference between these two subgroups was not significant (Chi2=2.04, I2 =51.1%, p =0.15).
LA diameter ≥40 mm predicted AF recurrence HR 1.08 [95% CI 1.03 to 1.14], P = 0.006, but the best cut-off value, in all included patients, was ≥50 mm HR 2.73 [95% CI 1.64 to 4.55], P < 0.001.

Conclusions: Increased LA diameter significantly predicts recurrence of AF after ablation procedure. While a diameter of 40 mm predicts recurrence, a diameter more than 50 mm is the most accurate predictor.

CARDIOMYOPATHY

P1759 Galactin-3 level and its relationship with clinical status and instrumental parameters in patients with hypertrophic cardiomyopathy

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1The Russian National Research Medical University named after N.I. Pirogov, Moscow, Russian Federation; 2City Hospital 52, Moscow, Russian Federation

Galectin-3 (Gal-3) is a novel marker of cardiac fibrosis and inflammation. The clinical significance of Gal-3 levels is now widely studied. Gal-3 levels in patients with hypertrophic cardiomyopathy (HCM) have been sufficiently described.

Purpose: To assess Gal-3 levels and its relationship with clinical status and instrumental parameters in patients with HCM.

Materials and methods: 30 patients with HCM were examined, (16 men (53.3%), average age 57.0 ± 13.2 years). All patients were treated with bisoprolol (5.5 ± 1.8 mg). In 10 patients (33.3%) obstructive form of the disease was identified. All patients underwent clinical examination, echocardiography with tissue doppler imaging (TDI) and Gal-3 levels evaluation.

Results: Gal-3 level was > 2.28 pg/ml in 17 HCM patients, average mean 4.5 ± 1.4, 6.9 pg/ml. There was a significant positive correlation between Gal-3 level and following parameters: age (r = 0.36, P = 0.05) and medium lateral RV walls’ (r = -0.63, P = 0.001) according anamnesis, the level of systolic BP (r = 0.42, P = 0.009), gender (r = 0.384) or left ventricular ejection fraction (63 ± 9 vs 65 ± 13%, p = 0.437) differences among HCM and control groups. Regarding volumetric analysis, the HCM group exhibited significant increases in EDV (46.7 ± 14.2 vs 28.0 ± 7.6 ml/m², p = 0.001) and ESV (32.2 ± 12.5 vs 15.5 ± 5.3 ml/m², p = 0.001). In HCM group, LAEF was significantly reduced (31.7 ± 11.4 vs 44.1 ± 12.0%, p = 0.001) and LA estimated mass was significantly higher (17.5 ± 14.5 vs 8.6 ± 1.5 g/m², p < 0.001). Regarding strain parameters, we found a significant decrease in GLS of HCM pts (14.0 ± 6.7 vs 24.9 ± 6.3%, p < 0.001).

Conclusion(s): The evaluation of LA by SDWMT in HCM pts provides detailed information about its volume, mass, function and global deformation parameters. In the analysed cohort, pts with HCM have increased volumes and masses, with a decrease in GLS.

P1760 Left atrium characterization in hypertrophic cardiomyopathy: three-dimensional wall-motion tracking technology as a valuable technique

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Background: Left atrium (LA) involvement is well established in hypertrophic cardiomyopathy (HCM), with higher volume values and lower deformation parameters being reported. These morphological and functional changes may be the result of secondary pressure overload (due to ventricular diastolic dysfunction, outflow tract obstruction or mitral insufficiency) and/or presence of primary atrial myocardial involvement (pathologically characterized by interstitial fibrosis).

Purpose: Using three-dimensional (3D) wall-motion tracking (3DWMT) echocardiographic technique, we aimed to characterize and compare LA volumes, mass and strain parameters in HCM patients (pts) with healthy controls.

Methods: Thirty-five (35) HCM pts and 27 healthy controls underwent standard bi-dimensional (2D) echocardiography, followed by 3DWT evaluation. Using Toshiba Artida echocardiography equipment (Toshiba Medical System), global strain values were obtained (global longitudinal strain (GLS), global radial strain (GRS), area tracking (AT)), as well as LA indexed estimated mass, LA indexed end-diastolic volume (EDV), LA indexed end-systolic volume (ESV), LA emptying fraction (LAEF).

Results: We found no age (61.5 ± 10.3 vs 57.5 ± 7.2 years, p = 0.097), gender (p = 0.384) or left ventricular ejection fraction (63 ± 9 vs 65 ± 13%, p = 0.437) differences among HCM and control groups. Regarding volumetric analysis, the HCM group exhibited significant increases in EDV (46.7 ± 14.2 vs 28.0 ± 7.6 ml/m², p = 0.001) and ESV (32.2 ± 12.5 vs 15.5 ± 5.3 ml/m², p = 0.001). In HCM group, LAEF was significantly reduced (31.7 ± 11.4 vs 44.1 ± 12.0%, p = 0.001) and LA estimated mass was significantly higher (17.5 ± 14.5 vs 8.6 ± 1.5 g/m², p < 0.001). Regarding strain parameters, we found a significant decrease in GLS of HCM pts (14.0 ± 6.7 vs 24.9 ± 6.3%, p < 0.001).

Conclusion(s): The evaluation of LA by SDWMT in HCM pts provides detailed information about its volume, mass, function and global deformation parameters. In the analysed cohort, pts with HCM have increased volumes and masses, with a decrease in GLS.
Patients with hypertrophic cardiomyopathy

**Background**

The identification of clinical variants and outcomes in individuals with hypertrophic cardiomyopathy (HCM) with the signs of progressive chronic heart failure (HF) remains a challenge and has not been fully understood. A number of factors have been proposed to identify subjects with HCM and high risk of CHF progression to a severe stage.

**Purpose**

The aim of our study is to assess survival rates, outcomes and the influence of factors associated with progressive HF in patients with HCM. Materials and methods. Clinical data of 345 HCM subjects (199 males and 146 females, median age 47 y.o., range 17 - 72 y.o.) treated in RPC "Cardiology" in the period between 2006 and 2016 have been studied.

**Results**

Twelve (3.5%) patients with HCM (mean-age 46 ± 12 y.o., 58.3% males) showed signs of Class III-IV NYHA HF accompanied by severe LV myocardial dysfunction. During the follow-up period (median follow-up period 6.7 years), 8 of 12 (67%) patients with Class III-IV NYHA HF showed adverse outcomes: SCD occurred in 1 patient, fatal outcome due to progressive HF occurred in 6 patients, and 1 patient had a fatal stroke. Median eventful survival was 4.3 years. During the follow-up, 21 (6.1%) patients had progression of HF symptoms from Class II to Class III NYHA. Based on data obtained from a multivariable analysis, predictors of CHF symptom progression from Class II to Class III NYHA were: LVEF < 55% (OR 4.8; 95% CI 1.6 - 14.5; < 0.001), LA size > 47 mm (OR 8.0; 95% CI 3.0 - 27.8; < 0.005), and pseudonormo diastolic dysfunction (OR 9.6; 95% CI 2.8 - 33.4; < 0.001). Percentage area of fibrosis with regard to a total myocardial volume based on cardiac MRI allows for an identification of patients with the risk of adverse remodeling with the threshold level > 25%.

**Conclusion**

Based on the abovementioned data, the discovered predictors allow to identify patients with adverse remodeling development and risk of end-stage of the disease progression.

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**P1763**

**Chronic heart failure in patients with non-obstructive hypertrophic cardiomyopathy: the effect of the angiotensin-converting enzyme inhibitors/angiotensin receptor blockers**

**Angiotensin-converting enzyme inhibitors (ACEI)/angiotensin receptor blockers (ARB) is the first-line therapy (IA) in patients with chronic heart failure (CHF). The possibility of their administration in HF with preserved ejection fraction (HFpEF) in patients with nonobstructive hypertrophic cardiomyopathy (HCM) remains debated (IaC).**

**Purpose**

To assess the effectiveness and safety of ACEI/ARB in HCM patients with HFpEF.

**Materials and methods**

We examined 40 patients with nonobstructive HCM and CHF II-III NYHA treated with bisoprolol. Patients were randomized into 2 groups: group I - 20 patients, in which periodont (3.7 ± 1.4 mg, n=14) and during 40.0 ± 13.7 mg, n=6) were added to bisoprolol (5.6 ± 1.5 mg) treatment; group II - 20 patients (control group), who continued to receive bisoprolol (5.0 ± 2.0 mg). All patients underwent clinical examination, echocardiography with tissue doppler imaging (TDI) and evaluation of the BNP level before and after 6 months of ACEI/ARB administration.

**Results**

There were no significant differences in sex, age, clinical – instrumental data and dose of bisoprolol between groups (p>0.05). After 6 months of ACEI/ARB therapy in group I there were significantly reduction of BNP level (from 322.8 ± 13.3 to 154.1 ± 10.1 pg/ml; p<0.01), thickness of interventricular septum (from 20.1 ± 1.0 mm to 18.4 ± 0.0 mm; p<0.001), LV posterior wall (p<0.0001), index of LV mass (from 145.1 ± 15.3 g to 125.1 ± 9.3 g; p<0.004) and right ventricle (RV) wall (p<0.009), decrease of isovolumic relaxation time (IRT) of transmural flow (p<0.001), RV (p<0.03) and LV (p<0.007) TDI index. According to the TDI data there was an increase of lateral systolic s´ of mitral annulus (MA) (p=0.01), a decrease of IRT in septal (p=0.01), lateral (p=0.01), anterior (p<0.05) part of the MA. After 6 months of therapy in group II structural and functional parameters didn’t change. During the course of ACEI/ARB therapy no adverse event were recorded.

**Conclusions**

Adding ACEI/ARA to beta-blockers therapy for 6 months in patients with nonobstructive HCM was safely, accompanied by reduction of the myocardial hypertrophy degree with an improvement of diastolic and systolic function of LV and RV and BNP level decrease.

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**P1762**

**Predictors of adverse outcomes and progression of heart failure in patients with hypertrophic cardiomyopathy**

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**Background**

The identification of clinical variants and outcomes in individuals with hypertrophic cardiomyopathy (HCM) with the signs of progressive chronic heart failure (HF) remains a challenge and has not been fully understood. The aim of our study is to assess survival rates, outcomes and the influence of factors associated with progressive HF in patients with HCM.

**Materials and methods.**

Clinical data of 345 HCM subjects (199 males and 146 females, median age 47 y.o., range 17 - 72 y.o.) treated in RPC “Cardiology” in the period between 2006 and 2016 have been studied.

**Results.**

Twelve (3.5%) patients with HCM (mean-age 46 ± 12 y.o., 58.3% males) showed signs of Class III-IV NYHA HF accompanied by severe LV myocardial dysfunction. During the follow-up period (median follow-up period 6.7 years), 8 of 12 (67%) patients with Class III-IV NYHA HF showed adverse outcomes: SCD occurred in 1 patient, fatal outcome due to progressive HF occurred in 6 patients, and 1 patient had a fatal stroke. Median eventful survival was 4.3 years. During the follow-up, 21 (6.1%) patients had progression of HF symptoms from Class II to Class III NYHA. Based on data obtained from a multivariable analysis, predictors of CHF symptom progression from Class II to Class III NYHA were: LVEF < 55% (OR 4.8; 95% CI 1.6 - 14.5; < 0.001), LA size > 47 mm (OR 8.0; 95% CI 3.0 - 27.8; < 0.005), and pseudonormo diastolic dysfunction (OR 9.6; 95% CI 2.8 - 33.4; < 0.001). Percentage area of fibrosis with regard to a total myocardial volume based on cardiac MRI allows for an identification of patients with the risk of adverse remodeling with the threshold level > 25%.

**Conclusion**

Based on the abovementioned data, the discovered predictors allow to identify patients with adverse remodeling development and risk of end-stage of the disease progression.
Gender differences in right ventricular function in dilated cardiomyopathy patients

Methods: We included 80 consecutive patients diagnosed with idiopathic and familial DCM that underwent a comprehensive CMR with a 3-T scanner, as part of their diagnostic work-up. Ventricular volumes, ejection fraction and mass were measured using dedicated software and were classified as normal or abnormal based on sex and age. Results: Male and female patients exhibited similar age at diagnosis (36 ± 13 vs 40 ± 14 years, p = 0.142), identical proportion of familial cases (55% vs 55%, p = 0.964) and positive molecular results (22% vs 26%, p = 0.730). Men and women presented similar mean cardiac index (2.95 ± 0.61 vs 2.74 ± 0.83 L/min/m², p = 0.265), ventricular mass (78 ± 19 vs 75 ± 24 g/m², p = 0.588), left ventricular (LV) ejection fraction (EF) (55 ± 11% vs 52% ± 11%, p = 0.263), LV end-diastolic volume (EDV) (126 ± 36 vs 128 ± 38 mL/m², p = 0.873) and LV end-systolic volume (ESV) (83 ± 36 vs 86 ± 38 mL/m², p = 0.674). On the contrary, women presented higher RVES and lower RVEDV and RVEF (58 ± 11% vs 48 ± 11%, p = 0.008; 69 ± 21 vs 88 ± 22 mL/m², p = 0.006; 32 ± 20 vs 45 ± 21 mL/m², p = 0.012). The differences in RVEF are particularly significant in the 2nd tercile of LVEF (29% vs RVEF < 40%) and the differences in volumes, in the 2nd and 3rd tercile of LVEF (Graph: mean right ventricular ejection fraction, mean right ventricular end-diastolic volume and mean right ventricular end-systolic volume according to gender and UVEF terciles). Conclusions: In patients with DCM, RV functional parameters assessed by CMR are significantly different between genders, particularly in those with LVEF ≥ 35%.

These differences might explain the diverse clinical presentations between men and women across the spectrum of LV systolic dysfunction.
Results: We included 99 patients, 59 (60%) male, mean age at diagnosis 38±13 years, mean left ventricle (LV) ejection fraction 34±12% and LV end-diastolic diameter 63±8 mm. Forty-five (46%) patients presented criteria of DCM (corresponding to 37 families) and 46 (51%) were in NYHA class I. After a median follow-up of 28 (IQR 18) months, 14 (14%) patients experienced adverse events (composite of death, HF and hospitalization from cardiac causes). Kaplan-Meier survival analysis showed that sinus rhythm (p=0.001), atrial fibrillation (p=0.041), first-degree atrioventricular block (AVB) (p=0.001) and non-sustained ventricular tachycardia (NSVT) (p=0.000) significantly influenced survival without adverse events (Figure 1–4). Multivariate logistic revealed NSVT as an independent predictor of worse outcome (OR 16.3; 95% CI 1.7–158.3, p=0.016).

Conclusions: In our cohort of DCM patients, 14% experienced an adverse event. Simple ECG data, namely atrial fibrillation, first-degree AVB and NSVT, may help to identify patients at higher risk of worse outcome, whom might benefit from a more aggressive clinical vigilance and timely interventions.

Poster session 3 435

P1767

Incremental prognostic value of cardiopulmonary exercise testing in non-ischemic dilated cardiomyopathy

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Funding Acknowledgements: British Heart Foundation Clinical Research Training Fellowship

Introduction: Cardiopulmonary exercise testing (CPET) is commonly used in the follow-up of patients with dilated cardiomyopathy (DCM). CPET variables have been correlated with poor clinical outcomes, however, little is known about their incremental value in addition to other prognostic markers such as brain natriuretic peptide (BNP), left ventricular ejection fraction (LVEF) and New York Heart Association (NYHA) symptom class.

Purpose: To investigate the incremental value of CPET in addition to other conventional prognostic markers such as LVEF, BNP and NYHA class.

Methods: We recruited patients with a history of DCM referred for CPET between 2007 and April 2016. CPET was performed using maximal treadmill ergometry. Clinical data contemporary to the CPET were used. The primary end-point was a composite of cardiovascular (CV) death, unplanned CV hospitalisation and cardiac transplantation. The association between the end-point and CPET and clinical variables was examined using proportional hazard modelling.

Results: 126 patients (mean age: 43 years, mean LVEF: 45%, 76 male) were included. All patients were diagnosed by echocardiography in all patients: LVEDP was 7,4±9.8 mmHg, left atrial dimension was 7,2±6.9 cm, left ventricular mass was not increased (p=0.04), peak oxygen consumption (peak VO2) per m/kg/min – HR 0.93; 95% CI 0.87-0.99; p=0.03), and anaerobic threshold (per m/kg/min – HR 0.89; 95% CI 0.79-0.99; p=0.04) remained predictors of the composite end-point.

Conclusion: Total exercise time, V̇E/V̇CO2 slope, peak VO2 and anaerobic threshold, as measured by CPET provide incremental prognostic information in addition to BNP, LVEF and symptom status in patients with DCM.

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P1769

Surgical treatment of dilated cardiomyopathy: the reverse remodelling operation and 5-years of follow up

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Funding Acknowledgements: This work was partially supported by the Russian Research Foundation, project No 16-15-10421

Background: The shortage of the donor hearts for transplantation leads to the search for new solutions for the surgical treatment of patients with dilated cardiomyopathy and severe heart failure. One of the possible methods could be a reconstructive surgery – the reverse remodelling of the heart.

Purpose: This study aims to review the outcome and 5-years follow-up of a surgical reverse remodelling of the heart in cohort of DCM patients.

Patients and methods: We have performed reverse cardiac remodelling in patients with dilated cardiomyopathy. The total number of patients operated with this technique was 24 (19 male and 5 female) patients aged 20–75 (average age = 50±7.7 years) years. All patients were operated with this technique between 2008–2015.

Results: and discussion. All patients have had a heart failure of the high grade (III FC NYHA – 3, IV FC NYHA – 21 patients). Prior the surgery cardiomegaly was diagnosed by echocardiography in all patients: UVEDP was 7,4±0.9 cm, UWE2V was 277±98 ml, left atrial dimension was 7.2±1.3 cm, LVEF was 29±10%, and PASP was 45±15 mm Hg.

We had no intraoperative mortality. Two patients had died in the early postoperative period after the reverse remodelling. 22 patients were discharged from the hospital. Significant normalization of intracardiac hemodynamics was observed in all 22 patients. Upon hospital discharge all patients had lower heart failure class III–II FC NYHA and improvement in the physical exercise tolerance. The comparative analysis of transthoracic echocardiography indicators had revealed the reduction of the heart chambers size and volume, significant decrease of the pulmonary artery systolic pressure, the left ventricular ejection fraction had increased as compared the baseline. In the late period (the follow-up period was 5 years) 5 patients died due to heart failure progression, and 3 patients died suddenly due to fatal cardiac arrhythmias.

Conclusion: The reverse remodelling of the heart could be considered as a promising organ preserving surgical technique for a certain group of DCM patients, allowing us in some cases to postpone or to avoid a heart transplantation.

Poster session 3 435

P1770

Dilated cardiomyopathy: from electrocardiogram to echocardiographic and cardiac magnetic resonance imaging

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On behalf of: FATIMA Investigators

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Introduction: Patients with dilated cardiomyopathy (DCM) may present diverse electrocardiogram (ECG) anomalies.

Purpose: We aimed to correlate baseline ECG with left ventricular (LV) and right ventricular (RV) anatomy and function assessed by echocardiography and cardiac magnetic resonance (CMR).

Methods: Multicentric national study of consecutive patients with idiopathic or familial DCM. Patients underwent extensive clinical evaluation, ECG, Holter, echocardiogram, CMR (in the absence of contra-indications) and molecular study.

Results: We included 111 patients, 48% with familial DCM, 60% males, mean age 47 ± 11 years, with mean age at diagnosis of 39 ± 13 years. Echocardiographic mean LV ejection fraction (LVEF) was 34 ± 11% and LV end-diastolic (LVED) diameter 62 ± 8 mm, CMR mean LVEF was 35 ± 11% and LVED volume 123 ± 30 mL/m², and 84% presented at least one ECG anomaly.

Patients in atrial fibrillation (AF) presented a higher proportion of RV dysfunction in echocardiogram (46% vs 15%, p = 0.029) and in CMR (100% vs 36%, p = 0.004) and a higher proportion of enlarged RV end-systolic volume (67% vs 24%, p = 0.004). Additionally, patients in sinus rhythm presented higher LVEF in echocardiogram (35 ± 11% vs 30 ± 9%, p = 0.009).

When considering conduction anomalies, 34% and 4% of patients presented left (LBBB) and right bundle branch block (RBBB), respectively, and 28% first-degree atrioventricular block (AVB).

Patients with LBBB presented higher ventricular mass (84 ± 21 vs 72 ± 21 g/m², p = 0.035) and larger RV end-diastolic (17 ± 28 mL/m², p = 0.023), end-systolic 90 ± 34 vs 74 ± 26 mL/m², p = 0.036). Curiously, LBBB was associated with better functional RV parameters (RVEF 57 ± 9% vs 50 ± 12%, p = 0.026; RV end-systolic volume 31 ± 10 vs 41 ± 24 mL/m², p = 0.021).

On the contrary, patients with RBBB presented worse RVF (42 ± 13% vs 53 ± 11%, p = 0.045) and larger LD (end-diastolic volume 111 ± 34 vs 74 ± 20 mL/m², p = 0.001). Also, all these patients presented late gadolinium enhancement (100% vs 34%, p = 0.017).

QRS duration presented a moderate positive correlation with left atrial diameter (r = 0.407, p = 0.003).

The presence of first-degree AVB was associated with larger left atrial diameter (47 ± 7 vs 42 ± 8 mm, p = 0.011), worse LVEF (28 ± 11% vs 37 ± 11%, p = 0.001) and a higher proportion of RV dysfunction in echo (43% vs 9%, p = 0.001).

Left atrial anomaly or LV hypertrophy were not associated with any functional LV or ular function evolution, known predictors of outcomes.

Conclusion: ECG anomalies are frequent in DCM patients. Simple data derived from serial ECG, namely atrial fibrillation, intraventricular conduction delay and first-degree AVB, may be of value in anticipating chamber dimensions and ventric-ular function evolution, known predictors of outcomes.

Reference: "The predictors of the response to cardiac resynchronization therapy in patients with dilated cardiomyopathy" by P. Manca1; S. Cossà2; G. Föld3; A. Staciu4; B. Schiuti; A. Setzu1; S. Mameli1; N. Sanna1; A. Gaita1; L. Minerva1; G. Matta1; M. Mauricio Poro1; G. Brozzi Hospital, Department of Cardiology, Cagliari, Italy; G. Brozzi Hospital, Department of Imaging, Cagliari, Italy; University of Cagliari, Dipartimento di Sanità Pubblica, Monserrato, Italy

Background: Cardiac resynchronization therapy (CRT) reduces mortality and mor- bidity in patients affected by dilated cardiomyopathy (DCM) and left bundle branch block (LBBB). However, approximately 1/3 of the implanted patients do not show any benefit from this treatment. Aim of the study was to evaluate the clinical, card- ial, echocardiographic and cardiac magnetic resonance (CMR) predictors of the response to CRT in patients with DCM.

Methods: We retrospectively analyzed thirty-nine heart failure symptomatic patients (21 M, 18 F, mean age 58 ± 11 yrs, NYHA class II-IV), with a diagnosis of DCM, LBBB and QRS ≥ 120 ms, who had a complete cardiovascular evaluation including clinical examination, blood parameters, ECG, echocardiography and CMR. All patients underwent coronary angiography to exclude significant (>50%) stenosis. Four patients were in atrial fibrillation (AF) with an adequate rate control and two of them had a biventricular pacing < 90%. All patients were treated with optimal med- ical therapy for at least 3 months (β86%, ACET-VATTI-A 90%, trosamide 92%, AA 87%). Based on the response to CRT, patients were divided into two groups: Responders those who had NYHA class I or II and Improvement > 15% in the ejection fraction; Non-Responders no improvement or even worsening of NYHA functional class and improvement < 15% in the ejection fraction.

Results: At a mean follow up of 39 ± 18 months twenty-four patients (62%) were considered responders, while fifteen (38%) did not show any benefit. At CMR, LV fibrosis was present in only 1/3 of patients, involving < 3% of myocardial mass of the whole population. The predictors of non-response were older age (≥ 64 vs 56 years, p = 0.036), higher creatinine level (3.6 vs 0.9 mg/dl, p = 0.036) and a more enlarged left atrium (38 vs 24 cm², p = 0.012). The four AF patients were all Non-Responders (p = 0.008). No other factors, such as baseline QRS duration and post CRT shorten- ing or LV ejection fraction, showed a prognostic value.

Conclusion: These data confirm that more than 30% of DCM patients do not have any substantial benefit from CRT, independently from the presence of ventricular fibrosis. In our experience, older age, renal impairment, atrial dilatation and AF rep- resent negative prognostic factors.
enhancement was present or by an expert consensus (3 clinicians) using all medical files. Diagnostic values of tests as well as their combination were calculated.

Results: Among sixty consecutive patients (64 ± 10 years, 18 with multiple myeloma and 42 with MGUS), final diagnosis of CA was done in 40 patients. Renal, digestive and neurologic AL involvements were present in 45%, 22% and 20% respectively of patients with CA. The table shows diagnostic values of EKG, BNP and echography as well as their combinations. Usefulness of troponin, Holter or stress test was less relevant.

Conclusion: Combining EKG, BNP testing and echocardiography result in nearly optimal diagnosis of CA.

P1774
The genetics of noncompaction cardiomyopathy
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Background: Left ventricular noncompaction cardiomyopathy (LVNC), despite being a relatively rare cardiomyopathy, is a major problem in cardiology, due to its high mortality and the presence of serious complications. Despite significant advances in genetic diagnosis, only a small number of patients with LVNC could be successfully genotyped. Although the use of large panels of genes can increase the impact of genetic testing.

Purpose: In our study we performed exome sequencing of patients with a clinical diagnosis of noncompaction cardiomyopathy and their relatives of 1 and 2 degrees of kinship to detect the genetics causes of the cardiomyopathy. Methods: In the last few years we formed the cohort of patients with noncompaction cardiomyopathy and their relatives of 1 and 2 degrees of kinship. The enrollment of participants was done by cascade and reverse-cascade methods in the heart failure center. Probands should have met echocardiographic criteria and cardiac MRI criteria for noncompaction. All the participants underwent standard clinical examination and noninvasive tests. The study was approved by the local and all the study participants signed the consent form.

Results: We have sequenced specimens of 29 participants. After the primary bioinformatics analysis have been done, all the variants in 37 genes associated with noncompaction cardiomyopathy were annotated and filtered according to population data, data of computational predictive tools (SIFT and PolyPhen2), association to any cardiomyopathy and segregation in family. Likely pathogenic variants were determined in 6 out of 9 families (29 participants). Among them 11 patients fulfilled the criteria of noncompaction cardiomyopathy. The signs of excess trabeculation were found in eight relatives and 12 relatives were negative for any signs of cardiomyopathy. For precise evaluation of pathogenic variants 37 genes earlier associated with noncompaction cardiomyopathy were screened.

Conclusion: In our study we performed exome sequencing of patients with a clinical diagnosis of noncompaction cardiomyopathy and their relatives of 1 and 2 degrees of kinship to detect the genetics causes of the cardiomyopathy. Likely pathogenic variants were determined in 6 out of 9 families (29 participants). Among them 11 patients fulfilled the criteria of noncompaction cardiomyopathy. The signs of excess trabeculation were found in eight relatives and 12 relatives were negative for any signs of cardiomyopathy. For precise evaluation of pathogenic variants 37 genes earlier associated with noncompaction cardiomyopathy were screened.

**Table 1. Diagnostic values of EKG, BNP and echography**

<table>
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<tr>
<td>BNP ≥ 100 ng/L and IVS ≥ 12 mm and GLS ≤ 16%</td>
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<td>94%</td>
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<tr>
<td>BNP ≥ 100 ng/L and EKG abnormalities and IVS ≥ 12 mm and GLS ≤ 16%</td>
<td>82%</td>
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P1775
**Ventricular deformation in type 1 diabetes children**
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Introduction: Diabetic cardiomyopathy is a new entity, defined as a form of heart failure with preserved LVEF, observed in diabetic patients, in the absence of coronary artery disease, hypertension and significant valvular heart disease. Application of a new echocardiographic tool, the 2D Strain is being evaluated. The aims of our study were to investigate the global longitudinal Strain (GLS) of the left ventricle (LV) and of the right ventricle (RV) and to determine the correlations between GLS and metabolic control evaluated by HbA1c.

Methods: It was a retrospective study of 24 children with type 1 diabetes. The conventional echocardiographic parameters and GLS were studied. These data were compared to the measured parameters in 24 healthy children matched for age and sex.

Results: The mean age was 11.13 ± 0.54 years. The mean duration of diabetes was 7 years ± 0.54, HbA1c 8.79% ± 0.25, LVEF was preserved in 83% (18 on 24) with an average of 67.88 ± 1.18%. The TDE was significantly shorter in the diabetic group (46.54 ms ± 3.69 Vs 161.42 ms ± 2.38 for the control group, p = 0.005). E/E' ratio was significantly higher in the diabetic group compared with the control group (6.72 ± 0.33 Vs 5.21 ± 0.15, p = 0.0011). RV function was preserved in the diabetic group: TAPSE was 20.33 ± 0.28 mm and S' Wave was 14 cm / s ± 5.02. No correlation was found between the GLS of the LV and the HbA1c (r = 0.12, p = 0.477).

Conclusion: Myocardial deformation analysis by Strain 2D can detect subclinical impairment of LV systolic function. It is an early marker of diabetic cardiomyopathy. It has a contributive value for screening early cases and for optimizing therapeutic management and consequently codifying the subsequent monitoring strategy.
P1777 Significance of hsTNF-alpha testing in the verification of inflammatory cardiomyopathy.

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Aim: To evaluate the role of hsTNFα in the verification of the inflammatory cardiomyopathy (ICM).

Methods: 35 patients mean age 40.8 ± 11.3 (21 male, 14 female), I-II Class NYHA, mean LVEF 33.8 ± 6.36%, with symptomatic heart failure for median 2.0 [1.0-3.0] years and suspected inflammatory cardiomyopathy underwent endomyocardial biopsy (EMB). EMB specimens were investigated with histo- and molecular-genetic methods with PCR detection of cardiotoxic viruses. Diagnosis was based on World Health Organization criteria. Leucocytes and macrophages cri-
teria amount was ≥ 14. Sera were taken for testing hsTNFα.

Results: The total number of EMB patients was 35 (100%). ICM was diagnosed in 15 cases (42, 9%) (9 cases (25, 7%) were virus-positive and 6 cases (17, 1%) were virus-negative). DCMP without signs of active inflammation was revealed in n=20 (57, 1%). 12 cases (34, 2%) were virus positive and 8 cases (22, 8%) were virus negative). Mean NYHA FC was 2.0 ± 0.7, 0.7 in ICM pts group and 2.1 ± 0, 7 in DCMP pts group (p = 0, 6). According to EMB results, in the myocardium of patients with ICM the median of lymphocytes, expressing CD4 + and CD8 + were 13,5[10,0;20,0]; and 10,0[6,0;11,7] relatively, that was significantly higher compared with group of DCMP without active inflammation; relatively 1,8[0,3;3,2] < p = 0,0001 for CD4 + and 3,1[1,5;4,2] for CD8 + (p < 0,0001). Between the groups of ICM and DCMP without active inflammation there was no significant difference in the level of the hsTNFα. The level of hsTNFα was 3.9[0,8;3,9] (p = 0,47) relatively. However, according to the quartiles of infiltrating cells/mm² of myocardium, the patients were divided into four groups: 1 group (0-4 cells), 2 group (5-10 cells), 3 group (11-17 cells), 4 group (>17 cells). In pts with more than 17cells/mm² was identified the maximum 3,1[1,3;9,7] versus 1,9 [0,8;3,9] (p = 0,47) relatively. However, according to the quartiles of infiltrating cells/mm² of myocardium, the patients were divided into four groups: 1 group (0-4 cells), 2 group (5-10 cells), 3 group (11-17 cells), 4 group (>17 cells). In pts with more than 17cells/mm² was identified the maximum 3,1[1,3;9,7] versus 1,9 [0,8;3,9] (p = 0,47) relatively. However, according to the quartiles of infiltrating cells/mm² of myocardium, the patients were divided into four groups: 1 group (0-4 cells), 2 group (5-10 cells), 3 group (11-17 cells), 4 group (>17 cells). In pts with more than 17cells/mm² was identified the maximum 3,1[1,3;9,7] versus 1,9 [0,8;3,9] (p = 0,47) relatively. However, according to the quartiles of infiltrating cells/mm² of myocardium, the patients were divided into four groups: 1 group (0-4 cells), 2 group (5-10 cells), 3 group (11-17 cells), 4 group (>17 cells). In pts with more than 17cells/mm² was identified the maximum 3,1[1,3;9,7] versus 1,9 [0,8;3,9] (p = 0,47) relatively. However, according to the quartiles of infiltrating cells/mm² of myocardium, the patients were divided into four groups: 1 group (0-4 cells), 2 group (5-10 cells), 3 group (11-17 cells), 4 group (>17 cells). In pts with more than 17cells/mm² was identified the maximum 3,1[1,3;9,7] versus 1,9 [0,8;3,9] (p = 0,47).

Conclusions: The level of hsTNFα was significantly higher in patients with the most pronounced inflammatory process and associated with the severity of myocardial infiltration. The level of this cytokine reveals the stage of cardiomegaly. 

P3206 Diagnostics of wild-type transmural cardiomyopathy and its clinical presentation in Czech patients - a single centre experience.

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Introduction: Transmural cardiomyopathy (TTR-CMP) has been recently recog-
nized as a cause of heart failure with preserved ejection fraction (HFPEF). Availability of non-invasive diagnostics using 99mTc-DPD scintigraphy and emerging modalities of pharmacotherapy have attracted attention of clinicians to this disease. We aimed to analyze our experience with diagnostics and clinical presentation of wild-type TTR-CMP.

Methods: The study group included 16 patients (14 males, 2 females; mean age 80 ± 6 years) diagnosed with wild-type TTR-CMP in our centre from 2010-2016. The diagnosis of TTR-CMP was based on index of maximal myocardial accumulation (IMA) at 99mTcDPD SPECT/CT following administration of 740MBq of 99mTcDPD. IMA was calculated as a ratio of peak myocardial and peak skeletal activity (mean 6.26 ± 2.42; upper limit of normal 1.1 in males and 1.7 in females). In addition, 8 patients (50%) underwent endomyocardial biopsy, which detected transthyretin amyloidosis in all cases.

Results: TTR-CMP was identified in 10 patients (62%) evaluated due to HFPEF. 5 patients (32%) were diagnosed during screening among 80 elderly patients (age > 70 years; 38 males, 42 females) indicated to 99mTcDPD bone scintigraphy due to oncologic diseases (most commonly prostatic and breast cancer). One asymp-
tomatic patient (8%) was diagnosed accidentally at echocardiography. 8 patients (50%) had a history of decompensated heart failure, mean NYHA class was 2.2 ± 0.5.

P1779 EMBS-based diagnosis in a large cohort of 2822 consecutive patients with unexplained heart failure: data analysis from 2014-2016

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Background: The diagnosis of unexplained heart failure is challenging. The current expert consensus statement of the European Society of Cardiology (ESC) maintains that endomyocardial biopsies (EMBS) remain the gold standard for definitive diag-

nosis of unexplained heart muscle diseases. However, EMBS is used inef-

fectively, although histology, immunohistochemical, and molecularbiological analysis of EMBS is a prerequisite to make an etiology-driven diagnosis with the aim to identify those patients in whom specific therapy would be appropriate.

Methods and Results: We enrolled n=2822 consecutive patients with unexplained heart failure (n=1034 men, 788 women, mean age 51.44 ± 16.04 years) from January 2014 to August 2016, who underwent EMBS. The suspected diagnosis had been made by clinicians. EMBSes were send to a FDA-proved laboratory (Institute for Cardiac Diagnostic and Therapy (Berlin, Germany)). Analysis included histology, immunohistochemistry, molecular virology, and gene profiling.

In n=810 patients the suspected diagnosis was acute myocarditis, in 1772 patients myocarditis or inflammatory/dilated cardiomyopathy was suspected. In n=240 patients a storage disorder was suspected. Based on EMBS results in 58.3% (n = 1664 patients) a specific heart muscle disease could be diagnosed. In particular, Cosacke-Adenovirus genomes were present in n = 44, Ebstein-Bar-Virus in n = 77, Human-herpesvirus 6 (HRHV) in n = 426 (including 21 patients with chromosomal integrated (ii) HHV6), and erythrovirus with active viral replication (positive mRNA) in n = 649 patients.

Results: Virus-negative intramyocardial inflammation was present in n=810 patients, includ-
ing a histologically-proven active myocarditis in n=64. Histological proof of giant cells was present in n=20 patients. However, in n=133 patients idiopathic giant cell myocarditis or eosinophilic myocarditis was diagnosed by analysis of myocardial gene expression profile. 116 patients showed evidence of cardiac storage disease. Based on EMBS results in 58.8% of this large cohort of patients a specific heart muscle disease could be diagnosed. These etiology-driven diag-

noses implicate a specific, causal therapy.

Our data clearly show the necessity of an EMBS-based diagnosis, which has a direct clinical consequence regarding a specific therapy in a notable high percentage of patients with unexplained heart failure.
Methods: This study focus on 16 patients with CCM, 20 patients with CCM-SAH, and 28 controls. The diagnosis of CCM was based on a positive serology for Chagas disease plus abnormal resting ECG or decreased left ventricular ejection fraction on echocardiogram. The diagnosis of CCM-SAH was done when patients with CCM had a SAH > 140 x 90 mmHg. Quantitative measurements of cytokines were performed on plasma samples using the double-ligand/sandwich enzyme-linked immunosorbent assay (ELISA). The cytokine concentration was expressed in pg/ml by the kit's standard curve.

Results: TNF-alpha levels were 259 ± 1,32 in controls, 412 ± 2,3 in patients with CCM, and 495 ± 3,2 in patients with CCM-SAH (p < 0.05). INF-gamma levels were 58 ± 1,57 in controls, 102 in patients with CCM, and 124 ± 2,6 in patients CCM-SAH (p > 0.05). IL-1 beta levels were 52 ± 1,33 in controls, 137 ± 3,12 in CCM, and 203 ± 5,56 in patients with CCM-SAH (p < 0.05). IL-2 levels were 22 ± 1,25 in controls, 45 ± 1,18 in patients with CCM, and 84 ± 2,8 in those with CCM-SAH (p < 0.05). IL-6 levels were 77 ± 1,45 in controls, 141 ± 1,8 in patients with CCM, and 195 ± 2,1 in those with CCM-SAH. IL-10 levels were 156 ± 2,8 in controls, 212 ± 2,1 in patients with CCM, and 255 ± 2,6 in those with CCM-SAH (p < 0.05). IL-12 levels were 65 ± 2,1 in controls, 221 ± 2,1 in patients with CCM, and 279 ± 3,2 in those with CCM-SAH (p < 0.05). IL-13 levels were 56 ± 1,9 in controls, 84 ± 2,1 in patients with CCM, and 95 ± 2,2 in patients with CCM-SAH (p < 0.05). TGF-beta levels were 35 ± 2,2 in controls, 60 ± 2,5 in patients with CCM, and 77 ± 2,3 patients with CCM-SAH (p < 0.05). IL-17 were 74 ± 2,5 in controls, 133 ± 2,8 in patients with CCM, and 189 ± 2,7 in those with CCM-SAH (p < 0.05). IL-23 levels were 50 ± 2,0 in controls, 144 ± 3,0 in patients with CCM, and 183 ± 3,4 in those with CCM-SAH (p < 0.05).

Conclusion: Patients with CCM-SAH have increased plasma levels of pro-inflammatory, anti-inflammatory, and regulatory cytokines in comparison with CCM patients, suggesting a higher level of immunomodulation in patients with CCM-SAH.

Methods: We conducted a prospective inclusion of Shabu consumers who were admitted for heart failure in our hospital during the period from January 2015 to September 2016. We identified five cases of Shabu users with a first episode of heart failure. For diagnosis, an initial urinalysis was performed by immunoassay and confirmed with gas chromatography-mass spectrometry.

Results: The median age of the patients was 42 ± 11 years. All patients presented as severe acute heart failure (acute pulmonary edema, cardiogenic shock, or heart failure NYHA functional class IV) due to left ventricular dysfunction (mean left ventricular ejection fraction (LVEF) 21 ± 5%). Mean left ventricular end-diastolic diameter was 64 ± 6 mm. Coronary angiography or computed tomography angiogram excluded obstructive coronary artery disease. Cardiac magnetic resonance imaging identified a non-ischemic cardiomyopathy in all of them with two patterns of late gadolinium enhancement (LGE): foci in the interventricular junction (Fig 1A) or multiple foci of LGE without lesions. All patients presented elevated necrosis biomarkers and QTc interval prolongation (mean QTc 477 ± 25 ms). Three types of cardiomyopathy were identified: two patients with dilated (Fig 1C) and two cases with hypertrophic cardiomyopathy (Fig 1D) in chronic consumption and one stress cardiomyopathy in acute consumption.

Conclusions: Shabu related cardiomyopathy presented as severe acute heart failure. At all patients presented severe left ventricular dysfunction and QT prolongation. The detection of these five cases of Shabu related cardiomyopathy represents an alert. It should motivate a rapid diagnosis and management of these patients and further studies on the cardiovascular risk of this drug.
Introduction: Heart failure (HF) after myocardial infarction (MI) is common and has been associated with excess mortality. The aim of this study was to provide an evaluation of the factors that predict the development of "de novo" HF in patients after MI with LVEF.

Methods: A total of 3507 consecutive patients discharged from hospital after AMI between January 2011 and December 2015 in two tertiary hospitals were included. We excluded patients with LVEF < 50%, Killip Class ≥ II and patients with prior or "de novo" HF (n = 1283). The final cohort was made up 2,158 patients. Using a competing risk framework for HF occurrence, accounting for death as a competing episode, predictors of follow-up HF development were assessed by Fine-Gray proportional hazards regression analysis. For the multivariate analysis, we used covariates with p < 0.05 in the univariate analysis. The adjusted hazard of HF was expressed as subhazard ratios (sHR) with corresponding 95% confidence intervals (95%CI).

Results: During a follow-up of 20.1 ± 11.8 months, 59 (2.8%) patients developed "de novo" HF. Table 1 shows the uni and multivariate Fine-Gray analysis. Age (as continuous variable, being 70 years the best cut-off to predict HF), hypertension, renal disfunction, and atrial fibrillation were independent predictors for HF development. Basing on the presence or absence of these 4 risk factors, we can stratify the risk of "de novo" HF after MI (Figure 1).

Conclusions: In a contemporary cohort of patients surviving an AMI, the incidence of HF is about 3%, and its occurrence can be easily predicted by 4 previous risk factors.

Table 1. Uni and Multivariate Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>UniV</th>
<th>UniV</th>
<th>UniV</th>
<th>MultiV</th>
<th>MultiV</th>
<th>MultiV</th>
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<tr>
<td>Age per 1 year increase</td>
<td>1.08</td>
<td>1.05-1.10</td>
<td>&lt; 0.001</td>
<td>1.04</td>
<td>1.01-1.07</td>
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<td>Female sex, %</td>
<td>2.83</td>
<td>1.69-4.72</td>
<td>&lt; 0.001</td>
<td>1.18</td>
<td>0.59-2.37</td>
<td>0.633</td>
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<td>Hypertension, %</td>
<td>4.32</td>
<td>2.05-9.11</td>
<td>&lt; 0.001</td>
<td>3.09</td>
<td>1.05-9.06</td>
<td>0.040</td>
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<tr>
<td>Diabetes Mellitus, %</td>
<td>2.40</td>
<td>1.44-4.00</td>
<td>0.001</td>
<td>1.38</td>
<td>0.75-2.54</td>
<td>0.293</td>
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<tr>
<td>ST-elevation myocardiopathy infarction, %</td>
<td>0.42</td>
<td>0.23-0.77</td>
<td>0.005</td>
<td>0.96</td>
<td>0.50-1.85</td>
<td>0.909</td>
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<tr>
<td>Haemoglobin at admission, g/dL</td>
<td>0.69</td>
<td>0.61-0.78</td>
<td>&lt; 0.001</td>
<td>0.89</td>
<td>0.72-1.10</td>
<td>0.270</td>
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<tr>
<td>CKD eGFR at admission &lt; 60ml/min/1.73m2</td>
<td>5.12</td>
<td>2.86-9.20</td>
<td>&lt; 0.001</td>
<td>2.30</td>
<td>1.05-5.04</td>
<td>0.037</td>
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<tr>
<td>Atrial fibrillation, %</td>
<td>8.87</td>
<td>5.28-14.90</td>
<td>&lt; 0.001</td>
<td>3.34</td>
<td>1.67-6.66</td>
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<tr>
<td>Multivessel coronary artery disease, %</td>
<td>2.06</td>
<td>1.03-2.88</td>
<td>0.040</td>
<td>1.33</td>
<td>0.73-2.42</td>
<td>0.356</td>
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<tr>
<td>Complete revascularization, %</td>
<td>0.51</td>
<td>0.29-0.91</td>
<td>0.021</td>
<td>1.01</td>
<td>0.56-1.80</td>
<td>0.984</td>
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<td>Statin, %</td>
<td>0.37</td>
<td>0.16-0.85</td>
<td>0.019</td>
<td>0.39</td>
<td>0.13-1.19</td>
<td>0.098</td>
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</tbody>
</table>

Risk stratification based on MV predictor

P1783

Influence of inflammation on the pathogenesis of cardiac ATTR and AL amyloidosis

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Background: Amyloidosis describes a group of disorders caused by the extracellular deposition of misfolded proteins, which can severely impair the function of the heart. The correct diagnosis of amyloidosis by immunohistological subtyping in endomyocardial biopsies is decisive as it determines the outcome of the disease and the therapy of the patients.

Purpose: In this study we aimed to identify parameters of pathogenesis in cardiac amyloidosis.

Methods and Results: We investigated 5 unselected patients (43 male, 7 female) with Congo red positive endomyocardial biopsies (EMB) by immunohistochemistry in order to classify the forms of cardiac amyloidosis. In 26 patients (52%) we found an ATTR amyloidosis and in 48% an AL amyloidosis with 17 cases of AL-lambda and 7 cases with AL-kappa. Patients with ATTR amyloidosis had a mean age of 78 years and a mean LVEF of 45%, those with AL amyloidosis had 67 years and a LVEF of 47%. As a part of our routine diagnostic program, we also performed immunohistochemical stainings to identify and quantify inflammatory cells in EMB. Astonishingly,
we found in 21/50 (42 %) patients with amyloidosis a significant cardiac inflammation. In 7/26 (27%) of ATTR amyloidosis we found enhanced levels of CD3 + T cells, CD8 + macrophages and MHCII expression. We have shown that lymphocyte myoarthritis is associated with an upregulation of the cytokines IL-1 and IL-6. As a consequence of IL-1 and IL-6 expression, signaling pathways are induced with enhanced ERK1/2 expression being most prominent in EMB of patients with AL-amyloidosis. ERK 1/2 expression is known to be involved in the molecular switch of necrosis to apoptosis. A significant number of apoptotic cardiomyocytes was identified in ATTR and as in AL amyloidosis by TUNEL assay as well as by electron microscopy. Virus infections were not prominent in amyloidosis patients. Only 1 patient with ATTR amyloidosis and inflammation and 3 patients with AL amyloidosis and inflammation were positive for viral DNA (PVB19 and HHV6) as determined by PCR.

**Conclusions:** Our results indicate that inflammation in hearts of patients with ATTR and AL amyloidosis is associated with expression of ERK1/2, finally contributing to the emergence of apoptotic myocytes and myocardial damage.

**P1784**

**NEOD001 demonstrates organ biomarker responses in patients with light chain amyloidosis and persistent organ dysfunction independently of previous haematological response**

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**Introduction:** Light chain (AL) amyloidosis is a rare and often fatal disease caused by the accumulation of misfolded light chain aggregates (LCs), produced by clonal plasma cells. Current therapies limit LC production; however, ~75% of patients have persistent organ dysfunction. NEOD001 is a novel investigational antibody that targets misfolded LC and is thought to neutralise circulating LC aggregates and clear insoluble deposits. Here we assessed safety and tolerability and analysed organ responses based on consensus criteria and association between organ responses and previous plasma cell–directed (PCD) treatment.

**Methods:** Inclusion criteria were that patients complete ≥1 PCD treatment before enrolment, attain partial haematological response (HR) or better to any previous therapy and have persistent organ dysfunction. NEOD001 was administered intravenously every 28 days. During the dose-escalation phase, 27 patients received NEOD001 at 0.5, 1, 2, 4, 8, 16 or 24 mg/kg in a 3+3 study design. An additional 42 patients with renal, cardiac or nerve involvement were enrolled and treated (24 mg/kg) in the expansion phase.

**Results:** In the overall population (N=68) the median age was 61 years (61% male). Median (range) time since diagnosis was 2.9 (0.4-16.0) years, and 45% of patients underwent ≥3 previous PCD regimens. Median time since last PCD treatment to the start of NEOD001 intervention was 5.8 (range, 0.0-65.8) months. Infusions were administered over a mean of 12.8 ranges, 2-35) months. NEOD001 treatment was not associated with dose-limiting toxicities, discontinuations, antidrug antibody development or treatment-related serious adverse events. The most frequent TEAEs were fatigue, nausea, upper respiratory tract infection and peripheral oedema. Best response rate indicating organ response was observed in 53% of cardiac-evaluable patients (n=19/36) and 64% of renal-evaluable patients (n=23/36). Time from patients’ best HR to previous PCD treatment did not impact the NEOD001 organ response rate (cardiac/renal: 35.6/33.6% [responders] vs 38.6/32.8% [stable] months; P=0.05). Depth of patients’ best HR also did not impact the NEOD001 organ response rate (cardiac/renal: 47.1/68.8% [CR], 66.7/63.6% [VGPR], 42.9/62.5% [PR]; P=0.05). Similarly, time or depth of patients’ last HR did not impact the NEOD001 organ response rate (P=0.05). Patients with NEOD001 organ responses were no more likely to have had their last PCD therapy <6 vs ≥6 months from their first NEOD001 dose. Patients’ previous treatment type had no impact on the NEOD001 organ response rate (cardiac/renal: 55.6/61.1% [stem cell transplanta- tion], 52.0/68.8% [bortezomib-based therapy], 50.0/57.1% [other chemotherapy]; P=0.05).**

**Conclusions:** These results demonstrate that NEOD001 infusions were safe, well tolerated and associated with organ responses independently of time since previous chemotherapy, depth of haematological response or predominant type of PCD treatment.

**P1785**

**Assessment of left ventricular function in asymptomatic systemic lupus erythematosus ab patients (about 70 cases)**

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**Introduction and Purpose:** Cardiac disease is common among patients with systemic lupus erythematosus (SLE). The aim of this study is to assess the systolic and diastolic function of the left ventricular (LV) in asymptomatic systemic lupus erytheme- tosus (SLE) patients.

**Methods:** We included 35 patients without symptoms or signs of heart failure or angina (group I) and 35 healthy subjects (group II). The two groups had similar mean age, sex ratio, mean blood pressure and body mass index. All selected subjects had no evidence of diabetes mellitus, valvular or ischemic heart diseases we used standard echocardiography and tissue Doppler imaging(TDI) and speckle tracking imaging.

**Results:** LV diastolic diameter and LV ejection fraction were similar in both group. However we observed lower mitral annulus systolic velocities measured by TDI in lupus patients (6.2 ± 0.7 vs 9.9 ± 0.6 cm/s, p < 0.01) reflecting subclinical LV systolic dysfunction. We noted also a lower s' peak value derived myocardial deformation strain and strain rate in lupus patients (-10% vs -17%) reflecting a systolic dysfunction of left ventricular, there was not significant difference in the ratio of early to late diastolic mitral filling velocities E/A and in deceleration time of E between the 2 groups. However mitral annulus early diastolic velocities Ea measured by TDI were markedly reduced in patients suffering from lupus (8.1 ± 1.4 cm/s vs. 11.5 ± 1.3 cm/s, p < 0.01) with function, diastolic impaired suggesting p<0.01, E/Ea 14.1 velocities Ea of E ratio higher.

**Conclusion:** This study shows the presence of systolic and diastolic dysfunction in asymptomatic systemic lupus erythematosus (SLE) patients. Evaluation of left ventricular function by tissue Doppler imaging. Strain rate is useful to detect intracranial left ventricular dysfunction during systemic lupus.
P1787
Prognostic impact of QRS duration in patients with Takotsubo cardiomyopathy
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1Hospital Sao Teotonio, Cardiology, Viseu, Portugal; 2Fans Hospital, Fans, Portugal; 3Atto Ave Hospital Center, Guimarães, Portugal; 4Hospital Santo André, Leiria, Portugal; 5Hospital Centre do Tamega e Sousa, Penafiel, Portugal; 6Hospital Garcia de Orta, Almada, Portugal; 7Hospital de Santarem, Santarem, Portugal; 8University Hospitals of Coimbra, Coimbra, Portugal; 9Centro Hospitalar do Alto Minho, Viana do Castelo, Portugal

On behalf of: SUNSHINE

Introduction: Takotsubo cardiomyopathy (TK) is characterized by transient left ventricular dysfunction that may lead to the development of heart failure (HF). The prolongation of the QRS interval on the electrocardiogram (ECG) is a predictor of adverse outcome in patients (P) with HF and acute myocardial infarction. It has not been established whether the same is true for P with TK.

Objective: To evaluate the impact of QRS duration on the outcome of P with TK.

Methods: A multicenter Portuguese study involving 12 hospital centers. Included P hospitalized with diagnosis of TK since 2004. We divided the P in two groups, according to the QRS duration: normal if QRS<120ms (nQRS) and prolonged if QRS>120ms (pQRS). Demographic, clinical, electrocardiographic and echocardiographic parameters were evaluated, as well as complications during hospitalization.

Results: We included 234 patients with TK: 89.7% female and mean age 71.6 ± 11.9 years. The nQRS group represents 91% of the sample.

We had no differences between groups regarding the gender, cardiovascular risk factors, history of coronary disease, heart failure, chronic kidney disease or anemia. Upon admission, there was a trend for pQRS to present more frequently with syncope (14.3% vs 4.7%, p = 0.007). In the ECG, the pQRS group included a greater number of P in atrial fibrillation than the nQRS group (43.6% vs. 3.6%, p < 0.001). There were no differences between the groups regarding the presence of ST elevation in the initial ECG. There were no differences in BNP or troponin values at admission or hospitalization.

There were no differences in ejection fraction (EF) at admission or discharge (left ventricular systolic dysfunction in the pQRS group 52.6% vs nQRS 32.6%, p = 0.08). About the hospitalization complications, there were no differences regarding the evolution to cardiogenic shock. The pQRS group presented more frequently dysrhythmic complications, namely ventricular tachycardia / fibrillation (VT / VF) (9.5% vs 1.9%, p = 0.034), with odds ratio of 5.54.

Conclusion: In this study, the P admitted with TK and pQRS evolved with a higher number of dysrhythmic complications, namely VT / VF risk when compared to P with nQRS. Thus, the pQRS at admission has an impact on the clinical evolution of the P, which implies a need to a closer surveillance during hospitalization.

P1788
Impact of cardiac 99mTc-HMDP uptake on left ventricular function and filling pressure in patients with transthyretin amyloidosis
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Background: Pathophysiology of 99mTc-labeled phosphate agents cardiac uptake is not yet sufficiently understood. The cardiac aggregation of insoluble fibrous deposits of misfolded proteins leading to amyloidosis is characterized by segmental myocardial wall thickening and left ventricular (LV) diastolic dysfunction. Cardiac retention by scintigraphy was assessed by visual scoring and the heart/whole body (H/WB) ratio was calculated by dividing counts in the heart by counts in the late whole body images.

Methods: Fifty patients with TTR cardiac amyloidosis underwent 99mTc-hydroxymethylene-diphosphonate (99mTc-HMDP) scintigraphy and echocardiographic and cardiac magnetic resonance findings. The relative "apical sparing" pattern was similar across TTR-CA and TTR mutations' subtypes. Early-phase myocardial scintigraphy identified regional distribution of 99mTc-HMDP uptake at patients with transthyretin-related cardiac amyloidosis (TTR-CA).

Results: All patients underwent a whole-body planar 99mTc-HMDP scintigraphy acquired at 10 min post-injection (early-phase) followed by a thorax SPECT/CT. The relative segmental uptake % was investigated on AHA 17-segment model and 3-segment model (basal, mid-cavity, apical).

Conclusion: A decreased longitudinal strain in basal segments with a base-to-apex gradient has been described in patients with cardiac amyloidosis (CA). Aim of the study was to investigate the left ventricular (LV) regional distribution of early-phase 99mTc-Hydroxymethylene diphosphonate (HMDP) uptake in patients with transthyretin-related cardiac amyloidosis (TTR-CA). Parameters: All patients were included of whom: 29 were wild-type (wt-TTR-CA) and 32 had hereditary TTR-CA (m-TTR-CA). Early cardiac 99mTc-HMDP uptake occurred in all TTR-CA. In all patients, segmental analysis of the LV myocardial distribution of 99mTc-HMDP uptake showed an increased median uptake (interquartile range) in basal/mid-cavity segments compared to the lowest median uptake of apical segments (respectively 79 [72-86] vs. 72 [64-81], p < 0.001). In m-TTR-CA group, 80 [74-86] vs. 73 [66-82], p < 0.10-6. This pattern was similar in wt-TTR-CA group and remains constant independently of the TTR mutation's subtype with P ranging 10-5 to 0.03. Conclusions: Early-phase myocardial scintigraphy identified regional distribution of 99mTc-HMDP uptake characterized by a base-to-apex gradient, corroborating echocardiographic and cardiac magnetic resonance findings. This relative "apical sparing" pattern was similar across TTR-CA and TTR mutations' subtypes.

P1789
Apical sparing pattern of left ventricular myocardial 99mTc-HMDP uptake in patients with transthyretin-related cardiac amyloidosis
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On behalf of: GRC Amyloid Research Institute

Funding Acknowledgements: None

Objective: A decreased longitudinal strain in basal segments with a base-to-apex gradient has been described in patients with cardiac amyloidosis (CA). Aim of the study was to investigate the left ventricular (LV) regional distribution of early-phase 99mTc-Hydroxymethylene diphosphonate (HMDP) uptake in patients with transthyretin-related cardiac amyloidosis (TTR-CA).

Methods: All patients underwent a whole-body planar 99mTc-HMDP scintigraphy acquired at 10 min post-injection (early-phase) followed by a thorax SPECT/CT. The relative segmental uptake % was investigated on AHA 17-segment model and 3-segment model (basal, mid-cavity, apical).

Results: Sixty-one TTR-CA patients were included of whom: 29 were wild-type (wt-TTR-CA) and 32 had hereditary TTR-CA (m-TTR-CA). Early cardiac 99mTc-HMDP uptake occurred in all TTR-CA. In all patients, segmental analysis of the LV myocardial distribution of 99mTc-HMDP uptake showed an increased median uptake (interquartile range) in basal/mid-cavity segments compared to the lowest median uptake of apical segments (respectively 79 [72-86] vs. 72 [64-81], p < 0.001). In m-TTR-CA group, 80 [74-86] vs. 73 [66-82], p < 0.10-6. This pattern was similar in wt-TTR-CA group and remains constant independently of the TTR mutation's subtype with P ranging 10-5 to 0.03. Conclusions: Early-phase myocardial scintigraphy identified regional distribution of 99mTc-HMDP uptake characterized by a base-to-apex gradient, corroborating echocardiographic and cardiac magnetic resonance findings. This relative "apical sparing" pattern was similar across TTR-CA and TTR mutations' subtypes.

P1790
Ability of 99mTc-DPD scintigraphy to predict conduction disorders requiring permanent pacemaker in patients with transthyretin-related cardiac amyloidosis
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Background: Transthyretin-related (TTR) amyloidosis is the second most common cardiac amyloidosis. TTR cardiac amyloidosis is a clinical disorder that arises from the cardiac aggregation of insoluble fibrous deposits of misfolded proteins leading
to a high rate of conduction disorders and increased risk of sudden death. TTR cardiac amyloidosis is being increasingly recognized because of the emergence of 99mTc-3,3-diphosphono-1,2-propanodicarboxylic acid (99mTc-DPD) scintigraphy. 99mTc-DPD scintigraphy has been shown to have excellent results in the diagnosis of TTR cardiac amyloidosis but is value to predict conduction disorders was never described.

**Purpose:** To evaluate the value of 99mTc-DPD scintigraphy to predict conduction disorders in patients with TTR cardiac amyloidosis.

**Method:** Fifty patients with positive 99mTc-DPD scintigraphy for TTR cardiac amyloidosis were retrospectively included. Cardiac retention was assessed by visual scoring and the heart/whole body (H/W) ratio was calculated by dividing counts in the heart by counts in the whole body images. Electrocardiograms were reviewed for main conduction system disorders requiring permanent pacemaker.

**Results:** – Mean age was 80 ± 10 year-old. Nineteen (38%) patients had a pacemaker. There was no difference between patients with or without pacemaker for age (79.9 ± 8 vs. 80 ± 10 year-old, respectively, P = 0.417) or visual score (2.9 ± 0.3 vs. 2.8 ± 0.4, respectively, P = 0.588). Patients with pacemaker had a higher H/W ratio than patients without pacemaker (16 ± 8 vs. 12 ± 6, respectively, P = 0.027). The area under the ROC curve of H/W ratio to predict presence of pacemaker was 0.688 with no significant difference (p = 0.064) between recovery group (88 ± 26.2 ml/m²) vs non-recovery group (105.7 ± 33.3 ml/m²). Mean LVEDV index at 6 months from both groups was 76.8 ± 34.9 with significant difference (< 0.001) between recovery group (51.3 ± 11.2 ml/m²) and non-recovery group (100.3 ± 3.4 ml/m²), and mean ΔLVEDV index from both groups was 21.06 ± 28.17 ml/m² with significant difference (p < 0.001) between recovery group (36.8 ± 10.6 ml/m²) and non-recovery group (5.4 ± 4.5 ml/m²). Multivariate linear regression analysis showed significant role of the baseline LVEDV towards improvement of left ventricular remodelling (β2.14; p = 0.034) after adjusting age, parity, and hypertension in pregnancy.

**Conclusion:** Baseline LVEF plays a significant role in recovery of left ventricular function and improvement of left ventricular remodelling in PPCM patients.

**P1792**

**Echographic factors of atrial arrhythmia in patients with arrhythmogenic right ventricular dysplasia**

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**Background:** Consequences of of atrial fibrillation (AF) on patients with arrhythmogenic right ventricular dysplasia (ARVD) is not well studied and predictive factors of these arrhythmias are not well defined. We aims to study transthoracic echocardiography (TTE) to predict AF in those patients.

**Methods and Results:** TTEs of 40 patients diagnosed with definite ARVD (2010 Task Force Criteria) we reanalyzed. Data were compared in patients with AF and all other patients. A total of 10 (40%) patients experienced AF during a median follow-up of 4.5 years. Kaplan-Meier analysis revealed, in patients presenting AF, reduced RV fractional area < 27% (P < 0.001), larger left atrial volume > 45 ml (P < 0.001) (apical 4-chamber view), and higher right atrial volume ≥ 22 ml (P < 0.05) (apical 4-chamber view). 3 patients with AF experienced inappropriate implantable cardioverter-defibrillator (ICD) shocks compared with 4 without AF (36% vs. 9%, P = 0.03). AF was more prevalent in the patients who present severe events like heart failure, Ventricular arrhythmia and death (42% vs. 8%, P = 0.02)

**Conclusions:** Atrial fibrillation is ARVD is associated with worst prognostic like heart failure and cardiac death. Evidence of reduced RV function and atrial dilation are a strong predictors of this complication.
P1794
Chemotherapy-induced cardiotoxicity in a Colombian heart failure program
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Funding Acknowledgements: the study has the financial support of our hospital.

Conclusions: SA occurred in 14% of patients at the acute phase of TTC and independent predictive factors of SA were age and LVEF. During the acute phase, identification of high-risk SA patients allows better management, with ECG monitoring and therapeutic intervention in the CCU.

COMORBIDITIES

P1795
Cardiovascular monitoring and management in cancer patients: a french national survey
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Background: Cancer treatments can cause serious cardiovascular adverse events. Consensual guidelines regarding this issue are lacking. The objective was to analyse practices and knowledge of oncologists about the monitoring of cancer patients under cardiotoxic agents.

Methods: A survey of knowledge and professional practices was conducted among oncologists between August 2015 and August 2016.

Results: In 4385 patients followed by the outpatient heart failure program over a 4-year period, 23 patients were identified as affected by chemotherapy-induced cardiotoxicity (1.7% of the population) 78.2% were women with a mean age of 57 years. The most common cancers treated were breast (60%), lymphoma (21%), and rectal (8.6%). Type I cardiotoxicity for anthracycline therapy was present in 65% of patients. Other agents identified were cyclophosphamide and trastuzumab (8.6%), and trastuzumab plus radiotherapy was identified in 73.9% of patients. Pre-chemo/po-therapy preventive measures were implemented by oncology service in only 17% of patients. Mean time between chemotherapy and heart failure debut was 5 years. Mean LVEF at acceptance was 27% and 35% during follow-up. Follow-up time was 2.7 years, and LVEF improved in 69% of patients. Electric stimulation therapy was indicated in 26% of patients. Of these, 25% had a CRT-D, and 17% had a ICD. Beta blockers, renin angiotensin aldosterone system inhibitor was added part of the chronic treatment of all patients in our Study. Overall mortality was 17.3%.

Conclusions: In our population, most of our patients were young women with breast cancer that received the standard treatment recommended by ESM guidelines with an improvement in the EF. Heart failure programs are a good strategy for the follow-up of patients with cardiotoxicity induced by chemotherapy.

P1796
Subgroups analyses of a prospective long-term study in patients with advanced cancer - the prognostic impact of elevated heart rate.
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1Charite - Campus Benjamin Franklin, Department of Cardiology, Berlin, Germany; 2University Medical Center Göttingen (UMG), Department of Cardiology and Pneumology, Göttingen, Germany; 3Charite - Campus Vinchon-Klinikum (CVK), Department of Hematology and Oncology, Berlin, Germany; 4University of Warwick, Coventry, United Kingdom; 5Charite - Campus Vinchon-Klinikum (CVK), Department of Cardiology, Berlin, Germany

Introduction: Cardiovascular problems like heart failure are frequently observed in patients with advanced cancer. It is often associated with reduced exercise capacity and quality of life. Nevertheless, the role of the resting heart rate in advanced cancer patients remains unresolved. Previously, we have shown that an elevated heart rate in cancer patients had significant prognostic value. We have now conducted additional subgroup analyses.

Methods: We enrolled 145 patients with histologically confirmed cancer (46% female, age 59 ± 10 years, tumour stage I/II/III/IV 11/10/32/46%) from 2005 through to 2010, and 59 healthy controls (46% female, age 65 ± 11 years). The cancer group consisted of 36 patients with colorectal, 72 with pancreatic, and 37 with non-small cell lung cancer. A thorough cardiologic assessment was performed at baseline including a resting ECG. Patients were followed to January 2017. During a mean follow-up of 34 months for all patients (maximum 126 months), 97 (66%) patients had died (1-year mortality 30% [95%CI:22-38%], 5-year mortality 63% [55-71%]).

Results: As demonstrated before, elevated heart rate >75 bpm in cancer patients was associated with an increased mortality also here (HR 1.68 [1.10-2.55], p = 0.017, Cox proportional hazard analysis). In multivariable analyses this effect remained significant. We now identified four subgroups within this effect was significant as well. A body mass index ≥20 kg/m2, i.e. the lowest tertile (n = 49, 34 deaths, HR 2.22 [1.05-4.85], p = 0.038), female gender (n = 64, 41 deaths, HR 2.03 [1.03-3.89], p = 0.033), age <59 years (n = 69, 46 deaths, HR 2.26 [1.14-4.46], p = 0.019), and without anaemia (haemoglobin ≥12 g/dL, n = 55, 33 deaths, HR 2.98 [1.33-6.67], p = 0.008) were identified as the subgroups that showed a significantly increased mortality, if the heart rate was >75 bpm. Other subgroups of patients (high body mass index, male gender, presence of anaemia and higher age did not show these results (p>0.20), but lack of power may in part be the cause (at HRs 1.25 - 4.4).

Conclusions: We have shown that the resting heart rate is an important parameter in predicting the patient’s increased mortality. This association is particularly strong in patients with low body mass index, female gender, lower age as well as in those without presence of anaemia.

P1797
The cumulative effect of chemoradiotherapy in the risk of developing cardiotoxicity
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Introduction: Cardiotoxicity is an increasingly recognized side effect of chemotherany (CT) and radiotherapy (RT), CT and RT the risk in the risk of developing cardiotoxicity.

Methods: Prospective study including cancer patients submitted to anthracyclines ≥ 5 taxanes ≥ RT ≥ trastuzumab and referred to echocardiographic monitoring (M-mode and 2D imaging, left ventricle ejection fraction (LVEF) and global longitudinal strain (GLS) evaluated by speckle tracking) at different timepoints during CT: T0 – before CT, T1 and T2 – during CT, T3 – at the end of CT and T4 – 1 year after the end of CT.

Results: 108 patients, 79.6% females, age 52.47 ± 12.32 years. Breast cancer 69.4%, lymphoma 22.2%, gastric cancer 8.3%, Epirubicine 52.3% and doxorrubicine 33.9%. Epirubicine was the most common chemotherapy agent. The heart rate (HR) gradually increased during treatment: T0 76.82 ± 13.64 beats per minute (rpm), T1 78.96 ± 13.30 bpm, T2 80.91 ± 13.84 bpm, T3 83.70 ± 11.88 bpm
Towards versus T3, p = 0.033). The HR variation (cutoff of 10 bpm) was not associated with gender (p = 0.689), age (p = 0.557), BMI (p = 0.579), type of cancer (p = 0.91), tumor grade (G1, G2, G3) (p = 0.226), dose of anthracyclines (p = 0.482) and taxanes (p = 0.70) and LVFE variation in T0-T3 (p = 0.106).

Conclusion: CT affects systolic biventricular function. RT with shielding was associated with RV systolic dysfunction but not significant LV systolic function variation. The HR increased during CT and was independent of cancer type, demographics and cumulative dose of anticancer drugs.

P1798
Risk factors for heart failure after epirubicin chemotherapy for breast or colorectal cancer
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Background: Appearance of dilated cardiomyopathy (DCM) is the most important limiting factor during anthracycline therapy. Incidence of DCM is highly dependent on anthracycline cumulative dose. In a published analysis, epirubicin treatment under dose of 800 mg/m² was associated with a low incidence of heart failure (HF). Patients older than 65 years are considered more susceptible for anthracycline-related HF.

Purpose: Our aim was to assess the incidence of HF after epirubicin therapy and to identify the risk factors for HF.

Methods: We conducted a retrospective nation-wide study using the anonymized financial database of the Hungarian National Health Insurance Company. The population and the outcome events were defined with the International Classification of Diseases (ICD) codes. We enrolled all the patients with breast- or colorectal cancer of I50 (HF), or I420 (DCM) ICD codes before index chemotherapy were excluded. Between 1 January 2014 and 31st December 2015, 164 640 patients met enrollment criteria. For eligibility, we specified a cumulative dose of anthracyclines, or ICD codes before index chemotherapy were excluded. The population and the outcome events were defined with the International Classification of Diseases (ICD) codes. We enrolled all the patients with breast- or colorectal cancer.

Results: Of these patients, 41% were female, the median age was 55 years (range: 17-96). The mean cumulative dose of epirubicin was 496 mg/m² (range: 89.0-709.1 mg/m²) and the median age was 55 years (range: 17-96). The mean cumulative dose of epirubicin was 496 mg/m² (range: 89.0-709.1 mg/m²) and the median age was 55 years (range: 17-96).

In the group of anthracycline cumulative dose and age. Epirubicin dose over 709 mg/m² was proven independently associated to surgery in order to reduce them, and secondary, left ventricular function restoration in order to improve survival and life quality.

Methods: We included 6 patients ongoing to kidney transplantation with severe left ventricular dysfunction defined as ejection fraction less than 35%. We practiced a biventricular echocardiography to assess left ventricle ejection fraction pre and post inotropic agent administration. We administered levosimendan with the following scheme: a loading dose of 0.05mcg/kg/min in a 10 minutes infusion followed by a maintenance dose of 0.05mcg/kg/min in a 48 hours infusion. After this, the patients went to a living donor kidney transplantation surgery.

Results: The mean ejection fraction was 27.8% pre inotropic agent and the mean ejection fraction post inotropic agent was 51.1%. The morbidity of cardiovascular and all causes was less between those patients with best ventricular function defined by acute pulmonary oedema, cardiogenic shock, myocardial infarction, stroke, acute renal failure or kidney reject. There were no mortality associated to kidney transplantation. The mean hospitalization days was 7.

Conclusions: Improving ventricular function with inotropic agent before kidney transplantation may reduce morbidity and mortality associated to this one.

P1799
Improving ventricular function in patients with severe ventricular dysfunction previous to kidney transplantation.
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Introduction: There is a strong correlation between end stage kidney disease and congestive heart failure associated to severe left ventricular dysfunction. We know now that mortality at three years after hospitalization for congestive heart failure is similar to after acute myocardial infarction. There have been several works evaluating management of left ventricular dysfunction previous to kidney transplantation and an improving of left ventricular function after that is expected. We know that not all the patients improves it and the minor left ventricular function improving, the highest perioperative complications rate and lack of surveillance.

Purpose: We studied the effect of improving left ventricular function with inotropic agent (levosimendan) previous to kidney transplantation and mobility/mortality associated to surgery in order to reduce them, and secondary, left ventricular function restoration in order to improve survival and life quality.

Methods: We included 6 patients ongoing to kidney transplantation with severe left ventricular dysfunction defined as ejection fraction less than 35%. We practiced a biventricular echocardiography to assess left ventricle ejection fraction pre and post inotropic agent administration. We administered levosimendan with the following scheme: a loading dose of 0.05mcg/kg/min in a 10 minutes infusion followed by a maintenance dose of 0.05mcg/kg/min in a 48 hours infusion. After this, the patients went to a living donor kidney transplantation surgery.

Results: The mean ejection fraction was 27.8% pre inotropic agent and the mean ejection fraction post inotropic agent was 51.1%. The morbidity of cardiovascular and all causes was less between those patients with best ventricular function defined by acute pulmonary oedema, cardiogenic shock, myocardial infarction, stroke, acute renal failure or kidney reject. There were no mortality associated to kidney transplantation. The mean hospitalization days was 7.

Conclusions: Improving ventricular function with inotropic agent before kidney transplantation may reduce morbidity and mortality associated to this one.

P1801
Different clinical profile in heart failure patients with chronic kidney disease
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Introduction: The prevalence of moderate to severe chronic kidney disease (CKD) in heart failure (HF) is as high as 30-60%. The baseline glomerular filtration rate (GFR) is a predictor of mortality in both acute and chronic HF.

Purpose: The aim of this study was to analyze the different clinical characteristics in HF depending on the GFR.

Methods: 112 patients with HF diagnosis were prospectively included in the HF unit at our institution between May 2014 and December 2016. We identified patients with moderate to severe CKD (GFR with the CKD-EPI equation < 60ml/min/1.73m²) at the time of inclusion. Clinical characteristics and medical treatment were compared among patients with and without CKD. Patients were systematically followed-up in the HF outpatient clinic. All changes in clinical status, admissions or deaths were documented. Kaplan-Meier estimates was used to analyze time to first HF admission or death from any cause.

Results: Mean age was 64.3 ± 13.2 years. 35.2% of patients had CKD at baseline. Clinical characteristics and medical treatment were different in these patients (table). Median follow-up was 13 ± 8.4 months. HF admission-free survival was lower in CKD patients (p = 0.017) (figure).

Conclusions: HF patients with moderate to severe CKD are older, have preserved LVEF more often, have more comorbidity and are less likely to receive optimal medical therapy. CKD patients have worse prognosis; nevertheless, these patients are associated with an increased risk profile, which may partly explain the higher risk.

<table>
<thead>
<tr>
<th>Clinical characteristics and treatment</th>
<th>GFR CKD-EPI &gt;60ml/min/1.73m²</th>
<th>GFR CKD-EPI &lt;60ml/min/1.73m²</th>
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<tr>
<td>Age (years)</td>
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<tr>
<td>p</td>
<td>0.01</td>
<td>0.01</td>
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<tr>
<td>Male (%)</td>
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<td>p</td>
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<tr>
<td>p</td>
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<td>Significant coronary artery disease (%)</td>
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<tr>
<td>p</td>
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<td>COPD (%)</td>
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<td>p</td>
<td>0.52</td>
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<td>PAD (%)</td>
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<td>p</td>
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<tr>
<td>Anemia (%)</td>
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<td>p</td>
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<td>0.03</td>
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<td>LVEF &lt;40% (%)</td>
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<td>Beta-blockers (%)</td>
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<td>ACE-I or ARB or ARNI (%)</td>
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<td>MR antagonist (%)</td>
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</tr>
<tr>
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</tr>
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</table>

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Cardiorenalhepatic syndrome is common in patients with decompensated heart failure

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Objective: Similar factors such as venous congestion and hypoperfusion are thought to underlie both renal and liver injuries in decompensated heart failure (DHF), known as cardiorenal syndrome (CRS) and cardiohepatic syndrome (CHS). The aim of this study was to assess the prevalence and predictors of combination of CRS and CHS in DHF.

Methods: Kidney and liver function was assessed in 322 patients with DHF (190 male, 69.5 ± 10.6 years (M ± SD), arterial hypertension 87%, myocardial infarction 57%, atrial fibrillation 65%, diabetes mellitus 42%, known chronic kidney disease 39%, chronic anemia 29%, left ventricular [LV] ejection fraction (69 ± 12.6%, EF<35% 39.1%). CRS was diagnosed if serum creatinine increased ≥26.5 μmol/L in first 48 hours of hospitalization. CHS was considered when at least one of liver function tests (LFT) level exceeded upper normal limit on admission. Simultaneous CHS and CRS were considered as cardiorenalhepatic syndrome (CRHS). Mann-Whitney test and multivariate logistic regression analysis were performed. p < 0.05 was considered statistically significant.

Results: CRS occurred in 60 (18.6%) patients. CRS was diagnosed in 274 (85.1%) patients. Isolated CRS, isolated CHS and CRS occurred in 78.4, 1.5 and 20.1% patients with DHF and hepatic or kidney injury. Patients with versus without CRHS had lower patients. Isolated CHS, isolated CRS and CRHS occurred in 78.4, 1.5 and 20.1% patients with DHF and hepatic or kidney injury. The independent predictors of CRHS were baseline GFR<45 ml/min/1.73 m², SBP>110 mm Hg on admission, echo-hydropericardium (OR 2.98, CI 1.62-5.50, p<0.001), LV and diastolic volume (92 ± 6 vs 56 ± 9 mm, p<0.001), higher incidence of severe mitral regurgitation (64.3 vs 39.6%, p<0.001), signs of congestion – jugular venous distension (57.1 vs 39.9%, p<0.05), hepatomegaly (85.7 vs 70.3%, p<0.05), echo-hydropericardium (46.4 vs 22.5%, p<0.001), vasoressor therapy (17.9 vs 6.3%, p<0.01). The independent predictors of CRS were baseline GFR<45 ml/min/1.73 m² (odds ratio (OR) 3.95, 95% confidence interval (CI) 2.15-7.21, p<0.01), SBP<110 mmHg on admission (OR 3.51, CI 1.55-7.94, p<0.05), vasoressor therapy (OR 3.23, CI 1.35-7.73, p<0.05), echo-hydropericardium (OR 2.98, CI 1.62-5.50, p<0.01) and EF<35% (OR 2.96, CI 1.81-5.44, p<0.05).

Conclusions: Isolated CRS, isolated CHS and CRHS occurred in 78.4, 1.5 and 20.1% patients with DHF and hepatic or kidney injury. The independent predictors of CRHS were baseline GFR<45 ml/min/1.73 m², SBP>110 mm Hg on admission, echo-hydropericardium and EF<35%.

Iron deficiency predicts decreased exercise capacity and physical fitness independently of skeletal muscle mass in men with heart failure with reduced ejection fraction

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BACKGROUND: Iron is an essential nutrient for the body and plays a central role in oxygen transport and energy metabolism. Iron deficiency is associated with reduced exercise capacity and physical fitness independently of skeletal muscle mass in men with heart failure with reduced ejection fraction (HFrEF). In men with HFrEF decreased iron stores (as reflected by low circulating ferritin) predict respiratory muscle dysfunction in these patients.

OBJECTIVE: To investigate the hypothesis of whether in men with heart failure with reduced left ventricular ejection fraction (LVEF) ≤40%, and 10 middle-aged healthy men (control group). We investigated respiratory muscle strength (maximal inspiratory and expiratory pressure at the mouth [MIP and MEP, respectively]), inspiratory muscle weakness independently of skeletal muscle mass or disease severity.

METHODS: We examined 49 male outpatients with stable HFrEF (age: 65 ± 11 years; New York Heart Association [NYHA] class I/II/III: 36/51/13%; ischaemic aetiology of HFrEF: 83%; all patients with left ventricular ejection fraction [LVEF] ≤40%) and 10 middle-aged healthy men (control group). We analyzed respiratory muscle strength (maximal inspiratory and expiratory pressure at the mouth [MIP and MEP, respectively]), inspiratory muscle weakness independently of skeletal muscle mass or disease severity.

RESULTS: The dystonic dysfunction of inspiratory muscles in these patients is associated with worse physical fitness independently of either skeletal muscle mass or disease severity.
Aim: To examine the ethnic/geographical variation in prevalence, clinical correlates and risk of anaemia in patients with HF patients.

Methods: Asian patients with HF (fraction <40%) and anaemia, defined as haemoglobin (hb) <13g/dL (men) and <12g/dL (women) from 11 regions (China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand) in the ASIAN-HF study were included. Ethnic groups included Chinese (33.0%), Indian (26.2%), Malay (15.1%), Japanese (9.5%) and Others (5.6%).

Results: Of the 3888 Asian HF patients (60 ± 13 years, 21% women), 40% were anaemic, with wide variation across ethnicities (32.6-54.4%) (Figure 1A). Indian ethnicity (adjusted OR 3.00, 95% CI 2.17-4.17), age (adjusted OR 1.03, 95% CI 1.02-1.03), presence of diabetes (adjusted OR 1.75, 95% CI 1.47-2.08) and chronic kidney disease (CKD) (adjusted OR 1.71, 95% CI 1.44-2.03) were independently associated with prevalence of anaemia (all P < 0.001). Ethnicity modified the association of CKD with anaemia (Pinteraction=0.04), with the strongest correlation observed in Japanese/Koreans (33% vs 34%, p < 0.05), whereas in DM subjects sTfR was related only to hs-CRP, hsCRP, NT-proBNP and haemoglobin level between these 2 groups. Regarding iron status, men with HFREF and DM as compared with those without DM demonstrated a similar prevalence of ID (33% vs 34%, p>2), and a trend towards a higher prevalence of IDA (13%, vs 9%, p = 0.08). There were no differences in either serum ferritin or TSAT between DM and non-DM men with HFREF (p>0.2), whereas DM was accompanied by reduced sTfR (1.19 (0.96-1.60) vs. 1.31 (1.01-1.83) mg/L, p < 0.05), and a borderline higher hepcidin (65 (33-123) vs. 55 (22-111) ng/mL, p = 0.07). STR >1.32 mg/L was found in 90% vs 41% of DM vs non-DM men with HFREF, respectively (p <0.05), whereas serum hepcidin >14.5 ng/mL was found in 18% vs 5% of DM vs non-DM men with HFREF, respectively (p<0.001). In non-DM men with HFREF, lower hepcidin was related to younger age, whereas such relationship was not seen in DM subjects. In non-DM men with HFREF, higher sTR correlated with lower UFE, sodium, GFR, and total cholesterol, and higher hs-CRP, NT-proBNP and uric acid (all p < 0.05), whereas in DM subjects sTR was related only to hs-CRP, NT-proBNP and uric acid (all p<0.05).

Conclusions: DM does not differentiate iron status in men with HFREF based on standard biomarkers (ferritin, TSAT), however the measurements of sTfR and hepcidin suggest the higher prevalence of intracellular ID (reflected by high sTfR) and depleted iron stores (reflected by low hepcidin). Importantly, there are different clinical correlates of novel iron status biomarkers in DM vs non-DM subjects with HFREF, which might indicate the different pathophysiological mechanisms related to these iron derangements.

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Anemia in heart failure is associated with higher CA-125, NT-proBNP and hsCRP levels.

**Background:** Iron deficiency is a common and ominous co-morbidity in patients with heart failure with reduced ejection fraction (HFrEF). However, it remains enigmatic whether and how ageing interacts with iron status in this group of patients. The aim of this study was to investigate iron parameters and clinical status in different age groups of patients with HFrEF.

**Methods:** We analysed the data of 736 stable patients with HFrEF (age: 58 ± 11 years, men: 86%, confirmed coronary artery disease: 71%, New York Heart Association (NYHA) Class III-IV: 44%, LVEF (left ventricular ejection fraction): 28 ± 8%, ID was defined as serum ferritin < 100 μg/L, or serum ferritin 100-299 μg/L, with transferrin saturation (TSAT) < 20%. Additionally, hepcidin and soluble transferrin receptor (sTfR) were assessed in peripheral blood as biomarkers of iron status, reflecting iron stores and intracellular iron status, respectively. All patients were prospectively divided into 4 age groups: < 50 (n = 148), 50-59 (n = 301), 60-69 (n = 174), ≥70 years (n = 113), respectively.

**Results:** There was a trend towards the higher prevalence of ID in elderly patients with HFrEF (36%, 30%, 41% and 41% - in aforementioned age groups, respectively, p < 0.07). There were no differences in TSAT, sTfR, MCV, MCH, MCHC, hsCRP and NT-proBNP between patients in different age groups (all p > 0.02). The older the patients, the higher prevalence of ID-related anemia (IDA) (4/3%; 7%, 16% and 14% - in aforementioned respective age groups, p < 0.01). Elderly patients with HFrEF were characterized by lower haemoglobin (14.5 ± 1.6, 14.2 ± 1.3, 13.5 ± 1.3, 12.4 ± 2.1 g/dL, p < 0.0001), ferritin (199 (98, 310), 170 (106, 296), 167 (88, 277), 144 (72, 241 nm/L), p < 0.05) and hepcidin (79 (43, 133), 52 (30, 111), 68 (31, 127), 46 (25, 93 nm/L), p < 0.05) and higher eGFR (95 (72, 78 ± 22, 72 ± 21, 65 ± 31 mL/min/1.73m²), p < 0.01).

Only among patients with HFrEF aged below 50 years, iron-deficient subjects demonstrated high NT-proBNP and low LVEF as well as high uric acid as compared to those with preserved iron status (all p < 0.05), also in this group sTfR was related with uric acid (r = 0.2, p < 0.05) and NT-proBNP (r = 0.35, p < 0.001), and that correlated with NT-proBNP (r = 0.21, p < 0.05) only. Among patients with HFrEF aged below 60 years, iron-deficient subjects demonstrated high hsCRP as compared to those with preserved iron status (all p < 0.05).

**Conclusions:** Elderly patients with HFrEF are prone to develop ID and IDA, and ID is reflected mainly by depleted iron stores (as assessed by low serum levels of both ferritin and hepcidin). There are clinical differences in younger versus older iron-deficient patients with HFrEF, which may presume the different pathophysiological background in these separate age groups.

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**P1809 Iron stores and prognosis in a cohort of elderly patients with heart failure and preserved ejection fraction**

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**Background:** Iron deficiency and anemia are frequent in Heart Failure with reduced ejection fraction (HF-REF) patients, and are related with a worse prognosis, but there are still few data about its prevalence and prognosis in patients with preserved ejection fraction (HF-PEF). The aim of this study is to determine Iron Deficiency and anemia prevalence, and its relationship with prognosis in a cohort of elderly HF-PEF patients.

**Methods and results:** All consecutive patients included into our Hospital HF Care Program after having a HF admission from June 2011 to June 2014 were prospectively recruited and followed up in consultant and/or by telephone until June 2015. Demographic data, cardiovascular risk factors, Barthel, Lawton and Pfeiffer scores, clinical, biochemical parameters, treatments at discharge (including oral and/or endovenous iron), new admissions and/or death were registered in a specific database integrated in our electronic medical record system. Anemia and iron deficiency were classified following standard EBC criteria.

**Results:** 173 patients were included during this period. Mean age was 79 years (61-88 years; 113 (85.3%) were women, mean Charlson score was 2.9 and mean Barthel was 84.1%. Ejection fraction (EF) was measured by echocardiography in 170 (98%) patients; 82% of patients (139) had HF-PEF (EF >50%), HF-PEF patients were slightly younger, usually women, and had statistically significant higher BMI and lower NT-proBNP levels than non-HF-PEF patients. Mean follow-up was 649 days. 48 (27.7%) patients died during follow-up, 33 of them having HF-PEF (23.7% of this cohort). 82 patients (48%) had a readmission during first year of follow-up. Iron status was registered in 154 patients (89%); anemia was present in 85 (63%) of HF-PEF patients, iron deficiency in 92 (67%) and absolute iron deficiency in 67 (48%). Anemia was statistically related to male sex and lower iron levels and transferrin saturation, but higher serum ferritin (165 vs 124, p = 0.28 NS) Increased mortality in our HF-PEF patients was statistically related in univariate analysis with age, previous hospital admissions, dependence in Barthel score, low albumin level, high ferritin level and non use of betablockers. Using a composite end-point of heart failure readmission during first year of follow up or death, lower Barthel Score and albumin values, higher NT-proBNP and ferritin level, and absence of iron deficiency, had an statistically significant worse prognosis. No one of the treatments registered produced any change in this composite outcome, including betablockers, aldosterone antagonist and oral and/or endovenous iron.

**Conclusions:** Anemia and Iron Deficiency are usual findings in our elderly HF-PEF patients. In contrast of evidence yet published in HF-REF patients, isolated anemia and/or iron deficiency didn’t show a worse prognosis in our patients, and higher levels of ferritin were associated with poor outcomes.
less likely to receive ACEI, beta blockers, aldosterone antagonists (all p < 0.001) and more likely to be on diuretics, vasoressors and anti-platelets (all p < 0.001). Anemic patients had significantly reduced survival (log rank p < 0.001), as shown by Kaplan Meir curve analysis.

Conclusion: Anemia is quite prevalent in a Saudi heart failure population with a significant preponderance in older patients with significant comorbidities. It is also associated with poor survival compared with those with normal haemoglobin levels.

P1811 Clinical benefits of intravenous iron therapy in patients with defibrillator due to heart failure with left ventricular dysfunction.
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Background: Iron deficiency is a common present comorbidity in patients with advanced heart failure (HF), and contributes to the existence of a higher mortality risk. A high prevalence of iron deficiency in these patients have high energy devices with remote monitoring that transmit arrhythmic episodes and a series of clinical parameters that try to anticipate the cardiac clinical deterioration and improve the prognosis. We conducted this study in order to evaluate the usefulness of intravenous iron therapy in this population.

Methods: We studied all the HF patients with NYHA functional class II-III and iron deficiency which were carriers of high-energy devices (ICD and ICD-CRT) with remote monitoring and who received intravenous iron therapy with ferric carboxymaltose in the years 2012-2015. We recorded their clinical characteristics, parameters of remote monitoring and adverse events during 3 months follow-up.

Results: We studied 32 patients (85, 30% women). We observed an improvement in NT-proBNP values at three months of intravenous iron treatment (2598 mg/dL vs 1510 mg/dL, p = 0.09). Mean heart rate at night was lower after three months of the treatment (73bmp vs 68bmp, p = 0.024), without significant differences in mean heart rate during the day (75bmp vs 72 bmp, p = 0.2), number of ventricular extrasystoles (118 vs 136, p = 0.17), ventricular doublts (84 vs 45, p = 0.25), and non-sustained ventricular tachycardia (8.3 vs 0.2, p = 0.29), although a reduction of these was observed after the three months of treatment. An increase in the number of hours of physical exercise performed was objectively after the intravenous treatment (2.2 vs 2.6, p = 0.021). Comparing the number of HF decompensations in the year prior to treatment with the events in the subsequent follow-up (decompensation of HF and/or death), a statistically significant reduction was observed (51.4% vs 12.9%, p = 0.001). There were no complications associated with the infusion and all patients had good treatment tolerance.

Conclusions: 1. We observed a tendency to reduce the mean heart rate and the number of ventricular extrasystoles and non-sustained ventricular tachycardias assessed by remote monitoring at 3 months of the treatment.
2. After the treatment the patients realized more physical activity and had less decompensations.

P1812 Anaemia and iron deficiency in Heart Failure: role of chronic anticoagulant and antiplatelet therapies.
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Introduction: Anaemia and iron deficiency are frequently reported comorbidities of Heart Failure (HF) and adverse prognostic factors associated with an independent risk for HF hospitalization and mortality.

Purpose: It’s known the prevalence of anaemia increases with HF severity and other comorbidities (advanced age, female gender, renal disease, diabetes mellitus). We investigated a correlation between anaemia/iron deficiency in HF and chronic anticoagulant and/or antiplatelet therapies, either alone or in combination.

Methods and Results: We retrospectively studied 629 patients hospitalized for HF between Dec 2013 and Aug 2016, 65% men. We collected values of blood count, iron status, creatinine, INR and BNP in different groups based on either anticoagulant or antiplatelet therapy or both. Group 1 (no therapy, n=194), group 2 (Vitamin K Antagonists (VKAs), n=184), group 3 (either a VKAs or a Novel Oral Anticoagulant (NOAC), plus antiplatelet therapy, n=65), group 4 (NOACs alone, n=39) and group 5 (antiplatelet therapy alone, n=227). The prevalence of iron deficiency and anaemia were respectively 75.99% (male 73%, female 82%) and 51.35% (male 49.3%, female 55.15%). We found a difference in the prevalence of anaemia among HF classes based on LVEF (p 0.0067) and a correlation between the severity of anaemia (moderate anemia) and female sex (p 0.0114). We found at the multivariate analysis predicting factors of anaemia (age, creatinine and RDW for the presence of anemia; female sex, RDW and OSAS for the severity) and iron deficiency (RDW alone). Therefore we used ANOVA analysis corrected by confounding factors to obtain a comparison between all groups’ variables, achieving significant differences on INR (p < 0.001), as parameter of good accuracy of data collection, but also on ferritin (p 0.015) and transferrin (p < 0.0001). In particular we found significant differences in ferritin between group 1 and 2 (p = 0.529) and in transferrin between group 1 and 2 (p = 0.0013) and between group 2 and 5 (p = 0.0001).

Conclusion: We observed a population with prevalence of iron deficiency and anaemia in perfect line with European data, obtaining predicting factors of them and a different prevalence of anaemia in the HF classification. We demonstrated a correlation between the severity of anaemia and female sex. A significant iron deficiency in VKA patients. Haemoglobin had a typical trend that was maintained in all progressive analysis between groups based on antiplatelet and/or anticoagulant therapies, with the highest value in patients with NOACs therapy alone. The absence of statistical significance may result from the different numeric composition of groups. We expect it will be achieved by increasing the sample size of the population, due to an increasing of NOACs prescription.

P1813 Methylocobalamin in patients with heart failure
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Background: Vitamin B12 deficiency in patients with heart failure (HF) might be underestimated. These patients may have “falsey” normal vitamin B12 serum levels due to coexisting hepatic dysfunction. Methylocobalamin (MMA) has been identified in several studies as an early indicator of vitamin B12 deficiency. Data regarding vitamin B12 and MMA in patients with HF are scarce.

Aim: To investigate vitamin B12 and MMA serum levels in HF patients.

Methods: 47 consecutive patients admitted to our hospital with symptoms and signs of acute compensated heart failure were included in the study. Demographic and clinical characteristics as well as echo-cardiographic parameters were recorded. Blood samples were collected during the first 24 hours of hospitalization and complete blood count, creatinine, vitamin B12, NT-pro BNP and MMA levels were measured. A total of 12 healthy individuals (blood donors) constituted the control group, whereby MMA serum levels were also measured.

Results: Preliminary analysis of data among 47 HF patients (aged 70.5 ± 12.5 years; 50% with ischemic cardiomyopathy) indicated typical systolic dysfunction (reduced left ventricular ejection fraction-LVEF < 40%; HFrEF) in the majority (77.7%) of patients, mild systolic dysfunction (mid-range LVEF 40-49%; HFNVEF) in 8.3% and preserved systolic function (preserved LVEF ≥50%, HFpEF) in 11.1%; right heart failure was present in 9.4%. Mean hematocrit was 38.2 ± 4.3%, creatinine 1.17 ± 0.31 mg/dl, and NT-proBNP levels 4694.4 ± 4260.1 pg/ml. Vitamin B12 levels averaged 358.8 ± 221.8 pg/ml. MMA levels were 37.1 ± 10.1 ng/ml in HF patients and 26.6 ± 2.7 ng/ml in the control group (p = 0.0042). In patients with vitamin B12 at lower normal levels (<350 pg/ml), MMA was high (mean 39.4 ± 8.4 mg/ml) and in patients with higher normal vitamin B12 levels (>351 pg/ml), MMA levels were low (mean 33.8 ± 9.3 ng/ml, p = 0.026), but still higher than control patients (Figure).

Conclusion: Patients with HF may have elevated levels of serum MMA, possibly indicating a subclinical vitamin B12 deficiency state.
P1814
Sleep-disordered breathing is linked to peripheral endothelial dysfunction and not to myocardial function in ischemic stroke: A mechanistic link complicating the acute phase
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Introduction: Sleep-disordered breathing (SDB) after acute ischemic stroke is frequent and may be linked to stroke-induced autonomic imbalance.

Methods: In the present single-center study we assessed SDB by transthoracic impedance records integrated into Holter system. Additionally, peripheral endothelial dysfunction (IEF) using reactive hyperemia index (RHI) was assessed using pulse arterial tonometry device in the acute phase of ischemic stroke and one year afterwards in patients without a history of SDB prior the stroke. Cardiac systolic and diastolic function was assessed by transthoracic echocardiography.

Results: SDB was observed in-hospital in 56 (57%) out of 99 patients with acute ischemic stroke (89 ± 11 years, 73% male, median NIHSS 5 [2.25-7.75], BMI 27.8 ± 9.4 kg/m²). Compared to patients without SDB (68 ± 13 years, 49% males, median NIHSS 3 [2-5], BMI 26.6 ± 5.7 kg/m²), ED was significantly prevalent in patients with SDB (32/106 vs. 64%: p<0.01). After adjustment for multiple confounders, presence of SDB remained independently associated with IEF (odds ratio 3.38 [CI 1.27-9.01], p<0.05). Forty-one patients underwent repetitive measurements one year after stroke (12.8 ± 0.8 months). The prevalence of SDB decreased from 59% to 14% in this cohort (p<0.001). Compared to patients without SDB, ED remained impaired in stroke patients with persisting SDB (p<0.05). Presence of impaired left ventricular ejection fraction (LVEF) had additional impact on severity of SDB (median 1.11 [0.73-2.53]) compared to patients with normal LVEF (median 4.7 [1-10]) or preserved LVEF (median 6.1 [7.28]; p<0.05). However, no significant difference in prevalence of SDB was observed between all three groups. In addition, LVEF and atrial fibrillation was not associated with presence of SDB in logistic regression analysis.

Conclusions: SDB was highly prevalent in acute stroke. Presence of the SDB was independently associated with peripheral ED but not cardiac function. Periphereral ED improved with the recovery to normal breathing pattern suggesting a mechanistic link of SDB and ED in ischemic stroke.

P1815
Sleep apnea syndrome in patients with chronic heart failure
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Introduction: Sleep apnea syndrome seems to be a frequent comorbidity in patients with heart failure. The purpose of the study was to analyze the frequency and impact of sleep apnea syndrome in patients with chronic heart failure, hospitalized in the Internal Medicine clinic of a University Clinical Emergency Hospital.

Methods: The study included 980 patients with chronic heart failure, consecutively admitted between January 1st, 2016-November 30, 2016. We have retrospectively and comparatively analyzed the frequency of sleep apnea syndrome and the clinical correlates in patients with chronic heart failure, using SPSS software.

Results: The distribution by sex in the group of study, 49.8% men, 50.2% women. The mean age of the whole group was 74 ± 11.6 years. The distribution of comorbidities in patients with chronic heart failure was: 66.84% arterial hypertension, 39.9 % atrial fibrillation, 32.85 % coronary heart disease, 31.13 % chronic kidney disease, 28.87 % dyslipidemia, 26.23 % type 2 diabetes, 24.49 % pulmonary hyper tension, 21.4 % obesity, 18.16 % bundle branch blocks, 16.94 % anemia, 7.85 % stroke, 7.14 % chronic obstructive pulmonary disease. Age, diabetes mellitus and obesity are considered as independent but additive factors. These factors are also contributors to left ventricular hypertrophy (LVH) and LV diastolic dysfunction (LVDd), which are important causes of cardiovascular morbidity. In this review, we present an overview of how OSAS may promote changes in LV geometry and diastolic dysfunction through its best-known cardiovascular factors. These factors are also contributors to left ventricular hypertrophy (LVH) and LV diastolic dysfunction (LVDD), which are important causes of cardiovascular morbidity. In this review, we present an overview of how OSAS may promote changes in LV geometry and diastolic dysfunction through its best-known cardiovascular factors.

Conclusions: Sleep apnea syndrome is a frequent comorbidity in patients with heart failure. Atrial fibrillation was more frequent in patients with heart failure and SAS than in patients with heart failure without SAS.

P1816
Consequences of obstructive sleep apnoea syndrome and hypertension on left ventricular diastolic function
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Study Objectives: Obstructive sleep apnoea syndrome (OSAS) is a frequent sleep disorder that is known to be an independent risk factor for arterial hypertension (AHT). Age, diabetes mellitus and obesity are considered as independent but additive factors. These factors are also contributors to left ventricular hypertrophy (LVH) and LV diastolic dysfunction (LVDd), which are important causes of cardiovascular morbidity. In this review, we present an overview of how OSAS may promote changes in LV geometry and diastolic dysfunction through its best-known cardiovascular factors.

Methods: This was a prospective long-term observational study. 56 participants had overnight polysomnography followed by transthoracic echocardiography. OSAS was characterized by the apnea-hypopnea index (AHI, events/hour). The LVDd was assessed by echocardiography using multiple categories with tissue Doppler imaging and left atrial (LA) volume measurement.

Results: 12 (21,4%) subjects were free sleep apnea (SA) AHI (apnea-hypopnea index <5/h), 15 (26.7%) had mild SA (AHI = 5-14.4), 17 (30.3%) had moderate SA (AHI = 15-30.8) and 12 (21.4 %) had severe SA (AHI>30). Among the participants, 27 patients (48.2%) had LVDd. The prevalence of LVDd increased with the SDB severity from 8.6% (normal) to 12.7% (mild to 40.0% moderate-to-severe SDB) (p<0.001). In the multivariate logistic regression analysis, the odds ratio of having LVDd in the moderate-to-severe SDB group vs. normal group was 5.96 (95% CI, P = 0.006).

Conclusions: OSAS is associated independently with diastolic dysfunction. Echocardiographic measures of adverse cardiac remodeling are strongly associated with OSAS and AHT, but are confounded by obesity. Hypoxia could be a stimulus for hypothyropenia in individuals with OSAS.
In Cox regression analysis, independent determinants of death were age (exp[B] 1.081, 95%CI 1.018-1.107; p < 0.005), presence of abdominal aortic aneurysm (exp[B] 0.291, 95%CI 0.114-0.741; p = 0.010) and severe tricuspid regurgitation (exp[B] 0.088, 95%CI 0.017-0.269; p < 0.005). Despite having a significant univariate association with all-cause mortality, B12 level lost its significance in multivariate analysis.

Conclusions: Increased B12 in HFrEF patients is associated with increased direct association with all-cause mortality, B12 level loses its significance in multivariate analysis.

**P1820**

Cardiac masses in pediatric population

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Introduction: Infant heart masses are rare. Most are benign tumors. Rhabdomyomas constitute the most common tumor. Malignant tumors are exceptional. Antenatal diagnosis is possible and it requires perinatal monitoring in order to optimize the management and prognosis.

Patients and methods: It was a retrospective study between January 2008 and December 2016, including all patients aged less than 16 years with heart masses diagnosed with transthoracic or fetal echocardiography.

Results: Of the 6451 pediatric transthoracic echocardiography and 364 fetal echocardiograms performed during the study period, 12 cardiac masses were identified with an incidence of 0.17%: nine cases of rhabdomyomas, 1 case of intrapericardial mature teratoma, 1 case of hydatid cyst and 1 case of cardiac thrombus in a patient with coarctation of the aorta with left ventricular dysfunction. The diagnosis was made in antenatal in 8 cases of rhabdomyoma and in the case of teratoma. Five patients with intraventricular rhabdomyoma showed heart failure symptoms. The evolution was favorable with total or partial regression of all cases of rhabdomyomas, it was fatal in patients with immature teratoma (patient died after tamponade) and with hydatid cyst (patient died following the intracardiac rupture of the cyst). The cardiac thrombus disappeared under anticoagulant treatment and the patient evolved well after surgery of the coarctation.

Conclusion: Clinical presentation, treatment and progression of cardiac tumors are variable. Rhabdomyomas have an excellent prognosis. Fetal echocardiography significantly improved diagnosis and management of such patients.

**P1821**

Association of genetic polymorphism of TCF7L2 with the severity of cardiac remodeling and adipokines disbalance in comorbidity of essential hypertension and type 2 diabetes

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In recent years, the researchers have been paying much attention to study of genetic components of essential hypertension (EH) and type 2 diabetes (DM2) - one of the most common noninfectious diseases in the world. Nowadays one of the worldwide

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Conclusions: disbalance in comorbidity of EH and DM2. Patients with EH without DM2 had no development of comorbidity of EH and DM2 in Ukrainian population. Rs7903146 gene basal characteristics: Mean age was 66.4 ± 8.6 years, 37 % female, 100% with hypertension. Mean LEF was 40.4 ± 10.0%, mean HTN wap level was 1430.7 ± 1243.8 pg/mL, and the mean dose of furosamide was 52.7 ± 38.2 mg daily.

Mean BMI was 27.8 ± 4.2 kg/m2 and mean A1c 8.45 ± 1.43 %. 73.6% of patients received metformin and 90.9% another oral antidiabetic medication. 63.5% used insulin. Follow-up (90 days): a significant reduction was observed in RT-proBNP values (mean 978.9 ± 900 pg/mL, p < 0.05), BMI (mean 26.7 ± 3.7 kg/m2, p < 0.05), A1c (mean 7.8 ± 0.8 %, p < 0.05) and dose of furosamide (mean 51.3 mg ± 37 mg daily, but p<0.05). Furthermore, a significant reduction of rate of admission for HeartFailure was shown (from 1.3 ± 0.8 90 days before to the beginning of SGLT2 inhibitors to 0.01 ± 0.3 90 days after the treatment with SGLT2 inhibitors, p < 0.05). It did not show hypoglycaemia episodes.

Conclusions: This is a pilot study which shows beneficial effects of SGLT-2 inhibitors in patients with Heart Failure and Diabetes Mellitus, improving HF situation and metabolic control. This study has several limitations, specially the short follow-up and small sample size. So, bigger studies, are required to contrast these hypothesises.

P1823 Co-morbidities and fragility are determinants of survival in patients with heart failure and mildly reduced ejection fraction

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Background: Heart failure (HF) is a chronic condition highly prevalent among older people. Due to this fact, fragility and co-morbidities are often present among HF patients. The 2016 Heart Failure (HF) ESC Guidelines boost to investigate the “new” subgroup of patients with HF and left ventricular ejection fraction (EF) mildly reduced (HFmrEF).

Purpose: Our aim was to assess the effect of co-morbidities and fragility on long-term prognosis in ambulatory HFmrEF patients, and to compare it with those observed in HF with reduced (HFrEF) and preserved (HFpEF) EF.

Methods: A score of co-morbidities was created, ranging from 0 to 7, that includes diabetes, hypertension, COPD, renal failure, anemia, peripheral arteriopathy and atrial fibrillation. Fragility was defined as having at least one abnormal evaluation among 4 standardized geriatric scales. Predefined criteria for such scales were: Barthel Index < 90; OARS scale < 10 in women and < 6 men; Pfeffer Test > 3 (1, depending on educational grade) and > 3 positive items on the abbreviated GDS. Median follow-up was 4.9 years (25–75: 2.5–8.4) for living patients. All-cause death, HF-related hospitalization and the composite end-point of both were assessed.

Results: 169 patients with HFmrEF were evaluated (116 men and 53 women, mean age 67.2 ± 11.8 years, median duration of HF 13 months [21–23–44], ischemic aetiology 58.6%, 104 (61.5%) and 58 (34.3%) in NYHA class II and III respectively) and compared with 999 patients with HFrEF and 146 patients with HFpEF. The number of co-morbidities in HFmrEF patients (2.37 ± 1.8) was similar to that in HFrEF (2.28 ± 1.4, p = 0.45) and significantly lower (p < 0.001) than in HFpEF patients (3.04 ± 1.4). In contrast fragility was more prevalent in HFmrEF (60.3%) than in HFrEF patients (41.5%), p = 0.03 and similarly prevalent than in HFpEF (65.5%) patients, p = 0.36. During follow-up 78 deaths, 32 HF-related hospitalizations and 85 composite end-points were documented. Co-morbidities and fragility were significantly associated with the 3 end-points: HR 1.34–1.82, p = 0.001 and HR 2.95 [1.84–4.70], p < 0.001 for all-cause death respectively; HR 2.01 [1.58–2.57], p < 0.001 and HR 2.72 [1.10–6.7], p = 0.03 for HF-related hospitalization respectively; and HR 1.84 [1.41–2.30], p < 0.001 and HR 2.80 [1.79–4.38], p < 0.001 for the composite end-point respectively. These figures were higher in all the end-points (from 4% to 10%) than that observed in HFmrEF and HFpEF patients. In multivariable analysis containing also age, sex NYHA functional class and ischemic aetiology the number co-morbidities remained independently associated with all-cause death (p = 0.03), HF-related hospitalization (p < 0.001) and the composite end-point (p < 0.01) and fragility with all-cause death (p = 0.01) and the composite end-point (p = 0.02).

Conclusion: Co-morbidities and fragility are determinant of outcome in ambulatory patients with HFrEF, even more than in HFmrEF and HFpEF patients.

P1824 Do we optimize antidiabetic treatment in HF patients?

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Introduction: The latest Heart Failure and Cardiovascular Prevention ESC Guidelines have shown the benefits of empagliflozin in preventing and slowing down the
progression of Heart Failure (HF) and reducing cardiovascular mortality. Our goal is to describe the characteristics of diabetic patients hospitalized in the Cardiology Service, to analyze whether the ESC Guidelines recommendations are being followed, and to suggest new treatment protocols.

Material and Methods: Prospective and descriptive study of type 2 diabetic patients hospitalized in the Cardiology Service from June 15th to December 31st, 2016, comparing patients with chronic HF and de novo HF.

Results: From June 15th to December 31st, out of a total of 121 diabetic patients hospitalized, 33% had chronic HF (due to decompensated heart failure) and 14% were diagnosed with de novo HF. There were no differences found between both groups in regards to age (70 ± 9 vs. 69 ± 14), gender (67% males in chronic HF vs. 50% in de novo HF) nor other cardiovascular risk factors (HTA in 80% patients with chronic HF vs. 77% with de novo HF, 39% of chronic HF patients were or had been smokers vs. 38% with recent HF diagnosis, and nearly 95% of the patients in both groups had BMI ≥ 25). There were significant differences in regards to dyslipidemia (82% with chronic HF vs. 77% with de novo HF), hypereuricemia (42.5% with chronic HF vs. 70% with de novo HF) and creatinine clearance (50% with chronic HF had a creatinine clearance < 60ml/min vs. 38% in de novo HF patients). The average EFV was 51% ± 13% in chronic HF group vs. 46% ± 17% in patients with de novo HF. Out of the chronic HF patients, 30% had HFREF, 15% HFP EF and 55% HFP EF, whereas 27% of the de novo HF patients had HFREF, 27% HFP EF and 44% HFP EF. All patients were being properly treated with Beta blockers, ACE Inhibitors, and MRA drugs. Still, nearly 50% of the hospitalizations in all Diabetic 2 patients were due to Heart Failure. Regarding previous anti-diabetic drugs, none of the patients were being treated with a SGLT2 inhibitor. 57% of chronic HF patients were under Metformin (15% on its own), 17% sulfonylurea, 15% DPP4 inhibitor and 55% under insulin (15% as single-drug treatment). As for the de novo HF patients, 77% were under Metformin (10% as single-drug treatment), 27% sulfonylurea, 25% DPP4 inhibitor and 33% under insulin. Nevertheless, 40% of the patients with chronic HF and 27% with de novo HF had HFrEF levels out of the target range.

Conclusions: We’ve detected that ESC guidelines aren’t being followed in the use of anti-diabetic drugs in patients with cardiovascular diseases, unlike other cardiovascular risk factors that have well-established treatment protocols. As seen use of anti-diabetic drugs in patients with cardiovascular diseases, unlike other cardiovascular risk factors that have well-established treatment protocols. As seen use of anti-diabetic drugs in patients with cardiovascular diseases, unlike other cardiovascular risk factors that have well-established treatment protocols. As seen use of anti-diabetic drugs in patients with cardiovascular diseases, unlike other cardiovascular risk factors that have well-established treatment protocols.

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Diabetes (p = 0.053). Survival according to iAVA

P1828
Long-term results with conventional treatment approach for prosthetic valve endocarditis in patients with prior heart failure

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Introduction: The initial management strategy in prosthetic valve endocarditis (PVE) patients remains a matter of debate. Evidence based therapeutic strategies are lacking and difficult to be achieved in multicentric manner because prosthetic valve endocarditis (PVE) is a rare condition. The appropriate therapeutic strategies need ultimately to fit the patient.

Purpose: The aim of our work was to analyze if initial conservative intention to treat with antibiotics (AbT) in patients with PVE may influence short- and long-term prognosis and to identify factors for the adverse outcome of this strategy.

Methods: Retrospective analysis of 56 cases of early and late PVE, from 2000 to 2004, 20 women and 36 men, age 54.64 ± 11.34 years, 51.8% with early PVE and 48.2% with late PVE. 44 PVE episodes (78.6%) were treated with antibiotics only (AbG – antibiotic group) and 12 episodes (21.4%) with combined antibiotic and surgery (SurgG-surgery group). The analysis included data of hospital records. Survival at long-term follow-up (LTFU) (12.87 ± 0.97 years) was obtained from National Insurance Database. Patients lost to follow up (n = 10) were excluded from our analysis.

Results: The cure of PVE was obtained with conventional therapy (antibiotics) for 71% of our patients and was independent of the AbT type (multivariate analysis). In the AbG-in-hospital death rate was 2% and transfer rate due to complications 27%, 21.4% of patients referred for early surgery due to hemodynamic instability (58.3%), perivalvular extension of infection (75%), embolism (58.3%), and persisting fever (25%) have had a 66.6% survival rate. Factors related to short-term mortality in this group were: age (p = 0.04), diabetes (p = 0.016), ischemic heart disease (p = 0.07), heart failure (p = 0.07), hemodynamic instability (p = 0.04), persistent fever (p = 0.06), anemia (p = 0.001). The AbT duration overall was 33.55 ± 12.8 days. Short-term survival rate overall at the end of initial treatment was 90.4%. Long-term follow up survival rate was 44%, very low and relatively homogenous: 42.8% SurgG, 44.1% AbG. Factors related to long-term mortality were advanced age (p = 0.0059), diabetes (p = 0.038), mitral valve ejection fraction (p = 0.039) and staphylococcal infection (p = 0.053).

Conclusions: In studied patients, there was a very high long-term mortality rates regardless of therapeutic strategy. Nevertheless, in selected patients, without complications, conservative approach could be adequate in setting of short-term follow up. Younger and hemodynamically stable patients, with non-staphylococcal PVE and with preserved ejection fraction, who are carefully supervised, may be safely treated with antibiotics alone. Whether the reasons of poor long-term results can be attributed to the lack of early surgery or to the progression of preexistent heart failure remains biased by the limited number of patients, high rate of loss to follow up and by the absence of current concept of “endocarditis team”.

P1829
Patient foramen ovale: red flag in radiologically isolated syndrome

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Objectives: To investigate the association of white matter lesions suggestive of demyelinating disease in magnetic resonance imaging (MRI) with patent foramen ovale (PFO) in migraine patients, with and without aura.

Materials: 22 migraine patients, 19 females and 3 males, with MRI evidence of white matter lesions suggestive of demyelinating disease. In 16 patients Bankoff criteria for dissemination in space were respected. For this reason, all the patients practiced further diagnostics including lumbar puncture, autoimmunity panel, thrombophilia evaluation, cardiovascular evaluation to detect the presence of PFO. Instrumental and clinical follow-up over three years was practiced and MIPAV software was used to analyse MRI imaging.

Results: 13 of 22 patients (59%) had PFO. Significant association was found between PFO and migraine with visual aura (p = 0.03) and thrombophilia (p = 0.04). None of them had oligoclonal bands in cSF (p = 0.014). No difference in number, volume and distribution of the lesions between the patients with and without PFO was noticed and 11 out of 16 patients carrying Bankoff criteria for disseminating in space had PFO. The follow up showed a stationary lesion load in all PFO patients, no inflammatory or spinal cord lesion no enhancement at any time. The presence of PFO didn’t affect the lesions localization (parietal, frontal, occipital, temporal or parietal) and corpus callosum lesion was never detected.

Discussion and conclusions: Migraine is often one of the main symptoms leading the patient to perform MRI, discovering, in most of the cases, white matter lesions of unspecific significance and placing always demyelinating diseases in differential diagnosis. Our study underlines the potential pathogenetic role of PFO in generating white matter lesion in migraine patients (59%), the potential of PFO in those with visual aura and thrombophilia. On the other side, with the evidence that 11 out of 16 patients carrying Bankoff criteria for disseminating in space had PFO and no clinical and instrumental diagnosis of demyelinating disease, we state that cardiologic evaluation represents a cardinal toll in differential diagnosis of RIS.

P1830
Risk factors, predictors and outcome of patients with complicated infective endocarditis in intensive care unit

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Introduction: Despite improvement in diagnosis and management, infective endocarditis related mortality and morbidity might occur even after successful treatment especially in patients with complicated IE needing medical intensive care unit (MICU) or coronary care unit (CCU) care. However, no previous study has explored the outcomes (for example, heart failure, myocardial infarction and cardiovascular death) in these patients.

Objective: This study investigates the short term, intermediate and long term outcome in patients with complicated IE admitted to MICU/CCU for medical treatment.

Method: A single – centre retrospective analysis was conducted among patients with complicated infective endocarditis requiring admission to MICU/CCU between 2001 and 2016. All patients underwent both transthoracic echocardiography (TTE) and then followed by transthoephalic echocardiography (TTE). TTE was performed within 3 days on presentation to the hospital while TCE was performed within 3 days prior to transfer to MICU/CCU or on the day of transfer itself. The patients were identified via the hospital information system.

Results: 65 patients, with a mean age of 47 ± 10 years, were diagnosed with complicated IE, in which, 39 (60.5%) of them were male. IE survivors were defined as patients who survived after being discharged from MICU/CCU and at 6 months follow up with a documented diagnosis of IE. A total of 30 survivors form total patients
of 65 were identified. 50 patients required inotropic support and 41 patients developed multi-organ failure. 22% of the patients developed mobitz type II heart block or complete heart block. 9 patients of the mobitz type II heart block progressed to complete heart block requiring temporary/permanent pacemaker. Microbiology laboratory investigation showed 95% of the patients grew gram-positive cocci in their blood cultures. Surgical intervention was conducted in 30% of the patients and the remaining was medically treated. Biomarkers of acute infection, APACHE III as well as echocardiographic findings were analyzed. Using multivariate analysis, patients who developed acute kidney injury prior to transfer to ICU (OR 9.95% CI 1.19-22.00, P = 0.03) or echocardiographic evidence of vegetation size > 15mm (OR 7.95% CI 1.07-17.71, P = 0.03) were identified as predictors for in-patient death.

Conclusions: In contrast to general IE populations, infectious agents and the type of infected impaired valve are not the main predictors of survival in critically ill IE patients. Our study concludes that markers for severity of illness (scores and organ failure) as well as echocardiographic findings are essential risk factors for poor prognosis and mortality. In addition, early utilization of TOE to identify large vegetation prompting a more aggressive treatment approach to prevent septic emboli as well as reducing mortality.

**P1831**

**Mitrail balloon valvuloplasty: risk factors for lack of success, severe mitral regurgitation and major complications**

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Background: Mitral balloon valvuloplasty is not always successful and free from complications.

Objectives: To determine the independent risk factors for an unsuccessful procedure, severe mitral regurgitation and major complications in mitral balloon valvuloplasty.

Methods: Longitudinal prospective study of 518 mitral balloon valvuloplasties performed between July 6, 1987 and December 31, 2004, on 429 (82.8%) female patients and 89 (17.2%) male patients with a mean age of 37.5 ± 12.9 years. Major complications were considered to be: perforation with cardiac tamponade, stroke and severe mitral regurgitation per procedure. The continuous variables were transformed in categorical variables and the chi-square or Fisher exact tests to compare the categorical variables, and logistic regression and multiple logistic regression were used to identify independent factors for predicting success, incomplete procedure, severe mitral regurgitation and major complications.

Results: Success was noted in 452 (84.0%) procedures, with major complications occurring in 22 (4.2%) patients, of which ten were severe mitral regurgitation; there were no per-procedure deaths, with four (0.8%) in-hospital deaths. In the multiple logistic regression, lower age predicted success in the procedure; the only variable that predicted an incomplete procedure was the initial period of the procedure, and a score <11 points predicted severe per-procedure mitral regurgitation. There was no independent predictor of major complications in this study.

Conclusions: Success was related to younger patients, an incomplete procedure to the initial period of the procedure and severe per-procedure mitral regurgitation to an echocardiography score <11 points.

**P1832**

**Balloon mitral valvotomy for patients with mitral stenosis in atrial fibrillation: immediate and long term prognosis**

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Background: Atrial fibrillation (AF) is a common finding in patients with severe mitral stenosis requiring Balloon Mitral Valvulotomy (BMV). Its immediate and long-term prognosis remains controversial.

Objectives: We sought to evaluate the effect of AF on immediate and long-term (23 years) outcome of patients undergoing BMV.

Methods: The immediate procedural and the long-term clinical outcome after BMV of 139 patients with AF were collected and compared with those of 381 patients in normal sinus rhythm (NSR).

Results: Patients with AF were older (43.3 vs 29.7 years; p < 0.001), had frequently a history of systemic embolism (9.4% vs 1.6%, p < 0.001) and of mitral commissurotomy (28.1% vs 19.4%, p = 0.035). Symptoms were similar between the two groups (NYHA-II: 48.9% vs 49.9%, p = 0.648), patients with AF had more frequently a wikira score >8 (51.4% vs 30.9%, p < 0.001), a larger left annulus (41.0 mm2 vs 32.0 mm2, p = 0.001) and a lower transmitral gradient (11.1 mmHg vs 16.6mmHg, p < 0.001) BMV was equally successful in the two groups (80.6% vs 94%, p = 0.187) but resulted in a smaller post BMV area (20.2 cm2 vs 21.5 cm2, p = 0.012) with a lower mitral valve area gain (0.8 cm2 vs 1 cm2, p = 0.015)BMV was not associated with a higher risk of complications (4.3% vs 4.7%, p = 0.844) After a mean follow up of 74 months , patient with AF had the same rate of restenosis (23.8%vs 25.6%, p = 0.98) but required more frequently a mitral valve replacement (16.3% vs 7.7%, p = 0.012) They also experienced higher rates of systemic embolism (3.8% vs 0.6%, p = 0.18) and had a lower rate of event-free survival (freedom from death , restenosis and systemic embolism) (2% vs 5%, p = 0.007) in the group of patients in AF , predictive factors for combined adverse event including death , restenosis , and systemic embolism and mitral valve replacement are : post BMV area < 2 cm2 (HR 2.5, 95% CI [1.2; 5.18], p < 0.03) and a lower transmitral gradient (11.1mmhg vs 16.6mmhg, p < 0.047). In the group of patients in AF , predictors for combined adverse event including death , restenosis , and systemic embolism and mitral valve replacement are : post BMV area < 2 cm2 (HR 2.5, 95% CI [1.2; 5.18], p < 0.047). In the group of patients in AF , predictors for combined adverse event including death , restenosis , and systemic embolism and mitral valve replacement are : post BMV area < 2 cm2 (HR 2.5, 95% CI [1.2; 5.18], p < 0.047). In the group of patients in AF , predictors for combined adverse event including death , restenosis , and systemic embolism and mitral valve replacement are : post BMV area < 2 cm2 (HR 2.5, 95% CI [1.2; 5.18], p < 0.047). In the group of patients in AF , predictors for combined adverse event including death , restenosis , and systemic embolism and mitral valve replacement are : post BMV area < 2 cm2 (HR 2.5, 95% CI [1.2; 5.18], p < 0.047).

Conclusion: Our data support the fact that patient with AF have worse immediate and long term outcomes after BMV. Post BMV area < 2cm2 , procedural complications and dyspnea/predicpt adverse events during follow up.
Redo percutaneous mitral commissurotomy interventions for mitral stenosis: immediate and one-year results compared to a primary procedure, a prospective observational study between 2010 and 2015

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Introduction: Percutaneous mitral commissurotomy (PMC) has virtually replaced surgery in the treatment of mitral stenosis. However, the indications for PMC in the setting of mitral restenosis remain poorly characterized, and a history of PMC is considered to be an unfavorable anatomic feature in the latest European guidelines. Our study has therefore compared immediate and one-year results of redo versus primary interventions.

Methods: All patients in whom PMC was performed for mitral stenosis between 06/02/2010 and 06/02/2015 in University Hospital were included. Patients have been divided into two groups depending on their status: primary or redo PMC. Clinical, echocardiographic and procedural data have been collected in the medical files. Referring cardiologists were contacted to obtain information on a one-year follow-up (restenosis, redo intervention, heart failure, and death).

Results: During the study period, 81 patients underwent PMC for mitral stenosis in our center. It was a redo procedure in 21 cases (26%). Baseline characteristics were comparable in both groups. Initial global success rate, as defined by a post-procedural mitral valve area > 1.5 cm² without mitral regurgitation ≥2/4, was 80%. It didn’t significantly differ depending on the status (82.9% for a primary versus 73.7% for a redo intervention; OR=1.717 [0.384; 7.999]; p=0.49).

One-year overall survival without event was 64.4% (65.9% versus 63.2%; OR=1.081 [0.293;3.84]; p=0.99). There were no significant differences regarding rates of death (16.6% versus 5.3%; OR=0.329 [0.006;3.045]; p=0.41), heart failure (27.2% versus 15.8%; OR=0.499 [0.078;2.089]; p=0.51), restenosis (15% versus 31.6%; OR=2.668 [0.573;11.613]; p=0.17) or reintervention (5% versus 21%; OR=4.908 [0.628;59.692]; p=0.07).

Conclusion: Redo PMC for mitral stenosis doesn’t appear to be a risk factor of immediate and one-year procedural failure. These results should be confirmed or invalidated by a larger study.

Methods: Single-center, retrospective study of patients who underwent CRT implantations between January 2002 and March 2016. A clinical and echocardiographic evaluation were performed prior to CRT and 6-12 months after. CKD was defined as a creatinine clearance ≤ 60 ml/min determined by MDRD formula. CRT response was defined as an increase in LVEF function ≥5% and an improvement in NYHA class ≤2. Predictors of the composite outcome were determined by logistic regression analysis. Variables with p < 0.1 in univariate analysis were included in multivariate model.

Results: A total of 246 patients were included (mean age 68.8 ± 10.6 years, 63.2% males, 40.7% ischaemic aetiology), with a mean follow-up time of 34.1 ± 21.1 months. CKD was present in 22.4% of patients. Patients with CKD were older (71.7 ± 10.5 vs 67.9 ± 10.6 years; p = 0.02), had a higher rate of hypertension (78.3% vs 65.5%; p = 0.022) and had more frequent NYHA class III/IV before CRT implantation (86.6% vs 67.1%; p = 0.04), compared to patients without CKD. There were no significant differences regarding baseline left ventricular ejection fraction or other cardiovascular risk factors. CRT response was similar between groups (43.2% vs 53.5%; p = 0.163). At 5 years follow-up, a significant difference was found on composite outcome (44.4% CKD vs 33.0% non-CKD group; p = 0.002). After multivariate analysis, presence of baseline CKD and absence of CRT response were independent predictors of the composite outcome (HR: 2.7; 95% CI 1.3-5.4 p = 0.004 and HR: 0.19; 95% CI 0.06-0.62 p = 0.006, respectively).

Conclusion: Patients with CKD had similar rate of response to CRT but worse prognosis. Presence of baseline CKD was an independent predictor of 5 years HF hospitalizations and global mortality.
Background: Several biomarkers are studied in order to predict outcome and response to Cardiac resynchronization therapy (CRT). ST-2 is linked to cellular death and fibrosis and it is a new emerging prognostic biomarkers in several Heart Failure (HF) setting, Galectin 3 (Gal-3) is related to myocardial fibrosis and cardiovascular stiffness, and N-terminal portion of the B-type natriuretic peptide (NT-proBNP) represents the more codified biomarker for risk stratification and assessment of the hemodynamic status. Finally, elevated levels of cytokine (IL-6 and TNF-α) have been related to the progression of HF status.

Purpose: 1) to investigate the role of ST-2, Gal3, NT-proBNP IL-6 and TNF-α for outcome prediction in terms of cardiac death, re-hospitalization for HF and sustained ventricular arrhythmias in patients submitted to CRT. 2) to evaluate the impact on renal dysfunction and measured biomarkers on outcome in responders versus non-responders.

Methods: We retrospectively evaluated 81 consecutive patients referred for CRT with symptomatic drug-refractory heart failure (NYHA II-IV), left ventricular (LV) systolic dysfunction with ejection fraction (EF) ≤35%, ORS width ≥120 ms. We measured all the aforementioned biomarkers together with creatinine, and estimated the Glomerular Filtration Rate (eGFR) at baseline and after 1 year of CRT. At 1 year an echocardiographic reduction of LV end-systolic volume ≥15% was considered as index of reverse remodeling and used to define a patient as responder to CRT.

The outcome was assessed during a mean follow-up period of 3 years.

Results: Out of 81 patients submitted to CRT, 51 (63%) were responders. Events rate in responders was 4% respect to 50% in non responders (p < 0.001). None of the studied biomarkers demonstrated a significant difference between responders versus non-responders. Conversely Gal-3 (29.8 + 13.9 ng/mL vs 19.9 + 7.6 ng/mL, p = 0.022) and NT-proBNP (5133 ± 4300 pg/mL vs 1391 ± 1205 pg/mL, p = 0.001), together with presence of renal dysfunctions [45 ± 17 mmol/L vs 58 ± 20 mmol/L (p = 0.006), demonstrated a prognostic significance. ROC curve analyses showed a relation among baseline Gal-3;23 mg/m², ORS NT-proBNP≤140 and prognosis (AUC 0.69 to 0.91, 0.80 to 0.84 and AUC 0.69 to 0.91 0.56-0.83 (p < 0.001 respectively). The difference between Gal-3 and NT-proBNP from baseline to 12 months was not able to recognize patients with increased risk during 3 years follow up.

Conclusions: Among patients with HF submitted to CRT the measurement of ST-2 and inflammatory biomarkers do not discern patients with worse outcome. Only baseline Gal-3 and NT-proBNP may provide additional information for risk stratification.
Conclusion: CRT in patients with severe HF was significantly more effective in those individuals who had preserved contractility of the right cardiac chambers. The values of RV PFR and RV 1/3FR may serve as prognostic criteria for favorable response to CRT.

P1841 Dynamic variation of renal function and novel or old HF biomarkers (ST2, Galectin 3, NT-proBNP) and response to cardiac resynchronization therapy (CRT)

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Background: Cardiac resynchronization therapy (CRT) is an established treatment in patients with drug-refractory heart failure (HF), left bundle branch block, and severe left ventricular (LV) dysfunction, although approximately 30% of patients do not respond to such treatment. CRT is a member of the interleukin-1 family involved in modulating cardiac remodeling and ventricular function. Galectin-3 (Gal-3) is a marker of fibrosis activity and cardiac remodeling. NT-proBNP represents the more cost-effective and measured biomarker for risk stratification and hemodynamic status in HF. However, dynamic changes in the aforementioned biomarkers and structural response to CRT are still poorly investigated.

Purpose: To investigate temporal variations of ST2, Gal-3, NT-proBNP and renal function from baseline to 1-year follow-up, and their interactions with LV reverse remodeling after CRT.

Methods: We retrospectively evaluated 81 consecutive patients referred for CRT according to current Guidelines. We measured ST2, Gal-3, NT-proBNP, creatinine and estimated Glomerular Filtration Rate (eGFR) at baseline and after 12 months. eGFR was calculated by the CKD-EPI formula. Variations of each marker were calculated as In(1/value at 12 month/value at baseline), given the skewed distribution of the data. Echocardiographic response was evaluated at 6 months follow-up, and traditionally defined as reduction of LV end-systolic volume ≥15%.

Results: At baseline, we found significant, mild correlation between Gal-3 and markers of renal function (for eGFR, Spearman’s rho = -0.330, p = 0.003 for creatinine, rho = 0.320, p = 0.004) and with ST-2 levels (rho=0.356, p = 0.001) and stronger correlation with NT-proBNP levels (rho = 0.453, p = 0.001). Moreover NT-proBNP showed a mild correlation with eGFR (rho=0.330, p = 0.001) and creatinine (rho=0.355, p = 0.001). All other correlations were not significant. However, temporal changes from baseline to 12 months for each parameters were not significantly related to each other, except for a very mild correlation between ST-2 and markers of renal function (for eGFR, rho=0.236, p = 0.044 for creatinine in rho=0.248, p = 0.034). Echocardiographic response was significantly associated with improvement in renal function at 12 months, as compared with baseline (independent sample t-test p = 0.038 for eGFR, p = 0.046 for creatinine), but not with variations in Gal-3 (p = 0.729). ST2 (p = 0.649) and NT-proBNP (0.289). Moreover, percentage changes in eGFR and in creatinine were linearly correlated with percentage changes in LVEF (Spearman’s rho = 0.229, p = 0.047; rho = -0.235, p = 0.041, respectively).

Conclusions: In patients candidates to CRT, markers of renal function, NT-proBNP and Gal-3 are significantly associated before implantation, but their temporal changes at 1-year follow-up are no more correlated. Echocardiographic response to CRT is associated with positive changes in indexes of renal function, but not with changes in NT-proBNP or Gal-3.

P1842 Cardiac resynchronization Therapy pacemaker or defibrillator? Long term follow-up outcomes

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Clinical characteristics, predictors, and outcomes of super-responder in cardiac resynchronization therapy of patients with heart failure

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Introduction: Cardiac resynchronization therapy (CRT) can improve cardiac function through reverse left ventricular (LV) remodeling in heart failure (HF) patients with wide QRS duration. Recently, ‘super-response’ to CRT is known to be associated with improved survival. We assessed clinical characteristics, predictors and outcomes of super-responders in CRT.

Methods: We retrospectively enrolled 76 patients with CRT implantation from January 2010 to October 2015. Pre-defined CRT responders were: respondents (decreased LV end systolic volume, LVEF <30%), and super-responders (decreased LVEF <30%). The response timing before or after 6 months was defined as early or late response, respectively. Clinical outcomes including all-cause mortality and rehospitalizations were assessed during follow-up period [median 555 days].

Results: Mean age, baseline LVEF and QRS duration were 66 ± 11 years, 24.8 ± 6.3% and 164 ± 24ms, respectively. The prevalence of men, LBBB and ischemic origin HF were 46.1%, 69.7% and 14.5%, respectively. At early period, there were 7 (9.2%) responders and 8 (10.5%) super-responders, while 9 (14.3%) responders and 22 (34.9%) super-responders at late period. There were no mortality cases in early and late overall responders and fewer HF rehospitalization (4.5% vs. 22.2%, p=0.037) and the prevalence of LBBB was higher (90.9% vs. 44.4%, p=0.055) in super-responders. There were not any significant differences between responders and super-responders in terms of the prevalence of men, ischemic origin HF and age, baseline LVEF, QRS duration. However, the follow up QRS duration was significantly narrower (150 ± 20ms vs. 169 ± 21ms, p=0.037) and the prevalence of LBBB was higher (80.9% vs. 44.4%, p=0.012) in super-responders than that in responders.

Conclusion: Super-responders of CRT showed favorable clinical outcomes compared to non-responders or even to responders. The decrease of QRS duration after CRT implantation can be a clinical predictor for super-response to CRT.

P1845
A systematic review of telemonitoring assessment for patients with heart failure

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Background/Introduction: Telemonitoring (TLM) can improve heart failure (HF) management. However proper assessment of TLM services, and their impact on process and outcomes of care, is required. To the best of our knowledge, there is no standardized evaluation framework for TLM services to comprehensively evaluate the various impacts of TLM. The objectives of this systematic review are to list the criteria used in published evaluations of non-invasive HF TLM services, to describe how they are used and to organise them into a comprehensive evaluation framework.

Methods: The articles were retrieved through Medline, Web of Science and Embase from 1990 to August 2015. Articles were eligible if they were English original reports of a HF TLM evaluation study in English language. Reviews, editorials and position papers and studies implantable devices were excluded.

Results: Overall, 121 articles were selected and reviewed, leading to 52 evaluation criteria that were classified along six dimensions: technical, economical, educational, clinical, organizational and users’ perspective. The technical and economical impacts were evaluated in over 65% of studies whereas the educational, organizational and technical impacts were studied in less than 15%. Users’ perspective was the most frequently covered dimension in the development phase of TLM projects, whereas study of the clinical and economical impacts were dominating in the later phases (implementation and integration).

Conclusions: TLM evaluation frameworks should cover all of the six dimensions, appropriately distributed along the TLM project life cycle. Our next goal is to build such a comprehensive evaluation framework for non-invasive HF TLM and to test it on an ongoing TLM project.

P1846
Implementation of intravenous inotropic protocol in hospitalization unit with telemetry: initial experience

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Background: Intravenous inotropic therapy plays an important role in the management of hospitalized patients with heart failure (HF). In particular, the use of inotropes at lower doses contributed to the potential expansion of its use, with lower rates of complications. Among patients with advanced HF using intravenous inotropic, severe, but stable cases, may be selected to benefit from continued treatment outside the intensive care setting.

Objective: To report the initial experience of the use intravenous inotropes at the ward unit under telemetry monitoring, in stable patients with advanced HF, in a general, public and university hospital.

Methods: Patients with advanced HF, refractory to conventional pharmacological treatment, clinically stable in the Coronary Care Unit for at least 24 hours with an unchanged (low or moderate) intravenous inotropic dose were selected (Méridion/dobutamine). The protocol was prepared by a multidisciplinary team and implemented in an inpatient unit whose staff was adequately trained. Inotrope was infused through a central inserted peripheral catheter; once the dose was considered stable the patient was discharged to the ward.

Results: From 09/2015 to 12/2016, 15 patients with advanced HF were followed with the use of inotrope under this protocol (Mean age 54 ± 17 years, 80% male, left ventricular ejection fraction 24 ± 7%, 40% ischemic etiology, 27% familial, 20% idiopathic). Milrinone was used in 13 patients to a median dose of 0.17 (0.27-0.25) μg/kg/min; dobutamine was used in 2 patients with a dose of 5 μg/kg/min. Of the 15 patients, eight were transplanted, two were discharged from hospital, one returned to the intensive care unit due to clinical worsening related to nephrotoxicity secondary to desensitization therapy and four died. There were no adverse events resulting from the use low dose inotropes with protocol.

Conclusions: The use of this low-dose inotrope protocol use in the ward unit with telemetry proved to be feasible and safe, allowing for the prolonged use of this therapy as a bridge for cardiac transplantation, weaning or palliative care support. Learning from the use of low or moderate doses may reconfigure the role of inotropes as transition therapy for management settings.

P1847
Evaluation of e-health tool for heart failure patients

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Background: A home-based tool for heart failure (HF) patients exists, which monitors symptoms, titrates diuretics and educates the patient about HF in an interactive manner. In order to promote a better self-care behaviour, if the system detects deterioration in HF status, the patient is advised to seek health care and told who to contact.

Purpose: The tool has previously been shown to improve self-care behaviour, but we wished to assess its impact on HF related in-hospital days, to evaluate the use of the tool from a quality of care perspective.

Methods: We performed an intervention study with a matched control group, with a total of 62 patients. 31 patients in the intervention group (IG) were equipped with the tool and 31 matched controls (CG), were subject to standard care. The patients were followed for 280 days. The groups were well balanced at baseline, with respect to age, gender and diagnosis. The mean age was 76 ± 10, with 34 % women in the IG and the mean age was 74 ± 10, with 42 % women in the CG. All hospitalisations for the patients were recorded during 280 days.

Results: After 280 days, a multiple regression analysis was performed, resulting in a risk ratio of: RR: 0.64; 95% CI: 0.47-0.87; p < 0.05. There was a statistically significant reduction of HF related in-hospital days by 36 %, corresponding to an average reduction of 1.3 in-hospital days per patient. In total there were 104 HF days registered for the CG and 62 for the IG. There was no significant difference in risk of admission between the two groups (28 % for IG vs 26 % for CG).

Conclusion: Our findings are very similar to what has been published before. The tool appears to help patients to seek care in time when symptoms are worsening, instead of waiting for an acute episode. This is most likely the underlying cause of the reduction of in-hospital days.

P1848
New concepts for remote monitoring and flow control in left ventricular assist device patients - The Medolution project.

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Purpose: An effective outpatient management is the key factor to ensure the long-term success of left ventricular assist device (LVAD) therapy. Ambulatory visits only take place every 3 month so that life-threatening complications (pump thrombosis, driveline infection) can often only be detected and prevented by the patients themselves. In consequence, hospital stays or readmissions are common. Furthermore, flow adaptation during exercise is an unsolved problem in continuous-flow LVAD patients.

It is the intention of the EU-funded project Medolution, to develop new approaches in order to provide the best possible support for physicians and patients in future.

Methods: Research project: In the meantime, there are different possibilities available for remote monitoring of relevant vital and device parameters in patients with a LVAD. In the future, technical opportunities are increasing. The Medolution project aims to bundle the relevant information (e.g. pump, driveline, LVAD-data) from different data sources into one platform in order to provide the physician a comprehensive overview of patient situation. In the system background a big data analysis runs permanently and tries to detect abnormalities and correlations as well. At crucial events, a notification system informs the physician and provides the relevant data via a decision support system. LVAD flow is adapted to the grade of exercise via sensors located in the driveline.

Results: First results of big data analysis for early detection of pump thrombosis based on LVAD parameters are available. Work on automatic image processing for driveline pictures analysis has started. For experimental tests a mock circulatory loop will be in use to simulate various situations (e.g. hypovolaemia or thrombus formation, but also exercise) and to examine sensor connectivity, data transfers, algorithms and notification system. Currently, both a mobile patient application and an application for the physician are under development.

P1849
Liberal right ventricular assist device extracorporeal membrane oxygenation support for right ventricular failure following implantable left ventricular assist device placement

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Introduction: Refractory right ventricular failure (RVF) after implantation of left ventricular assist device (LVAD) is a dramatic complication with high morbi-mortality. The addition of right ventricular assist device (RVAD) may help recovery and lead to improve outcomes.

Materials and Methods: From February 2012 to September 2014, 44 patients received a HeartMate II. These patients were retrospectively compared in 2 groups: no t-RVAD group and t-RVAD group according early liberal implantation. Patients in t-RVAD group were treated using extracorporeal membrane oxygenation as a RVAD.

Results: Of the 44 patients, 22 were didn't need RV support (no t-RVAD group), whereas 22 required addition of a temporary RVAD (t-RVAD group). Patients are sicker in the t-RVAD group with higher Michigan risk score (0.61 vs 2.2 pts vs 1.0 +/- 1.6 pts; p = 0.013) and INTERMACs clinical profile (2.1 +/-. 0.6 pts vs 3.4 +/- 1.3 pts: p = 0.0001). Despite severity of pre-implant conditions in t-RVAD group, clinical outcomes didn't differ in both groups with similar survival rate at 6 months (60.4 +/- 12 vs 71.4 +/- 9.9 months; p = 0.585).

Conclusions: Early and liberal use of temporary RVAD in case of risk factors of RVF allows to improve the prognostic of this pathology with similar survival rate in the both groups.
Background/Introduction: Impact of HLA-allosensitization in continuous-flow left-ventricular-assist-devices (LVAD) recipients is still under investigation.

Purpose: We sought to assess HLA-allosensitization in patients implanted with Jarvik-2000 or HeartWare as bridge-to-transplantation and compared results in No-VAD patients.

Methods: We included all consecutive patients tested for HLA-allosensitization before heart-transplantation from 2012 to 2016. Tests used were complement-dependent cytotoxicity on panel-reactive-activity (CDC-PRA) and Luminex.

Results: Included are 119 patients: mean age 51 ± 16 years, 24% female, 62% previously transfused. Forty-one patients entered the VAD group: 26 HeartWare, 15 Jarvik-2000. Seventy-eight patients were No-VAD. Two patients (9%) in the VAD group had a positive CDC-PRA; results in No-VAD group were comparable (8%, p = 0.56). Luminex was positive in 6 VAD patients (15%); HLA-class-I alloantibodies present in 7%, HLA-class-II in 5%, both HLA-class-I and II in 3%. Similar rates were observed in the No-VAD group: 26% positive (p = 0.17), 12% HLA-class-I (p = 0.47), 6% HLA-class-II (p = 0.74), 6% both HLA-class-I and II (p = 0.25). There were no statistical differences both at CDC-PRA (p = 0.29) and Luminex (p = 0.68) between the two LVADs used.

Conclusion(s): Rates of HLA-allosensitization with Jarvik-2000 or HeartWare are lower than those of first-generation LVAD and resulted comparable in the two LVADs used.

P1852
Success of bridging to transplantation with a continuous-flow left ventricular assist device in a single UK centre

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Background: In the United Kingdom, durable left ventricular assist devices (LVAD) are commissioned for use in patients with advanced heart failure as a bridge to transplantation (BTT) or as a bridge to transplant candidate (BTC), when elevated pulmonary vascular resistance precludes safe heart transplantation. In 2008, our institution commenced implantation of a single type of continuous-flow LVAD for patients selected by our multi-disciplinary team.

Methods: A prospectively maintained database of all LVAD implants at our institution was interrogated for BTT and BTC continuous-flow LVAD implantation procedures before 1st April 2016 and their follow-up. The data was verified and supplemented by information from medical records. Baseline characteristics including age, aetiology, risk factors, body surface area (BSA) and blood group were recorded. Follow-up was censored at the following events: death, heart transplantation or recovery (LVAD explant). We examined the association between baseline characteristics and success in bridging patients to heart transplantation. T-test was used to compare continuous variable data, and the Chi-squared test was used for categorical data.

Results: During the study period, 64 patients had LVAD implantation, with 41 BTT and 23 BTC. Age ranged from 17 to 86 years old (median 46). 63 patients were male, 1 female. Aetiology was dilated cardiomyopathy (ICM) in 34, ischaemic cardiomyopathy (ICM) in 23, end-stage hypertrophic cardiomyopathy in 6 and restrictive cardiomyopathy in 1. 24 procedures were elective, and 40 were non-elective. 9 patients had bloodgroups O (34 patients), A (16), B (10) and AB (4). BSA ranged from 1.45 to 2.47m2, (mean 1.94). Of 64 implants, one patient had their LVAD decommissioned due to recovery and one patient had their device explanted due to device failure. 54 (86%) patients were listed for transplantation, with 26 (41%) undergoing cardiac transplantation 82 – 1932 days (median 802) after implantation. 22 (34%) patients died during LVAD support 3 – 1598 days (median 171) after implantation. 14 (22%) patients remain on the transplant waiting list, 379 – 2290 days (median 653) after implantation. When comparing baseline characteristics of patients categorised by transplant status, aetiology was the only significant association; patients who were not transplanted were more likely to have an ischaemic cardiomyopathy (47% vs 19%; p < 0.05).

Conclusions: Continuous-flow LVADs may be an effective bridge to heart transplantation in patients with advanced heart failure. Gender, BSA, blood group or indication for LVAD therapy do not appear to impact on the likelihood of successful bridging to transplantation. However, patients with ischaemic cardiomyopathy appear to be less likely to be transplanted compared to other heart failure aetiologies. Further work is needed to investigate complications and adverse events to determine whether they contribute to the differences in transplant rates.

P1853
Percutaneous mechanical circulatory support in cardiogenic shock due to end-stage heart failure and acute myocardial infarction

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Background: ‘Pump failure’ and consequent cardiogenic shock (CS) is a common mode of death in end-stage heart failure (ESHF). However, there are little data on outcomes of percutaneous mechanical circulatory support (PMCS) in CS due to ESHF, unlike acute myocardial infarction (AMI).

Purpose: To describe contemporary outcome of PMCS bridging with vena-arterial extracorporeal membrane oxygenation (ECMO) and/or Impella in patients with CS due to ESHF and AMI.

Methods: Single centre study of consecutive patients with CS due to AMI (n = 20) and ESHF (n = 23) supported with ECMO and/or Impella as the primary PMCS modality.

Results: There was no difference in characteristics between patients with AMI and ESHF, except for lower LVEF (TABLE). PMCS included 7 Impella, 30 ECMO and 6 Impella + ECMO with no difference between groups. Of the 43 patients, 7 were bridged directly to heart transplantation (4 AMI and 3 ESHF), 4 directly to durable left ventricular assist devices (1 AMI and 3 ESHF), 13 patients underwent further bridging with temporary ventricular assist devices (4 AMI and 9 ESHF) and 24 patients died with/without transplantation or LVAD (7 AMI and 17 ESHF). 1-year survival was 39% and 65% in ESHF and AMI respectively (p = 0.037, log rank test, FIGURE).

Conclusion: Multiple bridging modalities are common in contemporary management of CS. Mortality is higher in patients with CS due to ESHF supported by PMCS compared to AMI.

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>ESHF (n = 23)</th>
<th>AMI (n = 20)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>43 ± 7</td>
<td>46 ± 5</td>
<td>0.536</td>
</tr>
<tr>
<td>Males</td>
<td>78%</td>
<td>75%</td>
<td>0.801</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>26%</td>
<td>35%</td>
<td>0.526</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>13 ± 2</td>
<td>17 ± 2</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mean BP (mmHg)</td>
<td>56 ± 3</td>
<td>58 ± 3</td>
<td>0.426</td>
</tr>
<tr>
<td>Heart rate</td>
<td>113 ± 5</td>
<td>120 ± 5</td>
<td>0.062</td>
</tr>
<tr>
<td>Cardiac index</td>
<td>1.74 ± 0.08</td>
<td>1.82 ± 0.15</td>
<td>0.227</td>
</tr>
<tr>
<td>Lactate</td>
<td>8.2 ± 1.2</td>
<td>8.6 ± 1.2</td>
<td>0.673</td>
</tr>
<tr>
<td>Ventilated</td>
<td>61%</td>
<td>80%</td>
<td>0.334</td>
</tr>
<tr>
<td>Inotrope score</td>
<td>19.8 ± 2.9</td>
<td>21.5 ± 3.6</td>
<td>0.449</td>
</tr>
<tr>
<td>Balloon pump</td>
<td>22%</td>
<td>35%</td>
<td>0.334</td>
</tr>
<tr>
<td>Primary PMCS modality</td>
<td></td>
<td></td>
<td>0.526</td>
</tr>
</tbody>
</table>

Mean ± standard deviation

Mean ± standard deviation

FIGURE

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Objectives: Temporary mechanical circulatory support (TCS) is recommended for patients with acute, profound hemodynamic compromise, including during acute myocardial infarction (AMI). ECMO and Impella are possible TCS devices; but the device choice and the timing around the percutaneous coronary intervention (PCI) are not definitely established. We evaluate a heart team strategy based on predefined agreement for the use of ECMO or Impella as TCS in AMI who underwent urgent PCI.

Methods: Our heart team has defined a strategy based on predefined agreement for the use of ECMO or Impella as TCS in AMI who underwent urgent PCI. The strategy was analyzed retrospectively from a cohort of patients who underwent TCS within 72 hours after admission for PCI in AMI, from January 2009 to April 2015, excluding refractory cardiac arrest.

Results: Among 88 TCS-treated AMI patients, 42 had early TCS: 23 ECMO and 19 Impella. Cardiac management including PCI was similar between the groups but ECMO patients were sicker than Impella patients (higher blood lactate level, p = 0.02). Most implantation occurred during PCI (43%) or just after (50%). Change of initial TCS choice was required in 10 cases (24%) for assistance upgrading (4 Impella) or left ventricle unloading (6 ECMO).

Conclusions: A heart team strategy based on predefined agreement for the use of ECMO or Impella as TCS for AMI with hemodynamic compromise seems relevant. ECMO is very effective in case of profound cardiogenic shock. Percutaneous Impella may be more appropriate for less severe hemodynamic compromise, possibly to secure hemodynamics during PCI.

Survivors through ICU stay follow-up

P1855 Veno-arterial ECMO/ECLS for cardiogenic shock: short term outcomes

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Objective: Veno-arterial ECMO (Extracorporeal Membrane Oxygenation) or ECLS (Extracorporeal Life Support) is now widely used to treat severe cardiogenic shock with disparate results. The aim of this study was to present the results of our institution and to identify early prognostic factors.

Methods: Retrospective analysis of prospectively collected data for all patients with cardiogenic shock requiring ECLS at our centre. Post cardiotomy ECLS were excluded.

Results: 159 consecutive patients (122 male – 76.7%), aged 53.9 ± 12.6 years, received ECLS between 2005 and 2016. The etiology of cardiogenic shock was myocardial infarction (100 – 62.9%), dilated cardiomyopathy (27 – 17.0%), ischemic cardiomyopathy (6 – 3.1%), myocarditis (17 – 10.7%), endocarditis (3 – 1.9%) and rhythmic storm (7 – 4.4%). 31 (19.6%) cases followed external cardiac massage (ECM) and 54 (34.0%) patients were implanted under epinephrine. 84 patients (52.8%) were alive at explant time; 52 (81.9%) were weaned, 16 (19.0%) were transplanted and 12 (14.3%) received long term assist device (other 4 – 4.8%) with a mean duration under ECMO of 10.1 ± 5.8 days. At 6 months follow-up, 63 (39.6%) patients remained alive. There was no difference in survival between males (74 deaths – 60.7%) and females (22 deaths – 59.5%), p = 0.87. Patients who died at 6 months follow-up were older (66.9 ± 10.4) than survivors (49.4 ± 14.2), p = 0.0025. Patients under ECMO at time of setup were less likely to survive (n = 8 – 25.8% vs n=55 – 43.0%, p = 0.0015) as well as patients receiving epinephrine (n = 14 – 25.9% vs n=49 – 46.7%, p = 0.0009). Creatinine at setup time was lower in the group of survivors (155.9 ± 97.3 μmol/L vs 188.1 ± 99.2 μmol/L, p = 0.00332) as well as lactate (4.1 ± 3.2 mmol/L vs 6.5 ± 4.9 mmol/L, p < 0.0001). Aspartate amionotransferase (AST) was lower in survivors (995.6 ± 1072.4 IU/L vs 1292.0 ± 2890.4 IU/L, p = 0.00021). There was no difference in alanine aminotransferase (ALT) (p = 0.14).

At 24 hours follow-up, creatinine was lower in survivors (133.3 ± 109.0 μmol/L vs 204.3 ± 133.6 μmol/L, p < 0.0001). Lactate was also lower in survivors (2.1 ± 2.3 mmol/L vs 3.5 ± 3.6 mmol/L, p = 0.0027). There was no difference in AST (p = 0.07), ALT (p = 0.25).

Between setup time and 24 hours follow-up, creatinine decreased in survivors (–28.0 ± 65.5 μmol/L) while it increased in the deceased (+ 17.1 ± 86.7 μmol/L, p < 0.0001). AST also decreased in survivors (– 184.8 ± 911.1 IU/L) while it increased in the deceased (+ 5352.2 ± 3552.9 IU/L, p = 0.0034). ALT remained stable in survivors (+ 2.1 ± 471.1 IU/L) while it increased in the deceased (+ 431.2 ± 1805.9 IU/L, p = 0.0047). There was no significant difference in lactate (p = 0.82).

Conclusions: ECLS results for patients in acute cardiogenic shock were acceptable at our centre. Younger patients without a requirement of epinephrine or prior ECM at setup time had improved survival. Furthermore, improvement of creatinine and AST at 24 hours favoured better survival.

P1856 Clinical consequence of new-onset persistent left bundle branch block after transcatheter aortic valve replacement

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Background: Cardiac conduction disturbances can develop after transcatheter aortic valve replacement with expandable prostheses because the conduction system exists adjacent to the aortic valve. However, the clinical consequence of patients with new onset conduction disturbances is not clear.

Methods: A total of 368 consecutive patients who underwent TAVI with a balloon-expandable valve without pre-existing LBBB or permanent pacemaker implantation (PPI) were included. Electrocardiograms were obtained at baseline, immediately after the procedure, and daily until hospital discharge. Patients were followed at 1, 6, and 12 months and yearly thereafter.

Results: New-onset LBBB occurred in 210 patients (57.1%) immediately after TAVI at hospital discharge. At a median follow-up of 32 months (range 1 to 78 months), there were no differences in mortality rate between the N-LBBB and no LBBB groups (22.9% vs. 27.3%); adjusted hazard ratio: 0.845 (95% confidence interval (CI): 0.558 to 1.280); p = 0.427. There were no differences between groups regarding cardiovascular mortality HR=0.511 (95% CI 0.229-1.141),p=0.102, rehospitalizations for heart failure HR=1.344 (95% CI 0.691-2.958),p=0.481. 32.9% required PPI in the first month and only 8 patients with N-LBBB required PPI during the follow-up period. There were 2 cases of unexpected (sudden or unknown) death was observed in 2 patients with N-LBBB.

Patients with N-LBBB showed a poorer evolution of left ventricular ejection fraction over time (1 and 3 years) than no N-LBBB group: 61.3 ± 4.9 vs. 63.8 ± 4.0 (p=0.0332) as well as lactate (4.1 ± 3.2 mmol/L vs 6.5 ± 4.9 mmol/L, p < 0.0001). AST also decreased in survivors (– 184.8 ± 911.1 IU/L) while it increased in the deceased (+ 5352.2 ± 3552.9 IU/L, p = 0.0034). ALT remained stable in survivors (+ 2.1 ± 471.1 IU/L) while it increased in the deceased (+ 431.2 ± 1805.9 IU/L, p = 0.0047). There was no significant difference in lactate (p = 0.82).

Conclusions: N-LBBB was a frequent complication of transcatheter aortic valve replacement, but it was not associated with any increase in overall or cardiovascular death or rehospitalization for heart failure after a mean follow-up of 2.21 years.

P1857 Predictors of survival and one year outcomes after continuous flow left ventricular assist device implantation

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Background: The aim of this study was to assess the outcomes of patients with advanced heart failure (HF) treated with continuous flow left ventricular assist devices (CF-LVAD) and to determine factors that may be associated with improved survival, in terms to improve clinical outcomes of CF-LVAD patients.

Methods: This is a prospective study of 47 consecutive patients with advanced HF who received CF-LVAD at our institution. The overall median duration of CF-LVAD support was 13 (9-21) months. In 42 patients CF-LVAD was used as a bridge-to-transplantation (BTT) and in 5 patients as destination therapy (DT). Overall survival and adverse events at 1 year were evaluated. Echocardiographic, functional, renal and liver function outcomes were assessed at 3, 6 and 12 months.

Results: The overall 30 day, 6-months and 1-year survival for both BTT and DT patients were 89%, 85% and 89%, respectively. At 3 months after CF-LVAD implantation, we noticed significantly improvement in dimensions of LV (LVEDD, LVEDD), LVEF, BNP, NYHA functional class, blood urea nitrogen and total bilirubin (p<0.05 for all), and they remained normal through all first year of follow-up. Improvements in estimated glomerular filtration rate was significant after 3 months in group of patients with baseline renal dysfunction (p=0.04), with no further change afterward. Any kind of adverse events were present in 27 (57.1%), with bleeding as the most common complication in 19 (40.4%). In univariate analysis, blood urea nitrogen and renal failure were significant predictors of survival (HR=1.1, p=0.034 and HR=14.2, p<0.001, respectively). Renal failure was found to be an independent risk factors for the overall survival in multivariate Cox regression analysis (HR=13.1, p<0.001).

Conclusions: CF-LVAD improves functional, cardiac, renal and liver function in patients with advanced HF. As renal dysfunction is common following CF-LVAD implantation and renal failure is an independent risk factor for overall survival, the key of LVAD success is determination of optimal timing of CF-LVAD implantation in order to avoid end-organ dysfunction and achieve better postoperative outcomes.

P1858
Symptoms, physical examination and biomarkers are important determinant of reactions to adaptive servo-ventilation

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Background: Adaptive servo-ventilation (ASV) has been reported that it could improve heart failure (HF) condition and prognosis in some small clinical studies. However, a recent large trial showed mortality was increased with ASV. It's not clear what kind of patients should stop or continue ASV.

Purpose: To assess clinical parameters which could predict the reactions to ASV.

Methods: We investigated 61 HF patients treated with ASV in our hospital between June 2009 and December 2015. We examined patient's background, symptoms, physical examination, and biomarkers at baseline. Improvements in NYHA functional class, diastolic blood pressure, heart rate and NT-proBNP were assessed during the ASV therapy.

Results: The mean left ventricular ejection fraction was 37.3 ± 19.3% and mean NT-proBNP was 8666 ± 11634 pg/ml. At the time of ASV initiation, 27 patients felt comfortable (C-group) and 34 felt uncomfortable (UC-group). In C-group, their proportional pulse pressure (PPP) and heart rate (HR) were significantly improved than those in UC-group (ΔPPP 6.2 ± 0.5 vs. 0.0 ± 0.1, ΔHR -6.7 ± 4.4 vs. -1.7 ± 0.08 bpm, p < 0.01). Among 32 patients who could continue ASV at least 1 month, patients in C-group showed significantly decrease of NT-proBNP in UC-group (p < 0.05). Readmission due to HF under ASV-therapy were observed more frequently in UC-group than in C-group (p < 0.05). There were 9 patients whose comfortable ness became worse and 7 stopped ASV-therapy. The other 2 continued ASV but they were attacked by sudden cardiac death although their NT-proBNP were improved enough. They had might been enough decongested and ASV might worsened their wellness became worse and 7 stopped ASV-therapy.

Conclusions: Patient's symptoms reflect the hemodynamic responses to ASV, and those could predict the efficiency of ASV-therapy in patients with HF.

P1859
Impact of interatrial shunting on heart failure morbidity and mortality: comparison to the CardioMems Champion cohort

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1The Ohio State University, Columbus, United States of America; 2Centre de Recherche de l'Institut Universitaire de Cardiologie et de Pneumologie de Quebec, Quebec, Canada; 3University Hospital Clinic of Tarragona-Valdefordos, Tarragona, Spain; 4Rabin Medical Center, Petach Tikva, Israel; 5Hospital Clinic San Carlos, Madrid, Spain; 6Hospital Universitario Valt of Hebron, Barcelona, Spain; 7Rambam Health Care Campus, Haifa, Israel; 8Charité - Universitätsmedizin Berlin, Berlin, Germany; 9V-Wave, Aigoua Hills, United States of America

Background: Adaptive servo-ventilation (ASV) has been reported that it could improve heart failure (HF) condition and prognosis in some small clinical studies. Methods: We investigated 61 HF patients treated with ASV in our hospital between June 2009 and December 2015. We examined patient's background, symptoms, physical examination, and biomarkers at baseline. Improvements in NYHA functional class, diastolic blood pressure, heart rate and NT-proBNP were assessed during the ASV therapy.

Results: The mean left ventricular ejection fraction was 37.3 ± 19.3% and mean NT-proBNP was 8666 ± 11634 pg/ml. At the time of ASV initiation, 27 patients felt comfortable (C-group) and 34 felt uncomfortable (UC-group). In C-group, their proportional pulse pressure (PPP) and heart rate (HR) were significantly improved than those in UC-group (ΔPPP 6.2 ± 0.5 vs. 0.0 ± 0.1, ΔHR -6.7 ± 4.4 vs. -1.7 ± 0.08 bpm, p < 0.01). Among 32 patients who could continue ASV at least 1 month, patients in C-group showed significantly decrease of NT-proBNP in UC-group (p < 0.05). Readmission due to HF under ASV-therapy were observed more frequently in UC-group than in C-group (p < 0.05). There were 9 patients whose comfortable ness became worse and 7 stopped ASV-therapy. The other 2 continued ASV but they were attacked by sudden cardiac death although their NT-proBNP were improved enough. They had might been enough decongested and ASV might worsened their wellness became worse and 7 stopped ASV-therapy.

Conclusions: Patient's symptoms reflect the hemodynamic responses to ASV, and those could predict the efficiency of ASV-therapy in patients with HF.

Funding Acknowledgements: V-Wave, Ltd.

Background: We hypothesized that left atrial decompression with a percutaneously implanted interatrial shunt device would reduce HF hospitalizations and all-cause mortality in patients with advanced HF when compared to a well-matched historic controlled cohort.

Methods: Patients with chronic NYHA Class III/ambulatory Class IV HF, regardless of LVEF, on maximally tolerated guideline directed diuretic drug and device therapies, and a prior HF hospitalization or elevated neurohormones were enrolled in a single arm open label study at 6 centers. After transseptal catheterization and implantation of the shunt device across the fossa ovalis, patients were generally w-12 months.

Results: There were 9 patients whose comfortable- ness became worse and 7 stopped ASV-therapy. The other 2 continued ASV but they were attacked by sudden cardiac death although their NT-proBNP were improved enough. They had might been enough decongested and ASV might worsened their wellness became worse and 7 stopped ASV-therapy.

Conclusions: CF-LVAD improves functional, cardiac, renal and liver function in patients with advanced HF. As renal dysfunction is common following CF-LVAD implantation and renal failure is an independent risk factor for overall survival, the key of LVAD success is determination of optimal timing of CF-LVAD implantation in order to avoid end-organ dysfunction and achieve better postoperative outcomes.

P1860
Antibodycardiac pacemaker with sleep apnea monitor: a new tool to evaluate left ventricular filling pressure?

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Background: Sleep apnea (SA) is highly prevalent in pacemaker (PM) patients and enables the detection of severe SA.

Purpose: We aimed to validate a SAM function of antibodycardiac pacemakers for the prediction of left ventricular filling pressure, based on the determination of the closure of the interatrial shunt.

Figure

Results: 38 consecutive patients, 97%/3% Class III/IV and 21% with LVEF >40%, were successfully treated. Although shunt patients were generally well-matched to the entire Champion cohort with respect to LV function and usage of drugs and devices, shunt patients were older (66 ± 9 vs. 62 ± 9 years; p = 0.0083), were more likely to have an ischemic etiology (76% vs. 60%; p = 0.041), have diabetes (68% vs. 49%; p = 0.020), have poorer renal function (eGFR 54 ± 20 vs. 61 ± 16 ml/min/1.73m2; p = 0.0062) and have higher baseline left atrial pressures (PCWP 20 ± 6 vs. 18 ± 5 mmHg; p = 0.019), Shunted patients also had other markers of higher risk including a baseline 6-minute walk distance of 89 ± 112m and NT-proBNP of 2640 ± 2301 pg/ml. During an average follow-up of 11.7 months, shunted patients had 10 hospitalizations for worsening HF and 2 deaths. When com- pared to the entire Champion cohort there were significant reductions in the annual- ized rates of heart failure hospitalization and mortality (Figure). Baseline and 6-month doses of renin-angiotensin antagonists and beta-blockers were nearly identical between the shunted and Champion control patient cohorts. Shunted patients were on smaller doses of mineralsocorticoid receptor antagonists and larger doses ofloop diuretics that remained stable over 6 months (P < 0.01) accompanied by poorer improvement of NT-proBNP (p < 0.03). There were 9 patients whose comfortable- ness became worse and 7 stopped ASV-therapy. The other 2 continued ASV but they were attacked by sudden cardiac death although their NT-proBNP were improved enough. They had might been enough decongested and ASV might worsened their hemodynamics.

Conclusions: Patients with similar eligibility criteria generally had higher risk baseline characteristics than Champion patients. Nonetheless, interatrial shunting was associated with significantly lower rates of HF hospitalization and all-cause mor- tality than the less ill but otherwise well-matched historical controls. These observa- tions are not explained by different dosing of HF medications and may be indicative of a beneficial device effect. If confirmed in larger prospective randomized controlled studies, interatrial shunt implantation could be an important new approach for treat- ing patients with advanced heart failure.
Effects of cardiac rehabilitation on exercise capacity and WHO-quality of life undergoing CABG patients - A quasi-randomised controlled trial

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Background: We undertook a quasi-randomized trial of cardiac rehabilitation (CR) for patients undergoing coronary artery bypass graft surgery in a developing country. We recruited patients suitable for CR and randomly assigned them to either cardiac rehabilitation (CR) or usual care (UC) alone. We screened patients 1:1 to either approach. Results: The study was conducted in Bangladesh from July 2012 to July 2013. Male and female patients were included if they were admitted for elective coronary artery bypass graft (CABG) surgery aged 25 to 65 years. Patients allocated to the CR group were offered individual CR sessions, including exercise sessions and monthly telephone calls from a member of the CR team over a 12-month period. The CR group also received a monthly telephone call from a member of the CR team over a 12-month period. The CR group also received a monthly telephone call from a member of the CR team over a 12-month period. Data on exercise capacity as measured by maximal oxygen uptake (VO2max), exercise risk factors, health-related quality of life, and mental health status were collected between 3-12 months follow up. Differences in outcomes were compared between CR and UC groups in patients with complete outcome data. Results: A total of 142 participants participated in the trial - 71 allocated to CR group and 71 allocated to UC group. At 12 months follow up, 61 (86%) and 40 (56%) patients respectively provided complete outcome data. VO2max at 6 months follow up was higher in the CR compared to UC group (mean difference: 7 ml/kg/min, 95% CI: 2 to 11, p = 0.005). Compared to baseline, improvements in overall and domain specific health-related on the WHO-QoL-BREF questionnaire, PHB-II assessed mental well-being below PHQ-9, and CHD risk factors (body mass index, blood pressure, HbA1C, lipids) were significantly greater (P < 0.05) for CR compared to UC group patients. Conclusions: The addition of a home-based CR programme of an educational booklet supported by healthcare professional telephone calls to usual care following CABG surgery was shown to provide important patient benefits compared to usual care alone. In the context of low or middle income countries, home-based CR programmes have been shown to be effective and feasible.
by catheterization and/or surgery. The most frequent symptoms at presentation were anterior chest pain (58.8%) and abdominal pain (26.5%). In 13.2% focal neurological signs were observed, and 25.6% had cardiopulmonary arrest. On admission 31.3% were hypotensive and 28.1% hypertensive. The first imaging test performed was transesophageal echocardiogram in 55.3% of the patients and the exam that confirmed the diagnosis was computed tomography in 81.6% and transesophageal echocardiogram in the remainder. The diagnosis was established less than 4 hours after admission in 53.6%. The main complications were moderate or severe aortic regurgitation in 18.2%, stroke in 13.2%, acute kidney injury in 35.3%, acute myocardial infarction in 10.5%, pericardial effusion in 54.5% and cardiac tamponade in 18.4%. 32.4% of patients required antihypertensive drugs and 12.5% vasopressor support. Percardioctenectomy was performed in 21.6% and emergent surgery in 68.4% (85.5% with type A AD). Among the non-operated patients, 25.0% died before surgery; 16.7% had uncomplicated type B AD, 16.7% were refused, 8.3% had major stroke with poor neurological prognosis, and in 33.3% the reason was unknown. Mortality at 30 days was 33.3%, at 1 year 45.2% and during the total follow-up (49.3±1169 days) 48.7%. There was a trend towards higher mortality in the non-operated patients (50.0 vs. 25.0%, p = 0.134). Focal neurological deficits (p = 0.022), hypotension at admission (p = 0.021) and the need for vasopressor support (p = 0.039) were identified as predictors of 30-day mortality. The independent predictors were the presence of focal neurological deficits (HR 7.0, 95% CI 1.4-34.1, p = 0.016) and hypotension at admission (HR 4.4, 95% CI 1.1-18, 4, p = 0.041).

Conclusion: AAS present more frequently with chest pain, however there are several forms of presentation, making this a challenging diagnosis. In this study 30-day mortality was high, and focal neurological deficits and hypotension were identified as independent predictors of mortality.

Effect of renin-angiotensin antagonist in patients with impaired renal function and heart failure: results from KorAHF registry

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On behalf of: KorAHF study investigators

Funding Acknowledgements: Korean National Institute of Health

Background: Renin-angiotensin-aldosterone system (RAAS) blockade with angiotensin converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB) is the corner stone in management of patients with heart failure. Some studies proposed the benefit of ACEI/ARB in patients with impaired renal function. However, side effects of those treatment may widely vary depending to the renal replacement therapy. Thus, renal replacement therapy can be important factor in expecting the benefit of ACEI/ARB. We aimed to analyze the different effect of early initiation of ACEI/ARB depending on renal replacement therapy in patients with impaired renal function and heart failure.

Methods: Among 5625 patients from the Korean Acute Heart Failure registry, 426 (7.6%) patients with creatinine clearance <30ml/min/1.73m2 were analyzed. One-year all-cause mortality was used to assess prognosis.

Results: A total of 143 (33.6%) deaths were observed during 1 year follow-up. Among the study cohort, 243 (57.0%) patients with impaired renal function were taking ACEI/ARB at the discharge. Kaplan-Meier survival analysis showed that 1-year mortality was 39.4% and 19.3% for patient with ACEI/ARB and without, respectively (p = 0.0186). ACEI/ARB was significantly related to better prognosis in patients with renal replacement therapy (hazard ratio [HR]=0.462 [0.256-0.835], p = 0.011), whereas it was not in patients without renal replacement therapy (HR 0.756 [0.540-1.421], p = 0.591) in adjusted models (p for interaction=0.045).

Conclusion: Early ACEI/ARB treatment in patients with renal impairment was related to better prognosis especially in patients with renal replacement. Cautions

Poster session 3
P1866

Influence of long-lasting treatment with ramipril and eprosartan on diastolic dysfunction and insulin resistance

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Funding Acknowledgements: Academy of Science of Moldova

Hypertensive heart disease (HHD) is a hallmark of target organ damages (TOD) in hypertension (HT) and often coexist with insulin resistance (IR). This “satellite conditions” determines reciprocal enhancement on TOD. Pharmacotherapy should aim both HHD and IR and RAAS inhibitors will be of peculiar utility in such conditions.

Methods: 101 hypertensives with HHD (HT) and DD were randomly assigned to two groups: R-gr, n=56, mean dose=15.3mg (±1.2mg/daily) or eprosartan (E-gr; n=45, mean dose=850 ±180mg). The threshold value for IR (HOMA-IR) was considered as >2.5.

Results: At baseline, group did not differ statistically with respect to clinic and indices of DD, as well as HOMA-IR values (p>0.05). At baseline, group did not differ statistically with respect to clinic and indices of DD, as well as HOMA-IR values (p>0.05). At baseline, group did not differ statistically with respect to clinic and indices of DD, as well as HOMA-IR values (p>0.05). At baseline, group did not differ statistically with respect to clinic and indices of DD, as well as HOMA-IR values (p>0.05).

Conclusion: The findings that both ACEI Ramipl and ARB Eprosartan progressively improve compromised diastolic function and insulin resistance, but with greater efficiency in the Eprosartan-mediated arm, probably due to additional sympatholytic effect of its moiety.

P1867

Real world experience of introducing the new heart failure drug LCZ 696 in ambulatory care setting

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Chronic heart failure (CHF) is associated with significant morbidity and mortality. It affects 120,000 people in the Republic of Ireland with the annual estimated cost of €660m to the State. Despite optimal evidence based care, patients continue to experience symptoms and require ambulant IV Frusemide and/or admission for decompensation. The PARADIGM trial reported superiority of LCZ 696 over Enalapril. LCZ 696 is a combined Angiotensin Receptor and Neprilysin Inhibitor (ARNI), reducing the risk of cardiovascular death and hospitalizations with a better tolerance profile. A total of 35 patients were commenced on LCZ 696 (average age 70.6 years, 60% males, 40% females, average EF# 24%, New York Heart Association (NYHA) II-III, NYHA IV (2)) since August 2015 to date. Patients were screened on criteria from the PARADIGM trial. A standardized protocol for commencement of the ARNI was introduced. A flush out period of 36 hours between the cessation of Angiotensin Converting Enzyme Inhibitor and initiation of LCZ696 was initiated. Patients were commenced on the lowest dose 24mg/26mg BD and were followed up closely for any signs of side effects such as hypotension and renal impairment. Of the 35 patients who commenced on LCZ 696, 26 patients tolerated the agent well with 10% of this cohort experiencing a 75 % fall in NT-pro BNP was observed in recurrance of atrial fibrillation (1) and decompensation (2). Creatinine levels remained unchanged in 54 % of the patients with 46% having an increase of between 10 and 20%. Summary This is a real world single center experience of the use of ARNI agent in the CHF population. While the patients were selected as per the PARADIGM study, only 6 patients were titrated to the dose achieved in the study. All patients reported feeling better with 5 patients on reduced diuretic doses and most patients maintaining stable renal function with modified responses in natriuretic peptides.

P1868

Changes in hemodynamic parameters and cerebral oximetry during head-up tilt test in heart failure patients: the HARVEST study

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On behalf of: HARVEST

Table P1866.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>6 months</th>
<th>12 months</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA vol index (mL/m2)</td>
<td>38.21 ± 2.53x88.71 ± 2.64</td>
<td>35.77 ± 1.89%</td>
<td>33.23 ± 1.45%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>WRT, ms</td>
<td>130.54 ± 12.74x105.33 ± 18.01</td>
<td>111.43 ± 8.84%</td>
<td>100.58 ± 5.37%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>DT, ms</td>
<td>263.09 ± 27.59x105.78 ± 33.09</td>
<td>200.35 ± 25.36%</td>
<td>172.58 ± 13.51%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>E/A ratio</td>
<td>0.67 ± 0.16x0.68 ± 0.29</td>
<td>0.76 ± 0.09%</td>
<td>1.12 ± 0.22%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>E/e' ratio</td>
<td>16.54 ± 0.34x16.97 ± 0.41</td>
<td>14.66 ± 0.74%</td>
<td>11.22 ± 0.81%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>HOMA IR</td>
<td>3.34 ± 0.09x3.93 ± 0.08</td>
<td>3.20 ± 0.02%</td>
<td>2.45 ± 0.07%</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>Mitral inflow patternDelayed relaxation, pts</td>
<td>53 (94.64%)</td>
<td>32 (57.14%)</td>
<td>20 (35.71%)</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>Pseudonormalisation</td>
<td>3 (5.76%)</td>
<td>2 (3.57%)</td>
<td>2 (3.57%)</td>
<td>R-gr/E-gr</td>
</tr>
<tr>
<td>Normal inflow pattern</td>
<td>--</td>
<td>22 (39.29%)</td>
<td>36 (64.29%)</td>
<td>R-gr/E-gr</td>
</tr>
</tbody>
</table>

Notes: *p < 0.001 from baseline

Baseline characteristics of groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Ramipl or ARB</th>
<th>Eprosartan or ARB</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>age (yr)</td>
<td>50.11 ± 6.79</td>
<td>53.04 ± 6.33</td>
<td>0.05</td>
</tr>
<tr>
<td>history of HT (months)</td>
<td>13.00 ± 1.95</td>
<td>13.41 ± 2.01</td>
<td>0.55</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>25 (51.79%)</td>
<td>20 (41.41%)</td>
<td>0.10</td>
</tr>
<tr>
<td>BNP (pg/mL)</td>
<td>201.3 ± 47.4</td>
<td>203.1 ± 47.94</td>
<td>0.31</td>
</tr>
<tr>
<td>BNP (ng/L)</td>
<td>106.25 ± 5.4</td>
<td>107.17 ± 6.2</td>
<td>0.21</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>76.5 ± 3.5</td>
<td>74.6 ± 3.54</td>
<td>0.27</td>
</tr>
<tr>
<td>BMI kg/m²</td>
<td>29.35 ± 1.31</td>
<td>25.41 ± 0.21</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>L' (mm/sec)</td>
<td>3.94 ± 0.05</td>
<td>3.88 ± 0.08</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>LVMi (g/m²)</td>
<td>140.42 ± 15.54</td>
<td>148.76 ± 10.95</td>
<td>0.45 ± 0.06</td>
</tr>
</tbody>
</table>

Fig 1: Baseline characteristics of groups
Aims: Circulatory adaptation to orthostatic stress in congestive heart failure (CHF) has been poorly investigated. We aimed to analyse changes in hemodynamic parameters and cerebral oxygenation in patients with CHF undergoing head-up tilt test (HUT).

Methods: Synchronized non-invasive beat-to-beat hemodynamic monitoring, ECG, peripheral oxygen saturation (SpO2) and near-infrared-spectroscopy (NIRS) were applied to measure hemodynamic changes and absolute frontal cerebral tissue oxygen saturation (BcSO2; normal range, 62-80%) during HUT. Forty-seven patients (mean-age: 71 ± 11 years, 79% male) with CHF, New York Heart Association (NYHA) class I–IV (n=1, II n=16, III=21, IV n=2) and mean ejection fraction (EF) 37 ± 15%, in stable condition were included in the analysis. Twenty-four patients met criteria for heart failure with reduced EF (HFREF), 9 had heart failure with preserved EF (HFpEF), and 8 had heart failure with mid-range ejection fraction (HFmEF). Differences in continuous variables were compared using Student’s t-test.

Results: After 3 min of HUT, both systolic (SBP, from 119 ± 23 mmHg to 123 ± 23 mmHg; p = 0.025) and diastolic blood pressure (DBP, from 64 ± 12 mmHg to 69 ± 14 mmHg; p < 0.001) significantly increased as also did heart rate (HR, from 70 ± 13 bpm to 73 ± 14 bpm; p = 0.012). In parallel, SpO2 decreased from 67 ± 5% to 62 ± 5% (p < 0.001). Only 3 patients (7%) met the diagnostic criteria of orthostatic hypotension.

Conclusions: Patients with CHF demonstrated increase in BP and HR paralleled by a significant drop in cerebral saturation during HUT. However, there were no symptoms of orthostatic intolerance reported, which suggests good orthostatic adaptation in patients with stable CHF.

P1869 Prognostic significance of myocardial energy expenditure and myocardial efficiency in patients with heart failure with reduced ejection fraction

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Introduction: In heart failure (HF) patients, myocardial blood flow (MBF), energy expenditure (MEE), and myocardial efficiency have been poorly evaluated because of the necessity of invasive procedures in the determination of these parameters. Transthoracic echocardiography (TTE) can provide reliable data for MEE, MBF (via coronary sinus (CS) flows). Also, myocardial efficiency can be evaluated by the MEE to MBF ratio.

Methods: The study included 80 patients with HF with reduced ejection fraction (LVEF < 45%), confirmed by clinical, laboratory and instrumental methods. 22 patients (27.5%) were included in the control group. MBF was calculated using 18F-FDG myocardial perfusion imaging (MPI) and indirect calorimetry. MEE was determined by indirect calorimetry. Energy expenditure and the prognostic value of these parameters in HF were evaluated.

Results: Median follow-up duration was 901 ± 361 days. MBF was calculated via coronary sinus blood flow. MEE was measured from circumferential end-systolic stress, stroke volume, and end-diastolic pressure. MBF and MEE were determined.

Conclusions: MBF was lower in HF group whereas MBF per 100 g left ventricular mass was not different.

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P1872  Hemodialysis induced alterations in coronary blood flow and cardiac function

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Heart failure develops in 20-25% of patients on chronic dialysis. Coronary flow reserve is reduced even in the absence of obstructive coronary artery disease in these patients. Sampling of coronary artery flow velocities is feasible using trans-thoracic Doppler echocardiography (TTE). Aim: To test the hypothesis that dialysis reduces coronary flow and alters cardiac function. Methods: Twenty five patients, age 71 ± 10yrs, 40% with heart failure were studied. TTE was performed before, during and immediately after hemodialysis. Doppler sampling of blood velocities in the left anterior descending coronary artery (LAD) was performed. Results: No ischemic or other serious event occurred during or after dialysis. During dialysis, left ventricular end-diastolic diameter, and velocities through the mitral and aortic valves decreased significantly. While right ventricular longitudinal function decreased significantly during dialysis, tricuspid and pulmonary valves velocities remained without change. Myocardial performance index did not change significantly. Diastolic blood velocity in the LAD decreased from 38 ± 12 to 31 ± 10 cm/sec, p < 0.001. LAD flow indices as well as myocardial oxygen demand indices decreased significantly keeping their ratio unchanged during dialysis. After dialysis, left atrial diameter and left ventricular diameters were smaller than before the procedure. Blood velocity parameters in the LAD were similar in those with and without heart failure. Similar changes in echo-Doppler parameters occurred in both groups during dialysis. Conclusion: Hemodialysis is associated with reduction in left side cardiac chamber diameters and velocities; coronary flow velocities is reduced but with maintenance of blood supply demand ratio and thus without ischemic events.

P1873  Percutaneous transarterial renal angioplasty in renovascular hypertension. Immediate results and in-hospital evolution

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Background: Worldh, it’s not defined the use of stents in all renal vascular hypertension etiologies and the independent variables to predict technical and clinical success. Objectives: To evaluate percutaneous renal artery intervention outcomes and in-hospital index of microcirculation. To identify the independent variables to predict technical and clinical success.

Methods: Eighty eight procedures were analyzed and subdivided into: Group A (n=25), between 1981 and 1992, when the stent was not available; and Group B (n=63), between 1993 and 2006, using balloon and/or stent. The procedures were also grouped by the two principal etiologies: atherosclerosis (n=68) and fibromuscular dysplasia (n=11). Results: Age and ostial lesion were higher in Group N. Technical success of 98.4% versus 84.0% in N and A group, respectively (p=0.0216), with similar and favorable in-hospital evolution. Pre and post procedure systolic arterial pressures were similar in both groups. Diastolic arterial pressure lower in group N. When the atherosclerotic and fibromuscular dysplasia groups were compared: age and ostial lesion were higher in former with similar technical success, in-hospital evolu- tion and pre and post procedure systolic and diastolic arterial pressure in both groups. The systolic and diastolic arterial pressures dropped significantly between pre-procedure and hospital discharge period both etiology, atherosclerotic and fibromuscular dysplasia groups.

Conclusion: Technical success was higher in percutaneous renal artery inter-ventions after the introduction of stents. A balloon angioplasty for fibromuscular dysplasia and, the possibility of implanting a stent for atherosclerotic etiology, constitute efficient renal vascular hypertension treatment.
Background: During pregnancy cardiovascular system undergoes complex changes including cardiac function and remodeling, left ventricle (LV) hypertrophy, as well as changes in systemic vascular resistance, secondary to growing uterine circulation.

Purpose: The aim of this study was to evaluate the changes in cardiac remodeling, function and systemic vascular resistance throughout gestation in obese pregnant women in comparison to pregnant women with normal weight.

Methods: We conducted a prospective cohort study, which included consecutive 23 obese, pregnant women with singleton pregnancy and 40 pregnant women with normal weight [control group] (mean age 29.1 ± 1.1 vs. 31.1 ± 0.8 respectively). Subjects with any cardiovascular disease, history of hypertension, diabetes mellitus, obesity or pre-existing cardiac disease were excluded.

Results: Blood pressure, heart rate and diastolic blood pressure were higher in obese pregnant women group in comparison to control group (82.6 ± 7.5 mm Hg respectively, p = 0.016), as well low LV cardiac index (LVI) (2.5 ± 2.6 L/min/m², p = 0.006) and increased LV mass index (LVMi) (64 ± 59 g/m², p = 0.047). There was no differences in SVR and PI. At V2, systolic diabetic and diastolic arterial pressure were higher than in control group (119 ± 111 mmHg; p = 0.017, 79 ± 68 mmHg; p < 0.001, 92 ± 82 mmHg; p < 0.001, respectively). SVR and PI were increased (1498 ± 1264 dyn·cm⁻²·m⁻¹, p = 0.015, 0.68 ± 0.58 m·s⁻¹, p = 0.034, respectively). LVCW was lower (2.7 ± 3.0 L/min/m²; p = 0.033), in contrast to LVMi (68 ± 63 g/m²; p = 0.042). We observed no differences in LVEF at both visits in study groups, whereas end-systolic wall stress (EWS) (Figure 1) was significantly increased in obese women at V2 (43 ± 39, 103 dyn/cm²; p < 0.001). What is more, ESS at V2 was positively correlated with LVMi (r = 0.432, p = 0.001) and PI (r = 0.357; p = 0.01), also measured at V2.

Conclusions: 1. In obese pregnant women we observed higher blood pressure, systolic vascular resistance and PI in uterine arteries, especially between 25 and 30 weeks of gestation. 2. Myocardial function in these women, expressed by end-systolic wall stress (ESS), LVCW and LVMi is impaired.

Background: Metabolic syndrome (MS) is a pandemic, encompassing a number of cardiovascular risk factors that, together, are associated with a particularly somber prognosis. We looked into the prevalence of MS in a CR population and its effect on response to CR.

Methods: We retrospectively analyzed data from a prospective cohort of pts referred to CR within 3 months after ACS and calculated the prevalence of MS as defined by the AHA and related societies in 2009. We then evaluated how this group’s response to CR differed from that of pts without MS. Logistic regression and independent samples t-test were used for the statistical analysis.

Results: From a total of 809 pts with available data, 305 (37.7%) met the criteria for MS; these pts were more frequently female (20.3 vs 11.7%, p = 0.001) and older (mean age 56 vs 53 years, p < 0.001) comparing to pts without MS. Pts with MS were more likely to not complete the CR program, with and odds ratio of 1.74 (95% CI: 1.13-2.67, p = 0.011). While exercise capacity, assessed by treadmill stress test at baseline and at 3 months follow-up, was also significantly worse in pts with MS, both groups showed significant improvement; indeed, MS pts actually showed a greater relative increase (91 vs 25%, p = 0.013). Regarding secondary prevention targets at 1 year of follow-up, according to AHA guidelines, both groups achieved similar proportions of smoking cessation, physical activity, HDL cholesterol, triglycerides and glycaemic control, but blood pressure (86.2 vs 96.5%, p < 0.001) and body mass index (BMI, 23.4 ± 52.9%, p = 0.001) targets were less frequently attained in MS pts.

Conclusions: Metabolic syndrome is frequent in cardiac rehabilitation patients, but in our cohort they nevertheless showed a greater relative improvement in exercise capacity and similar risk factor profile control compared to those without MS, with the exception of blood pressure and BMI. These findings make it all the more relevant that MS pts seem to abandon the CR program more frequently and they should encourage us to further investigate this association and develop tools to oppose this trend.

Background: Diabetes mellitus is an important independent factor in developing diastolic dysfunction. Diastolic dysfunction comprises about 30 to 50% of all patients hospitalized for heart failure. The aim of this study was to determine the correlation between glycemic status and left ventricular diastolic function in type 2 diabetes patients.

Methods: Our study included 100 subjects, 20 normal healthy subjects, 80 known to be diabetic patients presented in our diabetic outpatient clinic and echocardiographic unit at Al-Hussein University Hospital between November 2010 and June 2011. The patient were classified according glycaemic status in to three groups: Group I: Diabetic patients with controlled blood sugar. Group II: DM patients with uncontrolled blood sugar. The two groups had been subjected to the following diagnostic workup: Full medical history, full clinical examination, laboratory assessment, twelve lead resting ECG, Stress ECG, Echocardiography study, Traditional Tissue Doppler imaging. Assessment of global longitudinal strain. Patients with IHD, Systolic dysfunction, CHD, Valvular, Pericardial, primary, major systemic disease had been excluded.

Results: There was no statistically significant difference between the two groups as regard LVEF, LVEDD and LV EF%. There was statistically significant difference between the three groups as regard LA dimension mean E wave, mean of A wave mean of E/A ratio, mean of DT, mean of nVFT, mean of EEm degree of diastolic dysfunction. There was negative correlation between HbA1c level and E wave, E/A, EEm and positive correlation with LA dimension, A wave, nVFT, DT and EEm.

Conclusion: The Glycemic status is well correlated with severity of diastolic dysfunction in asymptomatic type 2 diabetic patients. Tissue Doppler imaging has been shown to be more sensitive and more independent for assessment of diastolic function in asymptomatic type 2 diabetic patients and its results are significant correlated with glycemic state.
P1879
Prevalence and characteristics of diabetes mellitus and insulin resistance in heart failure patients across Europe. A report of the 1st Postgraduate Course in Heart Failure of the HFA.

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On behalf of: 1st Postgraduate Course in Heart Failure of the Heart Failure Association

Introduction: Glucose metabolism abnormalities are common in heart failure with reduced ejection fraction (HFrEF), and adversely influence long-term prognosis. An increasing interest is focused on the recognition of overt diabetes mellitus (DM) and of insulin-resistance (IR) in HFrEF patients to improve therapeutic management and prognosis.

Purpose: Aim of the present report was to analyse the prevalence and characteristics of these conditions in HFrEF patients enrolled across Europe.

Methods: Six HFrEF specialists from 6 European countries (1 from Austria, 1 from France, 2 from North Italy, and 2 from South Italy) were involved in patients’ enrolment. In particular, they enrolled consecutive HFrEF patients seen from November 2016 to January 2017 fulfilling the subsequent criteria: 1) age ≥18 years; 2) EF ≤40%; 3) stable clinical conditions; 4) HF diagnosis since at least 6 months; 5) no acute coronary syndrome in the previous 3 months. On the same day patients underwent venous blood sample collection to assess fasting glucose, fasting insulin and glycated hemoglobin. IR was assessed through the evaluation of HOMA-IR, calculated by the formula [fasting Glucose (mM/mL) x fasting Insulin (mIU/L)/22.5], and the presence of IR was defined as HOMA-IR value >2.5.

Results: Two hundred twenty-two HFrEF patients were included in the analysis (72.5% M, mean age 66.5 ± 12.4 years, mean EF 30.9 ± 6.7%). The etiology of HF was ischemic in 131 (59%) patients, an idiopathic dilated cardiomyopathy in 75 (33.8%) subjects, and in the remaining cases other causes were identified; 71% of patients were in NYHA class I-II and 29% in NYHA III. Eighty patients (36%) exhibited DM (93.7% type2DM, 6.3% type1DM) with no significant differences among countries (47 vs. 37 vs. 34% in Austria, France and Italy, respectively; p=ns). Mean fasting glycemia was 141 ± 44 mg/dl, mean HbA1c 7.5 ± 1.7%, and mean fasting insulin 20 ± 22 µUI/ml. 34% were on treatment with oral antidiabetics alone, 20% with oral antidiabetic plus insulin, 21% with insulin alone, and the remaining patients were on diet control. HF was of ischemic etiology in 76% of cases, and an adequate, however not optimal HF therapy was prescribed (59% ACE-i or ARBS, 74% beta-blockers, 40% MRAs, 12% LCZ696). As regards IR, among non-diabetic patients the prevalence of IR was 46% with mean HOMA index of 3.1 ± 2.8, mean fasting glycemia of 95 ± 23 mg/dl and mean fasting insulinemia of 12 ± 10 µUI/ml. HF was of ischemic etiology in 55% of cases and HF treatment was not optimal also in this group (65% ACE-i or ARBS, 73% beta-blockers, 30% MRAs, 0% LCZ696).

Conclusions: Diabetes mellitus and insulin resistance are common comorbidities of European HFrEF patients with similar distribution across countries and still not optimal HF treatment. More efforts are required to prompt recognize glucose metabolism abnormalities in HF and to optimize HF management in these subgroups to improve patients’ quality of life and long-term prognosis.

P1880
Sex differences in diabetic patients from the ASIAN-HF registry

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On behalf of: ASIAN-HF investigators

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Background: Diabetes mellitus (DM) portends a greater risk of heart failure (HF) in women than men. However little is known about sex differences in the association of DM with quality of life (QoL) and outcomes in HF, particularly in Asia.

Aims: To examine sex differences in clinical correlates, QoL, and 1-year composite outcome (all-cause mortality or HF hospitalization) in diabetic Asian patients with HF.

Methods: In the ASIAN-HF Registry, a prospective multinational study of symptomatic HF across 11 Asian regions, we compared diabetic women vs men using WHO BMI cut-offs for Asians (lean : BMI <23; obese : BMI ≥27.5 kg/m2) and the Kansas City Cardiomyopathy Questionnaire (higher scores reflecting better QoL).

Results: Among 5255 Asian patients with HF (mean age 58.9 ± 13.1, 78% men), the prevalence of DM was similar in men (43%) and women (42%). Clinical correlates of DM in both men and women were older and hypertension (in 67% DM in men and 68% of DM in women). When adjusted for age and BMI, the odds of ischaemic aetiology was greater in DM men than women [OR=1.9 (95% CI 1.6-2.4) and OR 2.5 (95% CI 2.9-3.0) in non-DM men vs women respectively; p-interaction =0.206]. In contrast, the odds of chronic kidney disease (CKD) was higher in DM women than men (OR=1.6 (95% CI 1.3-2.1) and OR=1.1 (95% CI 0.9-1.4) in non-DM men vs women respectively; p-intersection =0.018). Among lean patients, 37% men and 31% women had DM (p=0.026). Higher BMI was related to increased odds of DM, and this relationship was modified by sex [interaction=0.014]. Adjusting for age and comorbidities, compared to BMI 18.5-23 kg/m2, the odds of diabetes increased in women above BMI ≥23 kg/m2 and in men above BMI ≥27.5 kg/m2 (Figure). QoL was poorer in diabetic women than men (overall score 60.4 ± 23.0 vs 63.1 ± 23.6, p=0.045), particularly in the physical limitation domain (61.5 ± 27.3 vs 67.3 ± 25.9, p<0.001) and self-efficacy (60.3 ± 28.1 vs 66.9 ± 25.8, p<0.001). Adjusting for age and comorbidities, DM was associated with higher hazards of 1-year composite outcome in women than in men [HR=2.1 (95% CI 1.5-3.1) vs HR=1.4 (95% CI 1.2-1.8) respectively; p-intersection=0.002].

Conclusions: Diabetes is highly prevalent in Asian men and women with HF, even in the absence of obesity, and impacts QoL and 1-year mortality/morbidity outcomes in Asian women than men.
Background: conventional echocardiography at rest provides little information regarding the presence of coronary artery disease in patients suspected of suffering from stable angina pectoris. Longitudinally oriented myocardial fibers are located subendocardially, the area most susceptible to ischemia, that is why measurements of longitudinal motion and deformation may be the most sensitive markers of CAD. Using 2D strain image, myocardial deformation imaging based on 2-D longitudinal peak systolic strain analysis may differentiate between ischemic segments and non ischemic segments as compared with SPECT MPI.

Methods: Application of Dipirydamoole stress Tc99m MIBI SPECT in patients with heart failure and reduced ejection fraction and suspected coronary artery disease

Conclusions: Using of 2DSE at rest is not inferior to the use of MPI in the non-invasive diagnosis of CAD, myocardial deformation imaging based on 2-D longitudinal peak systolic strain analysis may differentiate between ischemic segments and non ischemic segments as compared with SPECT MPI.

Background/Introduction Clinical presentation of acute myocarditis is non-specific. Its diagnosis is challenging because of the overlap with acute myocardial infarction. MRI is nowadays a valuable imaging tool to make an accurate diagnosis of acute myocarditis.

Purpose: The purpose of this work is to describe MRI findings and left ventricle function in acute myocarditis.

Methods: Retrospective review of MRI data of 17 patients referred to imaging department of our institution between June 2015 and December 2016 for high clinical suspicion of acute myocarditis. All exams were performed with a 1.5 T machine. The protocol included STIR, first pass perfusion, early and late enhancement sequences.

Results: Among the 15 patients, 9 (6 men and 1 women) had a positive MRI. Their mean age was 32.2 years. All of them had non-specific chest pain, 7 had a history of recent respiratory tract infection, and 6 had elevated troponins and electrocardiographic modifications. Edema presenting as myocardial high signal on STIR sequences was found in 5 patients. Early (on first pass perfusion and/or early enhancement sequence) and late gadolinium enhancement were found in all patients.

Conclusions: Cardiac MRI is an accurate tool to diagnose acute myocarditis, evaluate the lesions distributions and the left ventricle function.
Background: The total atrial conduction time can be measured as the time from the onset of the P wave on the ECG to the peak of the A wave recorded at the mitral annulus using tissue Doppler imaging (A-P TDI). A long P-A TDI predicts incident atrial fibrillation (AF) in the general population; however, it has only received little attention in patients with heart failure (HF).

Purpose: We studied the clinical associations and the predictive role of P-A TDI measured in ambulatory patients with a broad range of HF severity.

Methods: We retrospectively measured P-A TDI interval in ambulatory patients with HF and sinus rhythm enrolled in the "Studies Investigating Co-morbidities Aggravating Heart Failure" (SICA-HF) programme.

Results: P-A TDI measured at the lateral mitral annulus was an independent predictor of cardiovascular death, non-fatal myocardial infarction and percutaneous or surgical revascularization. The total atrial conduction time can be measured as the time from the onset of the P wave on the ECG to the peak of the A wave recorded at the mitral annulus using tissue Doppler imaging (A-P TDI). A long P-A TDI predicts incident atrial fibrillation (AF) in the general population; however, it has only received little attention in patients with heart failure (HF).

Conclusion: Measuring P-A TDI interval identifies ambulatory patients with HF at higher risk of dying or developing AF during follow-up.

About 71% of the patients performed SE with dobutamine and 29% with diprydiamole. Patients with LVSD (n = 228; 29.7%) were predominantly males (78%) with a mean age of 65 ± 12 years. Of the patients analyzed 42% had mild left ventricular function depression, 32% moderate and 26% severe, with an average value of fraction ejection of 38%. SE was positive in 17% of patients. The average follow-up time was 30.7 ± 19.7 months, events occurred in 24% of patients, with an average time to the first event of 195 days. SE presented a sensitivity of 38.9% and specificity of 89.9% for prediction of events in patients with LVSD, with a positive predictive value of 55.3% and a negative predictive value of 82.2%. Event-free survival in patients with positive SE was significantly lower than in patients with negative SE (47 ± 4 months vs. 60 ± 2 months, p = 0.004).

In the univariate analysis, the result of SE was a predictor of events. However, after multivariate analysis only the development of symptoms during SE (p < 0.001) and chronic kidney failure (p = 0.038) were considered independent prognosis predictors in patients with LVSD.

Patients with preserved left ventricular function (LVF) (n = 540, 70.3%) were male in 56.6% of the cases and had a mean age of 65 ± 11 years. The average value of fraction ejection during ejection was 62%. SE was positive in 10.7% of the patients. The events occurred in 7.8% of the cases, with an average time to the first event of 312 days. Event-free survival in patients with positive SE was significantly lower than patients with negative result (62 ± 3 months vs. 64 ± 2 months, p < 0.001). In the patients with preserved LVF, a positive result in SE (p < 0.001) and a higher number of modifiable vascular risk factors were identified as independent prognosis predictors (p = 0.003).

Conclusion: The result of SE was identified as independent prognosis predictor in patients with preserved LVF, but not in patients with LVSD.

P1887 Contribution of echocardiographic 2D strain analysis to the long-term follow-up of heart transplant patients

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Background: Few studies have evaluated the potential role of 2D strain for the long-term follow-up of heart transplant patients.

Aims: We evaluated the diagnostic and prognostic contribution of echocardiographic 2D strain analysis to the long-term follow-up of heart transplant patients.

Methods: The study population consisted of a cohort of 162 heart transplant patients followed-up at an hospital, France. Donor characteristics, as well as clinical, biological and echocardiographic data were collected. Patients with acute allograft rejection were excluded from the analysis. The 2D strain data was acquired by the same operator in all patients. For statistical analysis, we considered that strain was altered when ≥ -15%, according to the literature. Cardiovascular events (congesive heart failure, arrhythmias, high-degree conduction disturbances) were assessed in a subgroup analysis.

Results: Data of strain was available in 105 patients. The average strain was -15.8 ± 3.6%, strain was ≥ -15% in 22.8% of the patients. Patients with altered strain were treated with higher dosages of loop diuretics (185 ± 138 mg/day vs. 43 ± 27 mg/day; p = 0.005) and were more frequently dialysed (20 % versus 4 %; p = 0.005). Furthermore, these patients had decreased markers of systolic function such as altered S wave in DTI at the tricuspid ring (8.6 ± 1.9 cm/s versus 9.6 ± 2.0 cm/s, p = 0.038), lower subaortic and subpulmonary velocity time integrals (13.8 ± 3.8 cm/s versus 16.6 ± 3.8 cm/s, p = 0.003 and 13.6 ± 4.4 cm/s versus 15.7 ± 3.6 cm/s, p = 0.041, respectively). Strain was more altered in patients who experienced cardiovascular events (-14.1 ± 4.0 % versus -16.2 ± 3.5 %, p = 0.024).

Conclusion: 2D strain alteration seems to be a marker of chronic cardiac graft dysfunction and may be a useful tool for the management and follow-up of heart transplant patients.

P1888 Automatic 3D echocardiography for left ventricular ejection fraction assessment in daily clinical practice: the present and the future

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Aims: To identify prognosis predictors were collected demographic, clinical, electrocardiographic and echocardiographic data. A combined endpoint of cardiovascular events was defined, consisting of cardiac death, non-fatal myocardial infarction and percutaneous or surgical revascularization.

Results: The sample included 789 patients, 65% males, average age 64 ± 11 years. Automatic 3D echocardiography for left ventricular ejection fraction assessment in daily clinical practice: the present and the future
**Introduction:** The 2D echocardiography (2DE) is the most commonly employed technique for left ventricular ejection fraction (LVEF) quantification. Although the gold-standard in this issue is the cardiac magnetic resonance (CMR), however, its high costs and low availability does not allow becoming the routine technique for LVEF assessment. Inter and intra-observer variability for LVEF quantification could be improved by new fully automated systems for 3D echocardiography (Auto3DE), and could be an interesting tool for the heart failure outpatient clinic.

**Methods:** Prospective observational study that analysed 27 patients referred to our institution for LVEF assessment by CMR. In all patients LVEF was also quantified by Auto3DE and 2DE. Simultaneously we evaluated the feasibility of the Auto3DE in other 81 consecutive patients.

**Results:** Mean age was 49.8 year-old. The most frequent indications for CMR were hypertrophic cardiomyopathy (15.38%), infectious myocarditis (15.38%) and congenital heart disease (23%). The analysis of the left ventricle volume (LVV) and LVEF was 5 times faster by Auto3DE than 2DE, and 10 times faster than CMR (Table 1). Only 35% of the Auto3DE required image edition by a cardiologist during the analysis, compared to the 91% with the 2DE. End-diastolic and end-systolic volumes measured by Auto3DE were significantly closer to CMR measurements than 2DE. Even though LVEF assessment with Auto3DE was lightly overestimated, its correlation with CMR was better (Spearman’s rho: 0.54) than with 2DE (Spearman’s rho: 0.48). Auto3DE was feasible in 70 of the 81 patients (86.5%) and the main limitation was its dependence on acoustic window.

**Conclusion:** Auto3DE is much faster than other commonly used techniques for LVV and LVEF measurement, with an acceptable accuracy compared with CMR. We could consider it as a useful tool for daily clinical practice.

<table>
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**P1889**

**Orthostatic systolic blood pressure reaction is associated with cardiac remodeling in a heart failure population - The HARVEST study**

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**Background:** Orthostatic hypotension (OH) is a sign of autonomic dysfunction and a common comorbidity in patients with heart failure (HF). We aimed to assess relations between orthostatic blood pressure (BP) responses and echocardiographic changes in a series of patients admitted for HF.

**Methods:** One-hundred-and-forty-nine patients hospitalized for HF (age 74±7 years, menopause duration 3.8±2.4 years) and 61 women with natural menopause (46.2±4.7 years, menopause duration 4.3±2.1 years). All patients underwent general clinical examination, ambulatory blood pressure monitoring (Cardiotens-01, Meditech, Hungary) with circadian profile type evaluation, echocardiographic examination with systolic and diastolic left ventricular function assessment. Statistical methods such as Cruskell-Walles criteria and χ2 test were used.

**Results:** The prevalence of hypertension in women with natural and surgical menopause was the same: 45.9% (28 pts) and 42.3% (60 pts), respectively (p>0.05). Postmenopausal women, regardless of the presence of hypertension, have different types of circadian BP profile: 105 pts were dippers, 51 pts were over-dippers, 52 pts had no nighttime BP reduction (49 pts were non-dippers and 3 pts were night peakers). Only 39 postmenopausal women (19.2%) had normal LV geometry; 89 pts (45.8%) demonstrated LV concentric hypertrophy, 57 pts (28.1%) – concentric remodeling and 18 women (9%) – eccentric hypertrophy. The frequency of LV concentric hypertrophy in hypertensive postmenopausal women was wider than in normotensive ones: 60.2% (53 pts) vs 31.3% (36 pts), p<0.005, while normotensive postmenopausal women more often demonstrated LV concentric remodeling (33.9% (39 pts) vs 20.5% (18 pts), p=0.042) and LV normal geometry (23.5% (27 pts) vs 12.5% (11 pts), p<0.034). The presence of eccentric hypertrophy was the same in both groups. Nobody of included postmenopausal women had LV systolic function failure. Presence of LV diastolic function disturbance did not depend on BP level: 56.8% (52 pts) in hypertensive and 59.1% (68 pts) in normotensive women, p=0.118. Patients with LV concentric hypertrophy had LV diastolic dysfunction in 84.3% cases (75 pts); with LV concentric remodeling – in 52.6% cases (30 pts), with LV eccentric hypertrophy – in 31.6% cases (6 pts), this difference was statistically significant. Maximum prevalence of LV concentric hypertrophy was registered in the group of over-dippers – 52.9% (27 pts); in non-dippers/night peakers it was 28.8% (15 pts), in dippers – 47% (47 pts), p<0.05. The frequency of concentric remodeling formation was maximal in non-dippers/night peakers (48.1%, 25 pts), which was significantly greater than the specified index in dippers (15%, 15 pts, p<0.001) and overdippers (33.4%, 17 pts, p<0.001).

**Conclusions:** LV remodeling regularities in postmenopausal women depend on BP level and circadian BP profile type. LV diastolic function evolution for the most part depends on LV remodeling type, but not on arterial hypertension presence.

**P1890**

**Left ventricular remodeling in normotensive and hypertensive postmenopausal women**

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**Aim:** To assess changes of left ventricle (LV) structure and function in postmenopausal women depending on hypertension presence and blood pressure (BP) circadian profile type.

**Methods:** 203 postmenopausal women were included in the investigation: 142 women with surgical menopause (44.3±5.4 years, menopause duration 3.8±2.4 years) and 61 women with natural menopause (46.2±4.7 years, menopause duration 4.3±2.1 years). All patients underwent general clinical examination, ambulatory blood pressure monitoring (Cardiotens-01, Meditech, Hungary) with circadian profile type evaluation, echocardiographic examination with systolic and diastolic left ventricular function assessment. Statistical methods such as Cruskell-Walles criteria and χ2 test were used.

**Results:** The prevalence of hypertension in women with natural and surgical menopause was the same: 45.9% (28 pts) and 42.3% (60 pts), respectively (p>0.05). Postmenopausal women, regardless of the presence of hypertension, have different types of circadian BP profile: 105 pts were dippers, 51 pts were over-dippers, 52 pts had no nighttime BP reduction (49 pts were non-dippers and 3 pts were night peakers). Only 39 postmenopausal women (19.2%) had normal LV geometry; 89 pts (45.8%) demonstrated LV concentric hypertrophy, 57 pts (28.1%) – concentric remodeling and 18 women (9%) – eccentric hypertrophy. The frequency of LV concentric hypertrophy in hypertensive postmenopausal women was wider than in normotensive ones: 60.2% (53 pts) vs 31.3% (36 pts), p<0.005, while normotensive postmenopausal women more often demonstrated LV concentric remodeling (33.9% (39 pts) vs 20.5% (18 pts), p=0.042) and LV normal geometry (23.5% (27 pts) vs 12.5% (11 pts), p<0.034). The presence of eccentric hypertrophy was the same in both groups. Nobody of included postmenopausal women had LV systolic function failure. Presence of LV diastolic function disturbance did not depend on BP level: 56.8% (52 pts) in hypertensive and 59.1% (68 pts) in normotensive women, p=0.118. Patients with LV concentric hypertrophy had LV diastolic dysfunction in 84.3% cases (75 pts); with LV concentric remodeling – in 52.6% cases (30 pts), with LV eccentric hypertrophy – in 31.6% cases (6 pts), this difference was statistically significant. Maximum prevalence of LV concentric hypertrophy was registered in the group of over-dippers – 52.9% (27 pts); in non-dippers/night peakers it was 28.8% (15 pts), in dippers – 47% (47 pts), p<0.05. The frequency of concentric remodeling formation was maximal in non-dippers/night peakers (48.1%, 25 pts), which was significantly greater than the specified index in dippers (15%, 15 pts, p<0.001) and overdippers (33.4%, 17 pts, p<0.001).

**Conclusions:** LV remodeling regularities in postmenopausal women depend on BP level and circadian BP profile type. LV diastolic function evolution for the most part depends on LV remodeling type, but not on arterial hypertension presence.
Patients with right ventricular systolic dysfunction had significantly dilated heart failure. Patients with acute dyspnea, in two thirds of cases it coincided with chronic left heart failure. Patients with medically controlled arterial hypertension had significantly reduced LV ejection fraction (LV EF). Patients with acute dyspnea, in two thirds of cases it coincided with chronic left heart failure. Patients with medically controlled arterial hypertension had significantly reduced LV ejection fraction (LV EF). In patients with RVSD probability to have LVEF <40% was 48.5% (p < 0.001), and BNP level <100 ng/l = 47.76% (p = 0.006). Heart failure. Patients with acute dyspnea, in two thirds of cases it coincided with chronic left heart failure. Patients with medically controlled arterial hypertension had significantly reduced LV ejection fraction (LV EF). In patients with RVSD probability to have LVEF <40% was 48.5% (p < 0.001), and BNP level <100 ng/l = 47.76% (p = 0.006).

**P1891**

Characteristic echocardiographic parameters of right ventricular systolic dysfunction in acute dyspnea patients

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On behalf of: GREAT network Funding Acknowledgements: The work was supported by the Research Council of Lithuania, grant Nr. MIP-049/2015 and approved by Lithuanian Bioethics Committee, Nr L-15-01.

Introduction: There is still a discussion about the best echocardiographic parameters of acute right ventricular systolic dysfunction (RVSD) in acute settings. Aim: To estimate the prevalence and to characterize RVSD by novel ultrasound markers of acute right ventricular systolic dysfunction (RVSD) in acute settings. Methods: For estimation of RVSD, echocardiographic parameters were collected using ultrasound equipment (Vivid S6, GE Medical Systems, USA). RVSD was defined as reduced FAC (fractional area change), RV basal diameter, RV systolic function, indexed right ventricular mass, and RV ejection fraction (EF). Results: Of 323 patients (mean age 64.1 ± 12.7 years, 39.3% women) were analyzed. Echocardiography focused on RV parameters. RVSD was present in 87 patients (26.9%) with a median FAC of 29.2% (IQR 17.7-47.2). The prevalence of RVSD in acute dyspnea patients was 26.9%. Conclusion: RVSD is a common finding in acute dyspnea patients and can be estimated using novel ultrasound markers of acute right ventricular systolic dysfunction.

**P1892**

Ejection fraction of the left atrium in patients with medically controlled arterial hypertension compared to subjects with prehypertension and normotensive healthy controls

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Very important markers of cardiac dysfunction and predictors of adverse cardiovascular outcome are size and volume of the left atrium (LA).

Objective: To estimate the prevalence and to characterize RVSD by novel ultrasound markers of acute right ventricular systolic dysfunction (RVSD) in acute settings.

Methods: For estimation of RVSD, echocardiographic parameters were collected using ultrasound equipment (Vivid S6, GE Medical Systems, USA). RVSD was defined as reduced FAC (fractional area change), RV basal diameter, RV systolic function, indexed right ventricular mass, and RV ejection fraction (EF). Results: Of 323 patients (mean age 64.1 ± 12.7 years, 39.3% women) were analyzed. Echocardiography focused on RV parameters. RVSD was present in 87 patients (26.9%) with a median FAC of 29.2% (IQR 17.7-47.2). The prevalence of RVSD in acute dyspnea patients was 26.9%. Conclusion: RVSD is a common finding in acute dyspnea patients and can be estimated using novel ultrasound markers of acute right ventricular systolic dysfunction.

**P1893**

Association between in-hospital variation of natriuretic peptides and short term outcomes in patients hospitalised for worsening chronic heart failure

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On behalf of: FERRIC RO investigators Background: There is a large body of evidence suggesting that variation from admission to discharge of N-terminal prohormone brain natriuretic peptide...
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The present study suggests that the variation of NTproBNP from discharge of NTproBNP during hospitalization: group A characterised by reduction in NTproBNP by >30%, group B characterised by reduction of NTproBNP <30% and group C consisting of patients with increased levels of NTproBNP. The study outcomes were 3-month all-cause mortality and HF-rehospitalisation.

Results: The demographic and clinical characteristics of patients stratified by in-hospital variation of NT-pro-BNP are shown in the Table 1. The 3-month all-cause mortality rates were 8.9% vs. 10.1% vs. 13.7% (p = 0.08), while the 3-month HF rehospitalisation rates were 13.7% vs. 16.7% vs. 21.5% (p < 0.001), relationships between log BNP levels and the mortality risk were comparable among the HFrEF, HfNfEF, and HfNfEF groups. The CART analysis showed that BNP levels of 28.6, 103, 332 pg/ml were the optimal cut-offs to discriminate the mortality risk of the patients. Based on these BNP cutoff levels, we divided BNP levels into 4 categories; < 30, 30-99, 100-299, and >300 pg/ml. As compared with patients with BNP levels < 30 pg/ml in HfNfEF and HFrEF had comparable mortality risk (hazard ratio (HR) 1.2, P=0.80 and HR 0.87, P=0.45 for HfNfEF and HFrEF, respectively) and those with BNP levels >300 pg/ml had comparably increased mortality risks among patients with HfNfEF (HR 2.5, 4.7 and 7.8, respectively), HfNfEF (HR 2.1, 4.2 and 7.3, respectively), and HfNfEF (HR 3.0, 4.8 and 9.4, respectively) (Figure).

Conclusion: These results indicate that plasma BNP levels have comparable prognostic impacts among patients with HfNfEF, HfNfEF, and HFrEF.

Figure. Mortality risks among HfNfEF, HfNfEF, and HFrEF

P1895

Plasma B-type natriuretic peptide level is useful to predict incidence for both types of heart failure with and without left ventricular systolic dysfunction in the general population

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1Iwate Medical University, Morioka, Japan; 2Iwate Health Service Association, Morioka, Japan; 3Research Institute of Strategy for Prevention, Tokyo, Japan

On behalf of: Iwate Heart Registry Consortium

Aim: It remains unknown whether the predictive abilities of plasma B-type (BNP) are viable for either heart failure (HF) with preserved ejection fraction (HfPcEF) or with reduced ejection fraction (HfNfEF) in the general middle-aged and elderly population.

Methods: Participants were recruited from the general population (n = 14,141; mean age=63 years). A Cox regression analysis adjusting for traditional risk factors (age, sex, BMI, hypertension, diabetes, atrial fibrillation, eGFR, smoking) was performed to examine the hazard ratio (HR) of plasma BNP for each type of HF. Moreover, receiver-operating-characteristics (ROC) analysis were used to determine the predictive abilities of plasma BNP for the incidence of two types of HF.

Results: During a median follow-up of 9.0 years, new onset of HF (defined by Framingham criteria) was found in 142 participants (HfNfEF, n = 74; HfNfEF, n = 68) in the cohort. The HRs for both HF in terms of per one standard deviation (1 SD) increment (as a continuous variable) and values above the 80th percentile (as a categorical variable) of plasma BNP were significantly associated with both types of HF (HfNfEF; HR = 3.44 per 1SD, HR = 4.45 at 80th percentile; HfNfEF; HR = 7.79 per 1SD, HR = 5.93 at 80th percentile). Moreover, plasma BNP concentration showed optimal predictive abilities for both types of HF (area under curve of ROC analysis: HfNfEF=0.81, HfNfEF=0.80 (Figure). In addition, plasma BNP level for the optimal sensitivity and specificity to predict HfNfEF or HfNfEF was similar (54 pg/ml vs 57 pg/ml).

Conclusion: This study showed that plasma BNP level is a valid predictor for incidence of HF regardless of preserved or reduced left ventricular systolic function in this population.

Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>An=84</th>
<th>Bn=39</th>
<th>Cn=15</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>69±4</td>
<td>72±3</td>
<td>73±4</td>
<td>0.067</td>
</tr>
<tr>
<td>Gender - female</td>
<td>31%</td>
<td>34%</td>
<td>36%</td>
<td>0.09</td>
</tr>
<tr>
<td>Ischemic etiology</td>
<td>59%</td>
<td>63%</td>
<td>63%</td>
<td>0.34</td>
</tr>
<tr>
<td>Left ventricular ejection fraction (%)</td>
<td>38±12</td>
<td>36±12</td>
<td>38±10</td>
<td>0.08</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>29%</td>
<td>39%</td>
<td>33%</td>
<td>0.11</td>
</tr>
<tr>
<td>eGFR (ml/min/1.73m²)</td>
<td>59±18</td>
<td>55±22</td>
<td>50±17</td>
<td>0.004</td>
</tr>
<tr>
<td>Serum sodium (mmol/L)</td>
<td>133±8</td>
<td>133±9</td>
<td>132±8</td>
<td>0.072</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>39%</td>
<td>43%</td>
<td>42%</td>
<td>0.50</td>
</tr>
</tbody>
</table>
| eGFR=estimated glomerular filtration rate. Values are expressed as mean±SD or %.

On behalf of: The CHART-2 Study

Background: Although the usefulness of plasma levels of B-type natriuretic peptide (BNP) has been established to estimate the prognosis of patients with heart failure (HF), it remains to be examined whether BNP levels predict the prognosis of HF patients regardless of left ventricular ejection fraction (LVEF). In the past, only one preliminary study showed that, for a given BNP level, the prognosis was comparable between patients with HF with preserved LVEF (HfPcEF) and those with HF with reduced LVEF (HfNfEF), warranting a further validation study with a large number of patients.

Purpose: To examine the usefulness of plasma BNP levels for long-term risk stratification among HfPcEF, HF with mid-range LVEF (HfNfEF), and HfNfEF patients.

Methods: The CHART-2 (Chronic Heart Failure Analysis and Registry in the Tohoku District 2) Study is a large-scale prospective observational multicenter cohort study in Japan, in which a total of 10,219 patients with chronic HF or those at high risk for HF were enrolled between 2006 and 2010 and have been prospectively followed up. In the present study, we analyzed the data of 4,301 consecutive Stage C/D HF patients registered in the CHART-2 Study (mean 69 years, male 68% who were divided into HfPcEF (LVEF>50%, N=2,893), HfNfEF (LVEF 40-49%, N=715), and HfNfEF (LVEF <40%, N=693) groups. We performed the Cox proportional hazard models to compare the prognostic impacts of BNP categories among the 3 groups. BNP categories were determined based on the BNP cutoff levels that were indicated to most efficiently discern the mortality risk by the classification and regression trees (CART) analysis.

Results: A total of 1,435 all-cause deaths occurred during the median 6.3-year follow-up. Although median BNP levels were significantly increased from HfPcEF to HfNfEF, and then to HfNfEF patients (653, 327 and 216 pg/ml, respectively, P < 0.001), relationships between log BNP levels and the mortality risk were comparable among the HfPcEF, HfNfEF, and HfNfEF groups. The CART analysis showed that BNP levels of 28.6, 103, 332 pg/ml were the optimal cut-off levels to discriminate the mortality risk of the patients. Based on these BNP cutoff levels, we divided BNP levels into 4 categories; < 30, 30-99, 100-299, and >300 pg/ml. As compared with patients with BNP levels < 30 pg/ml in HfNfEF and HfNfEF had comparable mortality risk (hazard ratio (HR) 1.2, P=0.80 and HR 0.87, P=0.45 for HfNfEF and HfNfEF, respectively) and those with BNP levels 30-99, 100-299 and >300 pg/ml had comparably increased mortality risks among patients with HfNfEF (HR 2.5, 4.7 and 7.8, respectively), HfNfEF (HR 2.1, 4.2 and 7.3, respectively), and HfNfEF (HR 3.0, 4.8 and 9.4, respectively) (Figure).

Conclusion: These results indicate that plasma BNP levels have comparable prognostic impacts among patients with HfPcEF, HfNfEF, and HfNfEF.
Unbalanced plasma catestatin and norepinephrine predicted adverse outcomes of chronic heart failure

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Background: Catestatin (CST) is a vasopeptide with a broad spectrum of activities in cardiovascular system. The level of plasma CST increased in chronic heart failure patients. And plasma CST increased with NYHA classification escalated with possible protective effect through down-regulation of sympathetic stress. CST might act as a novel biomarker in heart failure. Whether the unbalanced sympathetic status indicated by plasma CST and norepinephrine (NE) related adverse prognosis of heart failure patients, however, is unknown.

Purpose: To investigate the potential predictive ability of ratio of plasma CST and NE on outcomes of heart failure patients.

Methods: We established a chronic heart failure patient cohort of 202 cases who admitted for exacerbation in our center. Plasma CST of these patients was measured with enzyme-linked immune-absorbent assay at admission. After a mean 52.5 months’ follow-up, major cardiac adverse events including readmission of heart failure, cardiovascular death and all-cause death were collected. The relationship between ratio of plasma CST and NE level and occurrence of adverse events were analyzed.

Results: There were 117 cases of readmission, 59 cases of all-cause deaths at the end of follow-up, and among them included 49 cases of cardiac deaths. Neither average plasma CST nor NE level was found to have statistical differences between patients with or without readmission. The levels of plasma CST were higher in patients with all-cause death and cardiac death than in survivors (1.360±1.82 pg/ml vs. 0.750±1.12 pg/ml, p=0.005 and 1.180±1.63 pg/ml vs. 0.750±1.12 pg/ml, p=0.002, respectively). However, there was no significant difference between plasma NE in patients with cardiac or all-cause death and survivors. In univariate Logistic regression, higher plasma CST and NE ratio predicted increased risk of all-cause and cardiac death, the hazard ratio (HR) was 1.221 (95% CI, 1.009-1.479, p=0.041) and 1.210 (95% CI, 1.001-1.464, p=0.049), respectively. In multivariate Logistic regression, after adjusted for covariates including age, gender, NYHA function class, eGFR, usage of diuretics, CCB, pulmonary artery pressure, plasma albumin level, plasma CST to NE ratio was not an independent risk factor for cardiac death. For all-cause death, plasma CST to NE ratio was not an independent risk factor, either.

Conclusions: Elevated plasma NE was common in heart failure patients and might indicate for chronic sympathetic activation with little fluctuation. Thus NE alone might not be a good predictor for adverse outcomes. Plasma CST has been known to elevate with the severity of heart failure. And the ratio of CST and NE might be a more sensitive predictor for all-cause and cardiac deaths in heart failure patients and reflect the compensatory mechanisms activated in exacerbation of heart failure. Further studies are needed to understand the effect of CST in heart failure.

Association between NT-proBNP and metabolic status in young healthy adults.

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Introduction: The B type natriuretic peptide plays an important role in regulating blood pressure, blood volume, and water and salt balance. The association between N-terminal pro-B type natriuretic peptide (NT-proBNP) and metabolic risk factors is still unclear. It has been suggested that obese individuals have reduced natriuretic peptide levels. The prevalence of obesity and other cardiometabolic disturbances among young adults has increased over the past decade. The aim of this study was to investigate the correlation between NT-proBNP and metabolic risk factors in young apparently healthy adults.

Methods and materials: We investigated 282 healthy young adults, mean age 18.5±1.7 years, 47% male. NT-proBNP, waist circumference, body mass index (BMI), fasting plasma glucose, insulin resistance (HOMA-IR) and lipid profile were measured.

Results: NT-proBNP level was 58±2.39 pg/ml (4±13 m). Multivariate regression analysis showed a positive association between NT-proBNP levels and fasting plasma glucose (p=0.013), NT-proBNP and high-density lipoprotein (p=0.01). There was no association between NT-proBNP and BMI, waist circumference, triglycerides, LDL cholesterol, insulin resistance.

Conclusions: Hypoglycemia is a risk factor most closely associated with a damage to cardiac function. It may be the main target in the prevention of cardiovascular diseases in young adults.
Background: Data on usefulness of Galectine-3 (gal-3) and ST-2 biomarkers in the prognostic evaluation of patients with chronic heart failure (HF) are less than those for natriuretic peptides.

Objective: aim of this study was to assess the plasma levels of BNP, ST-2 and Gal-3 in HF patients referred to our center, and to estimate their prognostic value in relation to cardiovascular mortality over a 20-month follow-up period.

Methods: From March 2014 to July 2016 we assessed BNP, ST-2, Gal-3 in 124 patients with known diagnosis of HF referred to our clinic and receiving optimal treatment according to ESC guidelines. Patients (63% males, 66% ischemic etiology) were 76.0±9.6 years old, with advanced NYHA class (60% II-IV), high rate of CRT/ICD implantation (53%) and reduced FE (41.3±13.3%).

Results: During follow-up (12.2±6.8 months, no data censored), 20 patients died for cardiovascular diseases (16%). We used ROC curves to establish optimal cut-off values in terms of sensibility/specificity for each biomarker, i.e. 412 ng/L (61%/79%), 29.9 ng/L (55%/76%) and 19.7 ng/L (85%/66%) for BNP, ST-2 and Gal-3, respectively. By using these cut-off values, we built Kaplan-Meier survival curves (p<0.01 for all, Log-rank test analysis). Through a Cox regression model the estimated Hazard Ratios (HRs) for cardiovascular mortality were 5.24, 8.13 and 10.00 for BNP, ST-2 and Gal-3, respectively.

Conclusions: Our data indicate possible cut-off values of BNP, ST-2 and Gal-3 for the prognostic stratification of patients with chronic heart failure, and suggest the potential role not only of BNP but also of Gal-3 and ST-2 in the management of HF patients. Our results need to be confirmed in the context of longitudinal studies of larger dimensions.

Poster session 3

P1999 BNP, Galectine-3 and ST-2 cut-off values for long term risk assessment in chronic heart failure patients

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P1900 Markers of inflammation are associated with arterial stiffness in young healthy subjects

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Plasma levels of circulating inflammatory molecules, such as high sensitive C-reactive protein (hs-CRP), interleukin-6 (IL-6), fibrinogen (FIBG) have been shown to be predictive of future cardiovascular disease (CVD). Chronic inflammation may impair vascular function and lead to an increase of arterial stiffness, an important determinant of cardiovascular risk. The role of arterial stiffness in the development of heart failure was demonstrated recently. There are some studies demonstrated the association between arterial stiffness, measured as increased pulse wave velocity (PWV), increased central blood pressure (BPc), and markers of inflammation in elderly people, in subjects with hypertension, rheumatologic diseases. Nowadays there are no enough data about relationship between increased arterial stiffness (early vascular aging) and inflammation in young healthy people.

Material and methods: To explore the relationship between markers of inflammation (hs-CRP, IL-6, FIBG) with arterial stiffness, we studied 258 healthy young adults, mean age 18.8±1.6 years old, 47% male, PWV and BPc were measured with an ambulatory blood pressure monitoring device BPLab Vasotens (BPLab, Russia) and related to plasma levels of inflammatory markers measured by ELISA.

Results: PWV was significantly related to plasma hs-CRP (r=0.14, P<0.05), FIBG (r=0.26, P<0.001). There was also a relationship between systolic BPc to hs-CRP (r=0.28, P<0.001), FIBG (r=0.25, P<0.001) and diastolic BPc to hs-CRP (r=0.20, P<0.001), FIBG (r=0.17, P<0.01). There was no significant association between IL-6 and arterial stiffness. hs-CRP was an independent predictor of PWV and systolic BPc in a multiple stepwise regression model.

Conclusions: Inflammation may be involved in arterial stiffening even in healthy young adults. Anti-inflammatory strategies may, therefore, be of benefit in reducing early vascular aging.

P1901 C reactive protein and procalcitonin elevation are related to NT pro BNP increase, diabetes and LP(a) values in acute coronary syndromes

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1Sapienza University of Rome, Department of Clinical and Molecular Medicine/Cardiology, Rome, Italy; 2Sapienza University of Rome, Department of Clinical and Molecular Medicine, Rome, Italy

Introduction: The role of Procalcitonin (PCT) and C Reactive Protein (CRP) in Acute Coronary Syndromes (ACS) is not clear. PCT is an inflammatory molecule released both during infections and other acute inflammatory conditions, CRP is a component of the immunitory system, raising in the circulatory system in pathological events (bacterial infections, ischemic events, multiple trauma and major surgery). As atherosclerosis has an inflammatory component, CRP has been considered an important marker and/or factor of atherosclerosis disease.

Purpose: In order to investigate the relationship between CRP and PCT and NT-proBNP we have studied these proteins in a population of patients with ACS.

Methods: In our prospective study we have analysed 575 patients at admission in our Coronary Intensive Care Unit for ACS confirmed by laboratory analysis, ECG, echocardiogram and a coronary angiography. Patients with infections were excluded. We divided our population into four groups, according to the levels of PCT and CRP and at admission: Group 1 PCT+CRP+, Group 2 PCT+/CRP+, Group 3 PCT-/CRP+, Group 4 PCT- and CRP normal. In particular we evaluated in these groups the distribution of the levels of NT-proBNP, diabetes and LP(a).

Results: In Group 1 NT-proBNP (845.85 pg/ml) and LP(a) (30.25 mg/dl) were more elevated. In comparison with Group 2 (521.35 pg/ml NT-proBNP and 25.45 mg/dl LP(a), Group 3 (273.70 pg/ml NT-proBNP and 19.70 mg/dl LP(a) and Group 4 (329 pg/ml NT-proBNP and 19.25 mg/dl LP(a). In Group 1 there were 34% diabetes patients, 28% in Group 2, 29% in Group 3, 21% in Group 4.

Conclusions: Our results suggest that PCT and CRP are particularly elevated in patients with a larger ventricular impairment, as measured by NT-proBNP levels. In our population elevated to levels of LP(a) are related to patients with known diagnosis of HF.

Our data suggest that PCT and CRP can be considered as stress proteins that rise in patients with increased myocardial damage.

P1902 Elevated Levels of urinary 8-oxo-7,8-dihydroguanosin in hospitalized patients with heart failure

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Funding Acknowledgements: Funding the National Key Technology Support Program of china. Research subject number: BJ-2012-143

Background: Oxidative stress is known to play a crucial role in the pathogenesis of heart failure. 8-oxo-dihydroguanosin (8-oxoGsn) is the product of oxidative RNA damage and has high concentration in urine. Recent researches showed that RNA oxidation played an important role in the pathogenesis of many diseases, such as Parkinson, Alzheimer’s disease, coronary atherosclerosis and diabetes. However, there is no report on correlation between 8-oxoGsn and heart failure.

Purpose: To investigate whether urinary 8-oxoGsn, a product of oxidative RNA damage, is a clinically useful biomarker for the severity of heart failure and oxidative stress levels in failing hearts.

Methods: We enrolled 149 hospitalized heart failure patients from March 2014 to January 2016. collected clinical data and liquid chromatography tandem mass spectrometry (LC-MS/MS) method established by our laboratory was used to detect the levels of 8-oxoGsn in urine after admission, which was adjusted by creatinine content. Age and sex matched healthy subjects n=155 were enrolled as the control group. We measured serum NT-proBNP, D-dimer, hemoglobin, interleukin-6 and creatinine, and LVEF were evaluated by echo.

Results: Compared with the control group, the level of 8-oxoGsn in patients with heart failure was significantly increased [4.68 3.47 6.62 VS. 2.75 2.59 2.85 P=0.001] (Figure 1). We divided the patients with heart failure into two groups at LVEF of 45%, 88 patients with EF<45% and 74 patients with EF ≥45%. There was no difference of 8-oxoGsn levels in these two groups[4.02 3.31 5.88 VS. 4.90 3.44 7.67 P=0.082] (Figure 1). Correlation analysis showed that 8-oxoGsn level was positively correlated with NT-proBNP and D-dimer and negatively correlated with hemoglobin and creatinine clearance (table 1).

Funding the National Key Technology Support Program of China. Research subject number: BJ-2012-143
Conclusion: Patients with heart failure had high level 8-oxoGsn in urine, and had independent positive correlation with NT-proBNP, which was an index of ventricular stretch and synthesized in response to wall stress. 8-oxoGsn is a clinically useful biomarker to evaluate the severity of HF as well as the status of oxidative stress in patients with HFrEF and HFpEF.

**Correlation analysis of 8-oxoGsn**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pearson or Spearman coefficient</th>
<th>Pvalue</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT-proBNP</td>
<td>0.224</td>
<td>0.008</td>
</tr>
<tr>
<td>D-dimer</td>
<td>0.333</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hb</td>
<td>-0.187</td>
<td>0.027</td>
</tr>
<tr>
<td>eGFR</td>
<td>-0.284</td>
<td>0.001</td>
</tr>
<tr>
<td>LVEF</td>
<td>0.098</td>
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**Introduction:** Markers of endothelial function including endothelin-1 (ET-1), nitric oxide (NO) metabolites (nitrate and nitrite) and asymmetric dimethylarginine (ADMA) have been identified as potent predictors of outcome in multiple heart failure models. Cardiovascular surgery in patients with heart failure with reduced ejection fraction (HFrEF) requires precise evaluation of risks and benefits and is still in need of early predictors of acute heart failure and other complications in postoperative period.

**Methods:** We aimed to assess the dynamics of endothelial function markers (NO metabolites, ADMA, ET-1) during coronary artery bypass grafting (CABG) in patients with heart failure with reduced ejection fraction to estimate their significance as predictors of acute heart failure and other complications in postoperative period.

**Results:** The Group II patients presented with significantly lower levels of NOx.total (U=124.4, p=0.006), nitrite (U=102, p=0.001) and nitrate (U=145, p=0.016) than Group I at the end of the surgery compared to baseline. In Group II end-surgery nitrite level was independently associated with acute heart failure incidence after surgery (U=32.5, p=0.013).

**Conclusion:** Decline of nitrite level by the end of the surgery was regarded as an important predictor of complicated course of postoperative period in HFrEF patients.
P1905
HscCRP in patients with heart failure and its associations with outcome
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Background: Markers of inflammation, including high sensitivity C-reactive protein (hsCRP), are often raised in patients with heart failure (HF); however, little is known about the associations between hsCRP and outcome.

Methods: The prognostic value of hsCRP was studied in consecutive referrals with suspected HF to a specialist clinic serving a local community of 500,000 people; HF was defined as symptoms or signs with either a reduced left ventricular ejection fraction (LVEF < 45%) or left ventricular systolic dysfunction- mild on visual estimate if LVEF could not be calculated) or raised amino-terminal pro-B type natriuretic peptide (NT-proBNP > 220 pg/mL).

Results: Of 4463 patients, 3473 fulfilled the criteria for HF. The median (IQR) hsCRP was 4.2 (1.7-9.1) mg/L and 3.9 (1.6-8.8) mg/L in patients with HF and reduced, or preserved LVEF (p = 0.18), and 2.9 (1.3-5.3) mg/L in those who did not fulfill criteria for HF (p = 0.12). Among HF patients in the lowest hsCRP range (9-299 mg/L) were older, had more symptoms and clinical signs of congestion, and higher plasma NTproBNP than those in the lowest quartile (< 0.7 mg/L). HF was an independent predictor of mortality, and identify patients with more severe congestion and higher hsCRP.

Correlation between biomarker has showed direct dependency in patients with chronic heart failure.

Conclusion: In patients with HF, higher plasma concentrations of hsCRP are a powerful predictor of mortality, and identify patients with more congestion and higher natriuretic peptides, but who are also more likely to die of non-cardiovascular causes.

P1906
Correlation in biomarkers in patients with chronic heart failure accompanied with depressive disorders.

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The aim of our research is to study correlation in biomarkers in patients with chronic heart failure (CFH) accompanied with depressive disorders. For conducting this research 107 CHF patients were involved. The patients were examined with: clinical methods; psycho-diagnostic methods (Hamilton Depression Rating Scale (HDRS), Beck Depression Scale (BDS)); State-Trait Anxiety Inventory (STAI); Quality of Life Test); ELISA – to estimate levels of tumor necrosis factor α (TNF-α) and transforming growth factor -β1 (TGF-β1), levels of serotonin, melatonin, adiponectin, noradrenalin, cortisol. The data were analyzed by descriptive statistical methods.

The results that we got showed that in 47% of CHF patients clinical and psychopathological signs of severe depression and moderate depression were observed. In 10% of CHF patients with severe depressive average indicators of HDRS was 28.5 ± 0.7, indicators of BDS – 19.3 ± 0.3, state and trait anxiety indicators of STAI were 46.3 ± 0.3 and 47.5 ± 0.3 respectively. In 37% of CHF patients with moderate depression average indicators of HDRS was 24.5 ± 0.6, indicators of BDS – 16.3 ± 0.3, indicators of STAI were 32.3 ± 0.3 and 33.5 ± 0.3. In other 53% CHF patients mild depression or absence depression were observed (HDRS < 9.5, BDS < 10.3, STAI < 25.3, ± 0.3 and 28.5 ± 0.3 respectively).

In the CHF accompanied with severe depression levels of serotonin, melatonin, adiponectin were lower than in group of CHF patients with moderate depression and in group of CHF with mild depression or absence depression. Serotonin: 101.1 ± 0.8 ng/ml, 112.1 ± 0.6 ng/ml, 167.7 ± 0.8 ng/ml; Melatonin: 13.6 ± 1.4 ng/ml, 13.9 ± 2.1 ng/ml, 14.8 ± 1.6 ng/ml; Adiponectin: 30.3 ± 7.6 pg/ml, 32.1 ± 8.7 pg/ml, 39.1 ± 8.8 pg/ml respectively. Levels of noradrenalin and cortisol were vice versa higher in groups of SD and MD. Noradrenalin: 410.1 ± 0.2 to 0.9 µg/ml, 363.1 ± 0.10 µg/ml, 210.9 ± 8.9 µg/ml; cortisol: 501 ± 1861.1 nmol/l, 473 ± 1694.9 nmol/l, 363.7 ± 78.0 nmol/l respectively.

The main levels of TGF-β1 and TNF-α were significantly higher in CHF in patients with severe depression and moderate depression (Severe - 56.7 ± 0.4 pg/ml and 55.4 ± 6.4 pg/ml; Moderate: - 78.35 ± 0.4 pg/ml and 44.46 ± 3.23 pg/ml) in comparing with CHF with mild or absence depression (42.3 ± 3.7 pg/ml and 27.2 ± 1.21 pg/ml).

Conclusion: Correlation between biomarker has showed direct dependencies between CHF and depression. CHF patients with severe depression and moderate depression characterized by higher indicators of TNF-α and TGF-β1 and leads to more quick development of cardiac hypertrophy and diastolic dysfunction in comparing with CHF patients with mild depression or absence depression.

P1907
Low circulating hepcidin as a measure of iron deficiency in patients with acute and stable heart failure
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Funding Acknowledgements: Financially supported by the National Science Centre (Poland) grant allocated on the basis of the decision number DEC2013/ 05/E/NS5/00980.

Background/Introduction: Hepcidin is a key regulator of systemic iron metabolism. Its elevated level might be involved in pathophysiology of iron deficiency (ID) in some chronic diseases accompanied by inflammation, such as heart failure (HF). There is a scarcity of data on circulating hepcidin level and its relationship with other markers of ID in patients with HF.

Methods: We analyzed data of 291 patients with stable HF (85% men, mean age: 61 ± 11 years, NYHA III: 34%, LVEF: 26 ± 7%) and 166 patients with acute HF (81% men, mean age 65 ± 12 years, NYHA III-IV: 34%, LVEF: 32 ± 7%) and 66 healthy controls (77% men, mean age 60 ± 11 years, HFRE: 64 ± 7%). Sera from all patients were analysed for hepcidin-25 by ELISA validated with a gold standard for hepcidin assessment, liquid chromatography mass spectrometry (LCMS).

Results: Serum hepcidin levels were: 39.6 (27.6 - 61.4) ng/mL (median with lower/upper quartiles) in the control group, 17.7 (8.8 - 45.3) ng/mL, and 57.3 (30.5 – 116.2) ng/mL in all patients in acute and stable HF respectively. In patients with ID as compared to those with optimal iron level hepcidin concentration was significantly lower in acute HF – 11.0 (3.2 – 35.6) ng/mL versus 28.3 (13.3 – 48.7) ng/mL, p < 0.001, and stable HF – 27.1 (15.6 – 58.4) ng/mL versus 76.2 (42.3 – 131.2) ng/mL, p < 0.001. For diagnosis of ID in stable HF group hepcidin < 31.223 ng/mL had a sensitivity of 59% and specificity of 88% and the area under the receiver operating characteristic (ROC) curve was 0.78 ± 0.03 (95% CI, 0.721-0.839). In acute HF group hepcidin < 7.998 ng/mL had sensitivity and specificity respectively 48% and 90% and area under ROC curve was 0.703 ± 0.045% (95% CI, 0.623-0.783). Serum hepcidin levels were significantly correlated with ferritin (R=0.55, p < 0.0001 for both acute and stable HF) and transfamin saturation (R= 0.26, p < 0.009, only for acute HF), and significantly negatively correlated with STR level (R=-0.37, p < 0.0001 only for acute HF).

Conclusion: Hepcidin concentration is markedly diminished in patients with ID and HF and particularly low in patients with acute HF. Serum hepcidin level might be a useful marker of iron status in patients with HF.
VEGF-A gene was performed by polymerase chain reaction with the electrophoretic pattern detection of result. CIMT was assessed sonographically using GE Vivid 7 with 13 MHz.

**Results:** The study results were shown that in patients with CHF GG genotype polymorphism -634 G/C (rs2010963) of the VEGF-A gene was dominated. The VEGF level was significantly higher in patients with the GG genotype – 545.2970.5, 626.4 pg/ml comparing with the CG genotype – 232.4[17.5; 394.8] pg/ml and the genotype CC – 216.9[17.6; 253.8] pg/ml (p < 0.05). There was no significant differences of the VEGF level among patients with the genotype GG and CC (p=0.05). CIMT assessment has shown that among patients with GG genotype CIMT indicator was significantly higher 1.17 (0.94; 1.25) mm compared with the CC genotype – 0.98 (0.93; 1.04) mm (p=0.05). There was no significant differences comparing the results of these indicators in CG genotype patients – 1.08 (0.96; 1.11) mm (p=0.05).

**Conclusion:** It was found that level of VEGF and the CIMT were significantly higher among patients with the GG genotype polymorphism -634 G/C (rs2010963) of the VEGF-A gene compared with genotypes CC and CG patients. The relationship between the level of VEGF-A, the representatives of GG genotype polymorphism -634G/C (rs2010963) of the VEGF-A can be regarded as predictors of carotid intima media thickening in patients with CHF.

**P1909**

**5-year prognostic value of different parameters from routine hemogram in patients with idiopathic dilated myocardopathy and severe systolic dysfunction referred to a heart failure unit**

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**Introduction:** We analyze the 5-year prognostic value of several parameters from routine hemogram in patients referred for evaluation for non-emergent heart transplantation in our Heart Failure Unit.

**Methods:** From 2009 to 2011, 87 patients with dilated myocardopathy and LVEF <30% were evaluated. Exclusion criteria included coronary artery disease, primary valvulopathies or hypertrophic or restrictive myocardopathies after echocardiogram, coronaryography and cardiac hemodynamics. Evolution after 5 years showed that 49 patients remained in good functional class (group A, 57%), while 38 patients were transplanted or died (group B). We analyzed next parameters from routine hemogram (and indexes derived from them): RDW (red blood cell distribution width), neutrophil count, lymphocyte count, neutrophil/lymphocytes ratio (NLR) and platelet count. Finally, as part of the BIOSTAT-CHF Scotland Study, NLR and platelet count were chosen for creating the CPNR score, choosing a cut-off value of NLR and platelet count at 3 and 275 respectively. Thus, a patient with both elevated NLR (>3) and platelet count (>275) was allocated a score of 2 (CPNR 2), and a patient shown one or neither was allocated a score of 1 (CPNR 1) or 0 (CPNR 0), respectively.

**Results:** Median RDW values were 13.9 in group A and 16.3 in group B (p < 0.001). Mean neutrophil count was 5.50 and 6.30, respectively (NS). Mean lymphocyte count was 2.22 and 1.64, respectively (p < 0.05) while NLR was 3.32 and 4.06 (p < 0.05). Finally, CPNR didn’t show statistical differences between groups.

**Discussion:** In patients with idiopathic dilated myocardopathy and severe systolic dysfunction referred to a Heart Failure Unit, RDW, neutrophil count and neutrophils/lymphocytes ratio show statistically significant differences between patients with good and bad prognosis at a 5-year follow-up.

**Conclusion:** Basic hemogram can be a rapid and available biomarker that could potentially help in risk stratification of CHF patients.
3. It was determined that IO is decreased in patients with HF.

1. The association between IFR and VEGF-A levels, parameters of fraction (r=0.33, p=0.007) was revealed. IFR level associated with RI (r=0.307; p=0.022). We found a strong positive correlation between RI and ejection fraction (r=0.57; p=0.02). We also found a negative correlation with LVEF (rs=-0.57; p=0.02). There was no association between bsST2 levels and the time needing vasoactive support or non invasive mechanical ventilation, bsST2 did not correlate with NT-proBNP levels, renal function or inflammatory parameters like C-reactive protein or procalcitonin.

Conclusion: This study demonstrates that a different expression of SERCA2a occurs in rejecting allograft patients, not only at the tissue level but also in the serum, showing their potential role as non-invasive biomarker in heart transplant rejection.

P1914

Soluble ST2 in bronchial aspirates of patients with severe respiratory insufficiency and its correlation with acute heart failure

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Background: Recent studies have demonstrated plasma soluble ST2 (sST2) to be a strong predictor of cardiovascular outcomes in acute heart failure (AHF). However, the main sources of sST2 are not completely known. The aim of this study was to investigate the presence of sST2 in bronchial aspirates of patients with severe acute respiratory insufficiency and its clinical correlates.

Methods: 34 patients (aged 63 ±16 years, 61% male) with acute respiratory insufficiency (ARI) requiring intubation were included. Bronchial aspirates and blood samples were obtained at the moment of intubation. sST2 levels were measured using an ELISA assay. ARI etiology was classified as cardiogenic (AHF) or non-cardiogenic. Clinical and laboratory data were also recorded.

Results: sST2 was detected in bronchial aspirates median 6 [IQR 2.6–72.2] ng/ml. Patients with AHF had showed higher bronchial bsST2 levels (bsST2 median 12 [IQR 2.6–15.4] ng/ml) vs those with non-cardiogenic causes of respiratory failure (n=22, median 3.8 [IQR 1.9–16.2] ng/ml) (p=0.02). We found a negative correlation between bsST2 levels and the time needing vasoactive support or non invasive mechanical ventilation, bsST2 did not correlate with NT-proBNP levels, renal function or inflammatory parameters like C-reactive protein or procalcitonin.

Conclusion: sST2 is present in bronchial aspirates from patients with severe ARI showing higher levels in those with AHF. bsST2 correlates with cardiac function, metabolic stress and cellular damage.

P1915

Mass spectrometry for detection heart failure with preserved ejection fraction

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Funding Acknowledgements: This study was supported by Russian Academy of Science

Background: Heart failure (HF) remains the leading cause of poor prognosis and death in developed countries. Early and reliable diagnosis of HF is a relevant and practically significant problem. Numerous prognostic markers of death and HF hospitalization have been identified in patients with HF. However, their clinical applicability is limited and precise risk stratification in HF remains challenging. The diagnosis of HF with preserved ejection fraction (HF-PEF) is still difficult.

Purpose: The purpose of this study was to investigate the correlation between acetone in exhaled breath and N-terminal pro-B type natriuretic peptide concentration in patient with HF-PEF.

Methods: Of 84 patients evaluated between October 2014 and April 2016, 56 patients (HF group) fulfilled inclusion criteria and were compared with healthy subjects (control group, n=8). Patients with HF were grouped according to ejection fraction (HF-PEF, n=26; HF with reduced ejection fraction (HF-REF), n=30) and submitted to exhaled breath collection. Identification of volatile organic compounds

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Background/Introduction: Soluble ST2 (sST2) is a biomarker of left ventricular (LV) remodelling, and it has been shown to be a predictor of adverse outcomes in heart failure. Focal myocardial fibrosis (FMF) detected by means of delayed enhancement (DE) cardiac magnetic resonance (CMR) has been proposed as a marker of advanced stage and worse prognosis in patients with severe aortic stenosis (AS).

Purpose: To evaluate the association of sST2 levels and the presence, distribution and severity of FMF in patients with severe AS.

Methods: A consecutive series of 79 patients with symptomatic AS and referred for aortic valve replacement, were prospectively studied with CMR on a 1.5T scanner, obtaining T1 mapping sequences before and 15 minutes after the administration of gadolinium, following a 5H-MOLLI protocol in the ventricular short axis. Blood samples were taken for determination of sST2 levels and other biochemical parameters.

Results: FMF was detected in 42 patients (53%). Patients with FMF showed significantly higher levels of sST2 than patients without FMF (34.6 ± 7.6 vs 17.9 ± 5.6; p < 0.0001). Intramyocardial and subendocardial fibroses was detected in 23 and 19 patients respectively. Independently of the severity of AS, patients with FMF have higher LV mass (predominantly those with intramyocardial FMF), and LV volume, and less LV ejection fraction (predominantly in those with subendocardial FMF). sST2 levels were higher in patients with Intramyocardial FMF. There was a positive correlation between sST2 levels and LV end-diastolic volume (r=0.53, p < 0.0001) and LV mass (r=0.28; p=0.0037). Similarly, there was a positive correlation between sST2 levels and FMF mass (r=0.43; p < 0.0001).

Conclusion: In patients with symptomatic AS, there is a relationship between sST2 levels and FMF evaluated by CMR, and between sST2 levels and morphological LV alterations. sST2 may be a prognostic marker of LV remodelling in patients with AS.

P1917
Serum ST2 levels are associated with myocardial fibrosis in severe aortic stenosis
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Methods: 53 patients with HF NYHA II-III were enrolled into single-centre prospective cohort study. Patients underwent echocardiographic evaluation of cardiac structure as well as systolic and diastolic function. Plasma levels of galectin-3 and NT-proBNP were assayed at baseline and at the day of discharge, using enzyme-linked immunosorbent assays. The Mann-Whitney U test was used to compare differences between two independent groups. The relationship between galectin-3 levels and other variables of interest was analyzed using Pearson (Spearman for non-parametric data) correlation analysis. A P < 0.05 was regarded as statistically significant. All patients were assigned to receive heart failure standard therapy that included ACEi/ARB, BB, loop diuretics and spironolactone.

Results: Galectin-3 plasma levels significantly decreased after holding standard treatment (ΔGalectin-3 at discharge vs baseline = -2.30 ± 0.79 vs -3.37 ± 0.69 respectively; P=0.001). In contrast, NT-proBNP levels increased significantly in the above mentioned period (ΔNT-proBNP at discharge vs baseline = 505 ± 161 vs 256 ± 152 respectively; P<0.0001). The analysis of the association of galectin-3 levels and other variables of interest revealed a significant correlation between galectin-3 levels and plasma levels of NT-proBNP and troponin I, as well as with left ventricular mass index and apical E’/E’ ratio. Galectin-3 plasma levels significantly decrease after holding standard treatment in patients with severe aortic stenosis.
therapy of heart failure (< 0.001). Decrease of galectin-3 plasma levels was observed in 84.3% of patients. Changes in galectin-3 levels positively correlated with changes in scale of evaluation of clinical state in CHF (as modified Murray YY 2003) (r = 0.5, p < 0.1). NT-proBNP plasma levels also decreased at the end of the treatment (p < 0.003). Decrease was observed in 84.2% of patients.

**Conclusions:** In a small cohort of patients plasma galectin-3 and NT-proBNP levels have decreased after holding of standard heart failure therapy. Changes of galectin-3 levels positively correlated with changes in clinical state of CHF.

**NT-proBNP and galectin-3 levels dynamics**

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Baseline</th>
<th>Before standard therapy</th>
<th>p</th>
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<tr>
<td>NT-proBNP, pmol/l</td>
<td>121.47 [43.3, 177,88]</td>
<td>82.69 [31.88, 132.66]</td>
<td>0.003</td>
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<tr>
<td>Galectin-3, ng/ml</td>
<td>8.5 (5.21, 15.72)</td>
<td>6.49 [3.36, 12.79]</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

**P1919**

Regardless of the fibrosis status 12-month kinetics of serum markers of fibrosis are not different in dilated cardiomyopathy patients

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**Funding Acknowledgements:** Grant from the Poland National Centre of Science (no. 2013/09/D/N5Z/00252)

**Background:** Serial assessment of serum markers of fibrosis may provide insight into dynamics of myocardial fibrosis process. It is unknown whether 12-month patterns of markers of fibrosis differ between dilated cardiomyopathy (DCM) patients (pts) with and without fibrosis.

**Methods:** We included 70 consecutive DCM patients (pts) (48 ± 12.1 years, EF 24.4 ± 7.4%). All pts underwent right ventricular endomyocardial biopsy (EMB) to study cardiac fibrosis. Markers of collagen type I and III synthesis – procollagens type I and III carboxy- and amino-terminal peptides (PICP, PINP, PICPc, PINPc), and ECM metabolism controlling factors – tumor growth factor beta-1 (TGF-β1-β) and connective tissue growth factor (CTGF) were measured in serum at baseline, and 3- and 12-month follow-up.

**Results:** Based on the EMB results, two groups of pts were identified without (n = 46, 65.7%) and with (n = 24, 34.3%) fibrosis. Baseline, 3- and 12-month values of PICP, PINP, PICPc, PINPc, TGF-β1-β and CTGF did not differ between two groups (Figure 1).

**Conclusions:** 12-month kinetics of serum markers of fibrosis is similar in DCM pts with and without fibrosis. Regardless of the time point of measurements, reliable differentiation between DCM pts with and without fibrosis, based on serum markers of fibrosis is questionable. These unexpected findings cannot be easily explain and warrant further studies.

**P1920**

The use of cardiac multimarker testing in patients with non-obstructive hypertrophic cardiomyopathy

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**Introduction:** The increase of cardiac markers in patients with hypertrophic cardiomyopathy (HCM) is associated with the severity of left ventricle outflow tract obstruction. However, little is known about the cardiac marker levels in patients with non-obstructive type of HCM.

**Purpose:** The aim of presented study was to analyze cardiac multimarker testing strategy in detection of the initial structural changes in patients with non-obstructive HCM.

**Methods:** In the group of 47 patients with non-obstructive HCM (58.4 ± 12.4 years, 12 females), plasma concentrations of creatine kinase MB isoenzyme (CKMB), myoglobin (MYO), glycolgenophospholase BB isoenzyme (GPPB), and heart type of fatty acid binding protein (FABP) were analyzed with the use of protein biochip system.

**Results:** Left atrium diameter was 48.2 ± 7.2 mm, and it exceeded reference values in 37 (78%) patients. Right ventricle diameter was 26.1 ± 3.8 mm, and it exceeded reference value in 2 (4%) patients. The end-systolic left ventricle dimension was 31.9 ± 7.1 mm, and it exceeded reference values in 4 (8%) patients. Left ventricle end-diastolic dimension was 47.1 ± 7.3 mm, and it exceeded reference values in 3 (6%) patients. The mean of the interventricular septum thickness was 19.4 ± 4.4 mm, and it exceeded recommendations for thickness of hypertrophic cardiomyopathy (<15 mm) in all patients. Left ventricle mass was 344.4 ± 129.9 g, and it exceeded reference values for two-dimensional method in all patients. Left ventricle mass index was 171.4 ± 60.3 g/m², and it exceeded reference values in all patients. The mean of the left ventricle ejection fraction was 67.1 ± 9.9%, and, only in 2 (4%) patients, the LV ejection fraction was below the reference values. Left ventricle fractional shortening was 33.7 ± 8.7%, and it exceeded reference values in 3 (6%) patients. None of the patients had left ventricle outflow tract obstruction. In peripheral circulation, we found increase of hsTnT: median [9 ng/L (Q1: 5 – 16 ng/L), vs. 7 [5 – 9] ng/L, p = 0.03]; CK MB [1.4 - 2.5 μg/L vs. 1.8 [1.1 - 2.2] μg/L, p = 0.04]; MYO [46.4 [33.3 - 65.2] μg/L vs. 35.6 [22.8 - 43.7] μg/L, p = 0.001]; FABP [1.8 [1.4 - 3.3] μg/L vs. 1.6 [1.3 - 2.1] μg/L, p = 0.05], and GPPB [3.9 [2.5 - 6.3] μg/L vs. 2.3 [1.9 - 4.2] μg/L, p = 0.001]. Furthermore, we found significant associations of left ventricle mass index and cardiac markers: FABP: r=0.41, 95% CI: 0.07-0.66, p=0.01 and with CKMB: r=0.33, 95% CI: 0.11-0.59, p=0.05.

**Conclusion:** This study indicates potential clinical use of the multimarker testing in diagnosis and screening of the hypertrophic cardiomyopathy even in initial stages.

**NURSING**

**P1921**

The impact of educational- supportive self-care package on anxiety, depression and stress in myocardial infarction patients hospitalized in Iran, 2016

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**Introduction:** Myocardial infarction is one of the most common cardiovascular diseases known which can be controlled, patients are always at risk of physical, and socio–psychological stressors.

**Purpose:** This study carried out to investigate the impact of educational- supportive self-care package on mean of anxiety, depression and stress in myocardial infarction of an hospital in Iran.

**Methods:** This pre- and post-quasi-experimental study will carried out on 56 hospitalized patients with heart failure selected from a hospital affiliated with University of Medical Sciences were assessed in 2016. They will assign to two groups of experimental (n = 43) and control (n = 43) groups. They are selected through convenience sampling and divided randomly into two intervention and control groups. Any patient in the experimental group received education after 48 hours of admission and after the disease’s acute phase through face to face contact and also a booklet and the questionnaires were completed before the intervention, after the intervention, before discharge from the hospital, and two months after discharge through phone calls or visiting patients in the intervention group if the patients requested. The patients in the control group receive no intervention. At the same time, patients and their relatives were taught about social support in four dimensions of emotional support, tools, information and evaluation. Demographic and DASS questionnaires (anxiety,
stress, depression) were used to collect data. Data were analyzed using statistical software spss version 21.

Results: The findings showed that educational- supportive self-care package can reduce anxiety and depression in experimental group after intervention as a lasting effect. On the other hand, the package does not effect on stress meaningfully decrease among the patients of control group, and only causes the decrease with the factor "time" p > 0.05.

Conclusion: The educational- supportive self-care package can reduce anxiety and depression and a part of stress among patients with myocardial infarction. Thus, it is recommended the results of this study be considered by health and treatment setting managers as a key factoring nursing care programs to decrease of stress, anxiety and depression among patients with myocardial infarction.

P1922
Our network- An hospital acute heart failure unit, an outpatient clinic, a chronic heart failure consultation evaluating hospital and primary care
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Heart failure (HF) a disease with growing prevalence requires specialized management. To minimize readmissions and emergency room visits, we implement a HF clinic.

Day Hospital (DH), in partnership with acute HFunit and chronic HFconsultation has a treatment room with 5 monitored seats, two consulting offices for both doctors and nursing, and an area for clinical trials.

The aim of this facility is a reduction in emergency visits and hospital readmissions.

Protocol: patients are discharged to DH for revaluation within 2 weeks: clin-
cial/analytic reassessment nursing consultation and HF drugs titration. Special attention is payed to education on disease, warning signs, medication, feeding, and how to proceed when they recognize decompensation and need to come back (ex: IV decongestion treatment up to 3 consecutive days). Direct connection with GPs was implemented. At discharge GP is notified to reevaluate his patient within 2 weeks. GPs may refer back to DH when decompensation, or send to HFConsultation for specialized evaluation/treatment (done within 2 weeks maximum).

Preliminary results showed that inclusion in our HF multidisciplinary management program reduced one year readmissions in 20% (p:0.0017) We have created an effi-
cient network where patients circulate through a close circuit of people well aware of disease wishing to improve their quality of life and survival

P1923
Nursing consultation pre-cardiac catherization in a university hospital: a retrospective study
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In a report published by the World Health Organization, in 2015, cardiovascular disease remains responsible for most of the deaths attributed to noncommuni-
cable diseases, resulting in the loss of 17 million lives annually. The anaemesis of patients undergoing cardiac catheterization is a necessary condition for the examination because it has the purpose of preventing intercurrences related to the conditions prior to the examination that may undergo some intervention for modification.

Objective: To evaluate the effectiveness of the nursing consultation to improve the quality of care provided.

Methods: Retrospective study of the nursing consultation records, conducted in the biennium 2015-2016, in a university hospital in Brazil. 1990 examinations were planned, with 1377 performed. Of these, only 35.3% were suspended due to lack of patient; 0.7% due to absence of companion; 25.9% because they did not present laboratory tests; 9.4% for having used hypoglycemic medication; 0.7% for having taken anti-coagulant medication: 4.7% because they presented laboratory tests with alterations; 3% due to allergy without desensitization; 6.6% had a clinical condition that made the examination impossible; 6.3% due to lack of space; 10% due to lack of material; And 12% for other reasons, including technical problems with haemo-
dynamic equipment.

Conclusion: Nursing pre-cardiac catherization allowed nurses to plan care for the

P1924
Do patients with midterm HF have profile like HFREF or HFpEF or they have their individual profile. Data from Russian national register 2012
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Background: In the new ESC guidelines for diagnosis and treatment of acute and chronic heart failure (HF) the new classification of heart failure was proposed which include the new type of heart failure – HF with mid-range LVEF (HFmrEF). At this moment, there is a lack prevalence and epidemiology of these patients.

Methods: We used data from Russian National Register 2012. For this analysis, patients were divided into three groups related to their LVEF: < 40%, HFREF; 40-49% HFmrEF; 50% HFpEF.

Results: 2055 patients with heart failure were included in this analysis: 542 had HFREF, 568 HFmrEF, and 945 HFpEF. Patients with HFmrEF were slightly older than patients with HFREF. Slightly younger than patients with HFpEF (mean 64; 61; 66, p < 0.01). The number of men was highest in HFREF (69%) lower in HFmrEF (60%), and lowest in HFpEF (38%), p < 0.01. The rate of myocardial infarction of these patient was slightly lower than in HFREF, p < 0.01. The prevalence of VT in patients with HFmrEF (7%) was dramatically lower than in HFREF (21%, p < 0.01) and substantially higher than in HFpEF (2%, p < 0.01). Patients with HFREF and HFmrEF have a higher prevalence of smoking and alcohol abuse, which could reflect the fact that there was the greater prevalence of infarctions and higher proportions of men in these groups.

Conclusion: Results of the work showed that patients with HFmrEF have some difference from both HFREF and HFpEF and we need study which would find the best treatment for this patients.

P1925
Does heart failure influence the clinical characteristics of admitted patients with arterial fibrillation?
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On behalf of: MISOAC Investigators

Background: Heart failure (HF), which is the most common single cause of admission to hospital, remains one of the leading causes of mortality. The coexistence of heart failure with arterial fibrillation (AF) is a clinical challenge, and it is frequently managed in the emergency department.

Objectives: To assess the prevalence of AF in consecutive patients, who were admitted to the Cardiology Department with any diagnosis, and had a history of AF.

Methods: We assessed the prevalence of HF in consecutive patients, who were admitted to the Cardiology Department with any diagnosis, and had a history of AF. Subjects with HF were stratified to HFREF, HFmrEF, and HFpEF categories, accord-
ing to their LVEF.

Baseline characteristics were calculated (age, main symptom on admission (dyspnea, angina, palpitations, dizziness, fatigue), number of comorbidi-
ties (coronary artery disease, stroke/TIA, chronic obstructive pulmonary disease, chronic kidney disease, diabetes mellitus, hypertension, dyslipidemia, vascular, hep-
atic, gastrointestinal, endocrine, rheumatic, other disease), CHA2DS2-Vasc and HAS-BLED scores). Comparisons were made between patients with and without HF, and within HF subgroups (T-test, one-way ANOVA, chi-square).

Results: A total of 510 patients (mean age: 73.3 ± 10.9 years) were enrolled. A history of HF (43%, HFREF:21%, HFmrEF:16%) was present in 45.6% of admitted patients with AF, of which 54.4% had permanent AF. Patients with AF were more likely to present with dyspnea (38%), with higher frequency in HF versus non HF (41% vs 31%, p < 0.01), while there was no difference between HF subtypes. Patients with a history of HF (versus no HF) had more comorbidities (3.9 vs 3.3, mean difference (MD) 0.6 CI: 0.2–0.9), higher CHA2DS2-Vasc (5 vs 3.7, MD 0.6 CI: 0.3-1.7) and higher HAS-BLED score (2.9 vs 2.5, MD 0.4 CI: 0.2-0.7), while there were no significant differences between HF subtypes.

POPULATION STUDIES - EPIDEMIOLOGY
Conclusion: Almost half of admitted patients with AF have a history of HF, with permanent AF and HFpEF being the most common phenotype. Patients with AF in the setting of HF had more prevalent dyspnea, a heavier multimorbidity burden, and a higher thrombotic and hemorrheic risk, irrespective of HF subtype.

P1926

Incidence and healthcare pathways in patients hospitalized for new onset heart failure in a region of northern Italy

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Background: Our Regional Social and Health Information System (SISSR) provides reliable information on epidemiology, healthcare pathways and prognosis of cardiovascular diseases (CV). The objective of our analysis was to describe the admission rate for new onset heart failure (HF) and analyze the provided healthcare among residents in our region in 2009-2010.

Methods: The analyses were made by querying the SISSR using SAS Enterprise Guide 7.1. The new cases of HF in 2009-2010 were identified from the Hospital Discharge Diagnosis Codes of the residents in our region with first ICD-9-CM codes 398.91, 402.01, 402.11, 402.91, 404.01, 404.03, 404.13, 404.91, 404.93, 428.0-4, 428.9. For the analyses, SISSR was linked with regional databases of healthcare services and procedures and drug distribution system.

Results: In 2009-2010 there were 5963 admissions for new onset HF (average rate of 2.41 per 1000 person-years; range in 5 Regional Health Authorities 2.14 to 2.72).

Hospital admission involved in 86% subjects ≥ 70 years, males were prevalent in pts < 80 years, females ≥ 80 years. 82% of the pts were discharged from Medicine, 11% from Cardiology. Comparing the pts of 2009-2010 with those of 2015, prevalence of exams (ECG, echocardiogram, chest-x-ray, inflammatory peptides) increased from 72% in the 5 years prior to admission to 75% in the 5 years after discharge. The number of pts in CV therapy during the same period increased from 89% to 94%. Comparing the 2009-2015 cohort with 2015, the number of first hospitalizations for HF was reduced by 12%, with a large variability in 5 regional Health Authorities (range -30% - 4%). The rate of ≥ 10,000 pts of age ≥ 70 years decreased from 117.0 (range 126.2 to 134.8) to 97.4 (range 92.0 to 101.4) while the average stay remained stable (10 days). Among the 5457 who were discharged alive, in 1713 (31%; 28.36%) the nursing education was active after admission (new activation in 473, 27.6%). Among 1042 GPs working in FVG, 909 (87%) were following at least one patient with HF (39% 1-5 pts; 38% 6-10 pts; 11% > 10 pts (average 5.5 pts with HF for each GP, range 0-20).

Conclusions: The regional data warehouse of our region provides useful information to plan educational activities and improvement of quality of care and clinical pathways. The trend of new admissions for HF is highly variable in the 5 Regional Health Authorities, as well as it is clear a lot of room for improvement of post-discharge pathways and care.

P1928

EORP Register of Bosnia and Herzegovina, comparative differences with other regions included in EORP

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Objective: A major goal of EURObservational Research Programme (EORP) is to record and evaluate medical practice in Europe and around the world, based on the collect of real-life data in different countries.

Methods: We did a statistical analysis and comparison of individual patient characteristics in EORP registry of B&H and other countries involved in EORP.

Results: There is a significant difference in the one-year follow-up of patients dying in B&H in relation to the other countries included in EORP in cardiovascular death (93.2%; p < 0.0001) between B&H and other countries in the region (51.7% in total and 48.7%). An UEF in patients in B&H was significantly higher as compared to other countries in the region (p < 0.0001) with median EF 51.5%; 37% and the number of patients with an UEF> 45% was higher in B&H in relation to other countries (59%; 31.6%). Comorbidities have been significantly greater in our patients in relation to other countries with p < 0.0001 for the disease: hepatic dysfunction (24.3%: 7.5%), COPD (53.3%: 18.4%), suffered ICV or TIA (37.3%: 11.7%), peripheral vascular disease (48.6%: 12.3%). Ischemic heart disease was significantly more prevalent (p < 0.0001) as a cause of heart failure in 71.4% compared to 53.1% of respondents from other countries. Smoking as a risk factor for CVD were present significant (p < 0.0001) with 68.2% of B&H respondents in the registry compared to 50.7% in subjects from other countries. The anemia with hemoglobin ≤ 12 g / dl (28.3%: 40.6%) was significantly lower in patients in B&H in relation to other countries. Intra hospital mortality was significantly represented (p < 0.0001) in patients register of B&H 15.3% compared to 4.4% in other countries of the region. Pulmonary edema as a form of hospital presentation was found in 7.5%, while in other countries it was 12.3% (p < 0.0001). Significantly (p < 0.0001) less application equipment to support heart rate (PM and ICD) in B&H patients in the registry compared to 50.7% in subjects from other countries. The anemia with hemoglobin ≤ 12 g / dl (28.3%: 40.6%) was significantly lower in patients in B&H in relation to other countries. Intra hospital mortality was significantly represented (p < 0.0001) in patients register of B&H 15.3% compared to 4.4% in other countries of the region.

Conclusions: Education of physicians is necessary to improve treatment and application of modern drugs. In long-term monitoring, we can come up with new knowledge on implementation of specific treatments of the ESC Guidelines for AHF/CHF.

Kaplan Mejer course of survival
Background: To evaluate the rate and predictors of mortality in patients hospitalized with decompenated chronic heart failure (DHF).

Material and methods: Hospital-based, prospective, observational study using the data from the HF Registry. All patients admitted for two Moscow city clinical hospitals with DHF from January to May 2015 were included into the registry (n = 484). Clinical, demographic, laboratory and instrumental characteristics and medical treatment were evaluated. After 6-month follow up data on mortality are collected by telephone contact with patients or relatives using structured questionnaire (n = 265).

Results: The median age was 73 years (95% CI: 68-78). Men – 45%, 97% of patients had HF II – IV (NYHA), among them 26% - HF II, 64% - HF III, 10% - HF IV (NYHA). Echocardiography was done in 100% patients with HF. EF ≤ 40% was found in 44% of patients. Uncontrolled arterial hypertension was the main reason for decoumepnent of chronic HF in 47%, atrial fibrillation – 46%, treatment non-compliance – 36%, coronary artery disease progression – 16%, respiratory infections – 14%, alcohol abuse – 6%, uncontrolled intake of nonsteroidal anti-inflammatory drugs – 2%, 6-month mortality rate was 18.8%. There was no significant difference in mortality rate between groups due to EF (19.1% in HFpEF vs 18.3% in HFpEF). Death due to HF decompensation was the most often reason (53%), among others – 10% – acute coronary syndrome, terminal chronic kidney disease – 5%, advanced cancer – 4%, sudden cardiac death – 4%, not known – 24%. Significant factors for six-month mortality were the following: hemoglobin (Hb) level at admission (p = 0.003), high dose of loop diuretics (p = 0.027).

Conclusion: In patients hospitalized with decompenated heart failure six-month mortality rate higher in presence of anemia and using of high dose of loop diuretics.

P1930
Admissions to intensive cardiac care units in france in 2014: a cross-sectional, nationwide population-based study.

G Gregoire Mercier1; A Riondel1; C Elmas2; S Manzo-Silberman3; G Leurent4; P1929 Predictors of six-month mortality after discharge in patients hospitalized with decompenated chronic heart failure

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1 RUDN University, Moscow, Russian Federation

Conclusion: In patients hospitalized with decompenated chronic heart failure (DHF).

Background: To evaluate the rate and predictors of mortality in patients hospitalized with decompenated chronic heart failure (DHF).

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Results: The median age was 73 years (93; 95); men – 45%; 97% of patients had HF II – IV (NYHA), among them 26% - HF II, 64% - HF III, 10% - HF IV (NYHA). Echocardiography was done in 100% patients with HF. EF ≤ 40% was found in 44% of patients. Uncontrolled arterial hypertension was the main reason for decoumepnent of chronic HF in 47%, atrial fibrillation – 46%, treatment non-compliance – 36%, coronary artery disease progression – 16%, respiratory infections – 14%, alcohol abuse – 6%, uncontrolled intake of nonsteroidal anti-inflammatory drugs – 2%, 6-month mortality rate was 18.8%. There was no significant difference in mortality rate between groups due to EF (19.1% in HFpEF vs 18.3% in HFpEF). Death due to HF decompensation was the most often reason (53%), among others – 10% – acute coronary syndrome, terminal chronic kidney disease – 5%, advanced cancer – 4%, sudden cardiac death – 4%, not known – 24%. Significant factors for six-month mortality were the following: hemoglobin (Hb) level at admission (p = 0.003), high dose of loop diuretics (p = 0.027).

Conclusion: In patients hospitalized with decompenated heart failure six-month mortality rate higher in presence of anemia and using of high dose of loop diuretics.

Methods: This is a nationwide, observational, population-based study based on the French hospital discharge database for the year 2014. All acute inpatient stays for HF with at least one ICCU admission were included. Age- and sex-standardized admission rates were calculated at the department level and modelled using epidemiological, access and socio-economic variables.

Results: 27,826 stays were included. At the department level (n = 94), the standardized ICCU admission rate varied between 0.04 and 1.24 per year per 1,000 population. It was positively associated with diabetes prevalence, and negatively associated with the proportion of the population aged 75 years or more and with the driving time to ICCU.

Conclusions: This study sheds light on considerable geographic variation in the ICCU admission rates for HF in 2014. This variation is explained not only by disease patterns, but by access to ICCU, too. This suggests inequalities of access to highly specialized cardiac care.

P1931
The proportion of heart failure patients with reduced, mid-range and preserved ejection fraction in a real-life heart failure population

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Background: The new ESC guideline for heart failure, published in 2016, introduced the terminology of heart failure with reduced mid-range ejection fraction (HFHFrEF/HFmrEF/HFpEF) (40%<LVEF<50%) in addition to the well-known definition of heart failure with reduced (HFHFrEF) (LVEF<40%) and preserved (HFPef) (LVEF≥50%) ejection fraction. The diagnostic criteria are the typical clinical signs and symptoms and specific values of left ventricular ejection fraction (LVEF) in every case. In HFHFrEF and HFpEF the elevated level of natriuretic peptides and at least one additional criterion of left ventricular hypertrophy and/or left atrial enlargement and/or diastolic dysfunction are necessary.

Purpose: The aim of the study was to identify the proportion of the HFPef, HFHFrEF and HFmrEF according to the new ESC guideline in patients with heart failure signs and symptoms, who were not treated for heart failure previously and referred to our heart failure outpatient department.

Patients and methods: We assessed the data of 367 patients (mean age: 63.2 ± 11.8 years) of the 265 patients with HFpEF out of 440 patients who were not treated for heart failure previously and referred to our heart failure outpatient department.

Results: LVEF was under 40% in the case of 173 patients (47.1%), in 52 patients (14.2%) LVEF was between 40% and 50%, and in the case of 142 patients (38.7%) was the LVEF>50%. In 44% of 52 patients with mid-range ejection fraction HFHFrEF was elevated, and in 41 cases left atrial enlargement and/or left ventricular hypertrophy were revealed, so in 41 patients HFPef was proved. In 104 of 142 patients with preserved ejection fraction NTproBNP level was elevated, and in 87 cases left atrial enlargement and/or left ventricular hypertrophy were found, so 87 patients were diagnosed as HFPef. 301 (82.0%) of 367 studied patients were proved to have heart failure and 97.5% of them was HFPef, 13.6% HFPef, and 28.9% HFmrEF. In 21.2% of the patients with mid-range ejection fraction and in 38.7% of the patients with preserved ejection fraction heart failure was not verified according to the new ESC guideline criteria.

Conclusion: According to our study, in a real-life heart failure population, the proportion of the patients with HFPef is half of HFPef, and quarter of HFPef. HFHFrEF and echocardiography criteria are concerned beyond signs and symptoms and LVEF at the diagnosis of HFPef, the real proportion of the HFPef patients becomes much lower than it was in the majority of the epidemiological trials.
Despite the differences between sexes in our study we found no significant differences in short-term mortality and mortality at 3 months

P1933
Determination of level of knowledge of cardiovascular disease risk factors among university students.
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Background: If we know cardiovascular disease risk factors in our life and take necessary measures, cardiovascular disease can be reduced.

Purpose: This study was planned as cross-sectional and descriptive in order to determine level of knowledge of cardiovascular disease risk factors among university students.

Methods: This research was carried out among the students who are studying in the University Faculty of Law and Faculty of Health Sciences, Nursing Department between the February - April 2016 dates. The study was attended by 650 students. Data were collected by a Questionnaire2 and “Cardiovascular Disease Risk Factors Knowledge Level scale” (KARRIF-BD). Data was analyzed by using frequency, percentage, mean, t-test and one-way ANOVA.

Results: The average age of the students was 20.1±3.9, 71.8% were female, 43.5% studied in the nursing department and 56.5% studied in the law department. The average body mass index of students was 21.8±4.6 (min-max: 17.6-38.7) kg/m². It had moderate knowledge level of the cardiovascular disease risk factors (p<0.001) and the result of changes in risky behavior (p<0.001) who know the blood pressure value (p<0.001). Nursing students and female students had higher information about the cardiovascular disease risk factors (p<0.001) and the result of changes in risky behavior (p<0.001) in category of the scale.

Conclusions: When looking at the average scale scores of KARRIF-BD in nursing and law students, the knowledge of nursing students was higher than the law students. The knowledge of female students was higher than male students.

P1934
Prevalence of subclinical atherosclerosis in persons of working age
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Objective: To evaluate the frequency of occurrence of subclinical atherosclerosis and atherosclerosis risk factors in people of working age with low cardiovascular risk.

Methods: The study included people of working age from 25 to 50 years, had no complaints on the part of the cardiovascular system. All performed: measurement of office blood pressure (BP), evaluation of anthropometric data, the study of complaints on the part of the cardiovascular system. All performed: measurement of office blood pressure (BP), evaluation of anthropometric data, the study of complaints on the part of the cardiovascular system.

Results: A total of 394 students were evaluated. There were 309 (78,43%) in the female group. The average age of the students was 20.1±3.9 years. According to the survey: 40% of patients smoking, hypertension in 43% of patients, diabetes in 36% of patients, overweight in 34% of patients. Females (4,026, 2.373 to 6.828), age (1.081, 1.004 to 1.164), hypertensive mother (8,368, 1,027 to 3,288) and greater waist circumference (1,087, 1,035 to 1,100).

Conclusions: About a fifth of the students were considered to be in prehypertension group. Factors associated with prehypertension in this study: male, older, mother with hypertension and increased waist circumference.

PSYCHOSOCIAL - ETHICAL CONCEPTS - EDUCATION
P1936
Professional or personal experience increases the awareness of heart failure in the European population.
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On behalf of: Heart Failure Awareness Day Initiative

Background: Heart failure (HF) is a common pathological condition. HF Awareness Day represents an European awareness day, the objective is to increase the knowledge of the general population regarding HF symptoms and management.

Aim: To demonstrate that working in the medical field or having a previous exposure to HF would increase the HF awareness.

Method: We analysed 3 annual sets of consecutive data, obtained from questionnaires filled in by the general population from various European countries, during Heart Failure Awareness Day campaign (from 2013 to 2015). A score was computed from the correct answers. A cut-off of 6 points was considered to prove HF awareness. Two specific subgroups were defined: group A, with professional experience (present or former employment in the medical field); and group B, with personal experience (patients with HF or their relatives with HF).
Results: A total of 7947 subjects were enrolled: 1777, 368, and 2485 subjects, corresponding to the 3 annual sets, with a similar median score of 7.3 ± 4.4, 7.3 ± 4.4 and 7.2 ± 4.4, respectively. High scoring (above 6) was more frequent in both group A and B, for all 3 annual sets (Table).

Conclusion: Professional or personal experience, achieved either through learning or exposure increases awareness of heart failure in the studied European population.

P1937
The impact of congestive heart failure on health-related quality of life among patients with cardiac-involved light chain amyloidosis
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Background: Light chain (AL) amyloidosis is a heterogeneous, rare disease characterized by misfolded protein deposits in tissues and vital organs. While any organ can be affected, cardiac involvement is one of the most common and severe forms of the disease. These patients are at risk for developing serious complications including arrhythmias and congestive heart failure (CHF). Deficits in health-related quality of life (HRQoL) have been documented among cardiac-involved patients, but the incremental impact of CHF on HRQoL among AL amyloidosis patients has not been documented.

Purpose: To compare clinical characteristics and HRQoL of patients with cardiac-involved AL amyloidosis by self-reported history of CHF.

Methods: A non-interventional, online study was conducted among patients with AL amyloidosis (N=341) to assess demographics, disease and treatment history and HRQoL, including the Kansas City Cardiomyopathy Questionnaire–Short Form (KCCQ-12), a validated HRQoL measure specific to heart failure. KCCQ-12 items were used to derive a total summary score and the following subscale scores: symptom frequency, physical limitations, social limitations and quality of life. Characteristics of cardiac-involved patients with self-reported CHF (n=82) and without CHF (n=85) were compared using chi square and independent samples t-tests. Differences in HRQoL were examined using multivariable generalised linear models.

Results: Approximately 49% of patients with cardiac involvement reported a history of CHF. Patients with and without CHF were similar in demographics, time to cardiac involvement, family history and comorbidities. KCCQ-12 group B score was significantly lower among patients with CHF compared to those without (43.8% vs. 30.1%, respectively; p = 0.01), however, the prevalence of other common reported symptoms was comparable. The prevalence of having complete hematological response (HR) was significantly lower among patients with CHF as compared to those without (42% vs. 62%, respectively; p = 0.01). Among patients with HR, HRQoL did not differ significantly by CHF status; however, KCCQ-12 score among patients who had not achieved HR were approximately 30% lower among CHF versus non-CHF patients (p < 0.05 for all).

The average total KCCQ-12 score among non-CHF, non-HR patients was 55.7, which corresponds to scores previously observed in patients with New York Heart Association (NYHA) functional class II symptoms. In contrast, scores among CHF, non-HR patients (mean=38.6) were equivalent to scores from patients with NYHA functional class III symptoms.

Conclusion(s): Previous research has documented significant HRQoL burden in AL amyloidosis patients with cardiac involvement. These findings indicate that the impact is even worse among patients with CHF. However, differences are attenuated if HR is achieved.

P1938
Caregiver health behaviors of patients with cardiorespiratory failure
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Background: The vulnerability of caregivers is continuously related to the disease process of patients with cardiorespiratory failure (CRF). The disadvantages of the care provided by the caregivers include the lack of support equipment, the amount of time invested and the physical effort. This affects the normal development of the physical, psychic and social areas of the caregivers, making it wear and dysfunctional.

Purpose: To describe the caregiver health behaviors of the patients with CRF

Method: 19 caregivers of patients with CRF (mean age 56.6 ± 2.9, 79.5% women) participated. The caregiver’s health survey was used to identify the psychosocial characteristics of the caregiver. It consists of 30 items, of which 18 were selected for health care behaviors. Descriptive statistics were performed, using the statistical package SPSS version 23.

Results: Regarding the care provided by the caregivers, 52% of caregivers are children of patients and 36.6% are spouses. 84.2% of the caregivers share the same house and only take care of one person. As to their activities, caring for their patients (36.8%), house chores (31.6%) work (21.1%) occupy most of their time. With regard to his / her own health, 73.1% have not had any medical examination done in the last 6 months. 47% of caregivers go to the doctor immediately when they feel bad, 26.3% only when they feel “very sick”. 78.9% of the caregivers came to the doctor, dentist or nutritionist in the last 6 months at least once. In contrast to mental health care, 84.2% did not go to the psychologist, therapist or psychiatrist in the last 6 months. 63.2% do some physical activity, 94.7% do not smoke, 73.7% do not consume alcoholic beverages and 57.9% do not report a dietary regimen. Despite the fact that 57.9% of the caregivers reported have the same symptoms as their patients in any occasion. The main reasons that they prevented them to take care of their health, are: lack of time (26.3%), having no one to leave their patient (15.8%), lack of money (15.8%), no reason (15.8%), the distance from the hospital / clinic (5.3%). Likewise, the caregivers has not received information or training from the health professionals about the care of their patient (57.9%), about what it is to be a caregiver and what it implies (78.9%) or about taking care of their own health (63.2%).

Conclusion: These characteristics show an inattention to caregivers that can lead to deterioration of the different areas of their life (physical, psychic, social) and to be a risk factor for cardiorespiratory diseases. Permanent attention to the patient causes exhaustion and self-neglects to generate deterioration in their health, which is reflected in the perception of the same symptoms as their patients’ symptoms.

P1939
Endothelial dysfunction, skin temperature, and vulnerability to psychological stress in patients with heart and respiratory failure. Preliminary data
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1National Institute of Respiratory Diseases, Heart Failure and Respiratory Distress Clinic, Ciudad de Mexico, Mexico; 2National Autonomous University of Mexico, Mexico City, Mexico

Background: A chronic state of psychological stress impacts the endothelial function by increasing the atherosclerotic and pro-inflammatory process of the cardiorespiratory disease, reducing the skin temperature variability (STV) during psychological stress, and also promotes less vasodilatation, which is a prognostic indicator of hospitalizations.

Purpose: To investigate the relationship between bilateral STV during psychological stress and endothelial function in patients with heart and respiratory failure.

Method: 11 patients with heart and respiratory failure (mean age of 70.09 ± 12.80 years, 55.5% males and right-handed dominance) participated in this study. Bilateral STV was assessed during a psychophysiological stress profile of three phases of five minutes each (baseline, arithmetic stressor and recovery), while the patients underwent a stress test, considering these indicators for STV symmetry (difference between both hands in °C), dominance (the highest temperature in the dominant hand), synchrony (difference between both hands at the end of each phase) and gain (increase of the temperature from the beginning to the end of each phase); more than 18 points in the total sum of all indicators was considered low vulnerability to
心理的ストレス。行動機能はその評価に使用した、心拍数基準の基準を、基準と行動機能に、記録された trả

Exercice testing and training

P1941
Reduced cardiac reserve contributes to exercise tolerance in adult patients with sickle cell anemia

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Background: Sickle cell anemia (SCA) is associated with marked exercise intolerance. However, mechanisms underlying this functional limitation remain incompletely characterized. We hypothesized that abnormal cardiovascular reserve is an important determinant of SCA exercise capacity.

Objectives: To investigate the cardiac response to exercise in a contemporary adult SCA population.

Methods: We compared 60 SCA patients (median age, 31 years, 60% women) to 20 controls matched for age and gender. All subjects prospectively underwent a symptom-limited cardiopulmonary exercise testing with combined echocardiography.

The oxygen uptake (VO2) and cardiac index (CI) were simultaneously measured. The difference between arterial and venous oxygen content (Cv-a(VO2)) was calculated using Fick’s principle. The left ventricular (LV) function was comprehensively studied at rest and during exercise.

Results: Compared to controls, the SCA patients had severe exercise intolerance (median peak VO2, 19.7 versus 34.3 ml/min/kg, p < 0.0001). In SCA population the increase in CI from rest to peak exercise was widely scattered and correlated closely with peak VO2 (r = 0.71, p < 0.0001); in contrast, the Cv-a(VO2) reserve was homogeneously reduced and did not correlate with exercise capacity (r=0.18, p = 0.16). Compared to controls, SCA patients had chronotropic incompetence, blunted LV preload reserve and higher LV filling pressures. The SCA patients were classified in tertiles according to peak VO2. While hemoglobin level and Cv-a(VO2) were similar, SCA patients in the lower VO2 tertile were characterized by an alteration of cardiovascular reserve related to ageing and to left atrial function deterioration (table).

Conclusion: The ability of cardiovascular system to increase CI is an important determinant of SCA exercise capacity.
However <10% of CHF patients in the UK participate in cardiac rehabilitation programmes due to lack of resources and absence of HF in local commissioning agreements. An effective home-based physical activity intervention may improve current clinical practice and benefit patients. The aim of the present study was to evaluate safety, compliance, and physiological effects of a novel, personalised, home-based physical activity intervention in CHF.

**Methods:** A single-centre pilot study recruited 20 patients (mean age 68±7 years) with stable CHF due to left ventricular systolic dysfunction (LVEF<31±8). At baseline patients underwent maximal graded cardiopulmonary exercise testing with non-invasive bioelectance cardiac output monitoring, assessment of quality of life (Minnesota Living with Heart Failure Questionnaire, MLHFQ), NTproBNP and physical activity level over a 7-day period using pedometers. Following initial assessments, patients were asked to increase and maintain their daily physical activity level by at least 2000 steps per day from baseline for 12 weeks, as this increment has been shown to be associated with a significant 10% reduction in cardiovascular events in high risk patients. All patients were monitored weekly via telephone calls and daily activity levels were recorded using diaries. During the follow-up visit, all assessment performed at baseline were repeated.

**Results:** Seventeen patients (85%) completed the study, achieved and maintained targeted physical activity level (Figure 1). Number of steps increased significantly from baseline to 3 weeks by 2546 (510±3364 to 7654±3489 steps/day, p=0.03), and was maintained until week 12 (9022±3942 steps/day). No adverse reactions to increased activity level were reported. On average MLHFQ score decreased by 4 points following intervention (25±18 vs. 22±18, p=0.05), suggesting improvement in quality of life. There was no clinically relevant change in NTproBNP (856±1106 vs 833±1164 ng/L, p=0.95), and O2 consumption at peak exercise (16.8±3.8 vs. 17.6±4.2 ml/min/kg, p=0.54), whereas peak exercise workload and cardiac index increased by 10% (82±10 vs. 91±19 watts, p=0.01; and 6.8±1.5 vs. 7.6±2.0 L/min/m², p=0.19). Peak exercise heart rate remained unchanged following intervention (106±19 vs. 107±16 beats/min, p=0.92), while peak stroke volume index increased by 15% (84±14 vs. 75±17 ml/beat, p=0.04). Workload and O2 consumption at anaerobic threshold increased by 16% (49±16 vs. 59±14 watts, p=0.001) and 10% (11.3±2.9 vs. 12.4±2.2 ml/min/m², p=0.39) after the intervention.

**Conclusion:** Personalised home-based physical activity intervention has minimal cost implications for the health service and is safe for CHF patients. It increases their daily physical activity levels and improves exercise tolerance and hemodynamic response to exercise.

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**Cardiac rehabilitation programs in left ventricular systolic dysfunction patients: differences between risk profile and functional capacity according to ejection fraction.**

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**Introduction:** Cardiac rehabilitation programs (CRPs) in left ventricular systolic dysfunction (LVSD) patients provide optimal medical treatment, as well as supervised exercise, education and counselling. Our purpose was to compare the risk profile and functional capacity according to the ejection fraction (EF) in LVSD patients undergoing a CRP.

**Methods:** We made an observational retrospective study including patients with reduced EF (LVEF <40%) and mid-range EF (LVEF 40-49%) admitted to a CRP in our institution between 2006 and 2015. Physical training, optimal pharmacological treatment, medical counselling, nutritional education, and smoking cessation support when needed, were supplied for 8 to 10 weeks. Left ventricular ejection fraction (LVEF) was assessed before and after the program using transthoracic echocardiography, selecting in our study patients with a LVEF <50%. FC was tested before and after the CRP according to the NYHA Functional Classification, in addition to a treadmill stress test (TST). Exercise capacity (EC) was reported in terms of estimated metabolic equivalents of task (METs).

**Results:** A total of 442 patients were included, mean age 57.93±11.78 years, male 89.6%. Cardiac rehabilitation was performed after a recent acute coronary syndrome in 91.2% of patients. No statistically significant differences depending on the previous cardiovascular risk profile and comorbidities between mid-range EF (mEF) and reduced EF (rEF) patients were found (table 1). Medical therapy when starting the program showed a significantly higher use of ACEIs/ARBs, MRAs, diuretics and anticoagulants in rEF than mEF patients (p<0.003, p=0.001, p=0.001; respectively). Patients with rEF had a worse FC assessed by NYHA class than mEF patients, class I (43.4% vs 74.2%), II (49.8% vs 25.4%), III (6.3% vs 2.2%), IV (0.5% vs 0%); p<0.001. EC reported in METs was significantly lower in rEF than mEF patients before (6.22±2.73 vs 7.76±2.38; p=0.001) and after the program (9.82±2.68 vs 10.65±2.42; p=0.003). After completing the CRP an increase in LVEF was observed in both groups (mEF patients increased LVEF from 43.81±3.00% to 52.53±6.60%, rEF patients from 30.59±5.83% to 42.62±10.75%). FC after the program was significantly higher in the mEF than the rEF group (I: 92.1% vs 73.4%, II: 7.9% vs 25.5%, III: 0% vs 1.1%; p<0.001). Regarding the heart rhythm, there was a non-significant trend showing an increased prevalence of atrial fibrillation in rEF patients (7.3% vs 3.1%; p=0.06). The dropout rate of the CRP was similar in both groups (11.9% in rEF patients vs 7.8%).

**Conclusions:** Reduced exercise fraction patients included in a CRP have a lower functional and exercise capacity than mid-range ejection fraction patients, both before and after completing the program. LVSD patients have a high prevalence of cardiovascular risk factors and comorbidities. However, no differences are found according to the left ventricular ejection fraction.

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**Long-term effects of cardiac rehabilitation in obese patients**

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**Introduction:** Cardiac rehabilitation programs (CRP) improves exercise capacity (EC) and decreases cardiovascular morbidity and mortality after an acute coronary syndrome (ACS). However, some subpopulations are under-represented in CRP, namely obese patients.

**Purpose:** To compare the EC of obese patients with non-obese patients over 12 months of follow-up after CRP.

**Methods:** We retrospectively analysed data prospectively collected from patients who underwent CRP after an ACS. Patients were divided in two groups according to their body mass index (BMI): BMI<30kg/m² (obese) and BMI >30kg/m² (non-obese). EC was assessed with a standard exercise test, including chronotropic index, rate-pressure product, exercise duration, and intensity in metabolic equivalents (METs). EC was evaluated at baseline (T1), end of CRP (T2) and after 12 months of follow-up (T3). The mixed between-within analysis of variance was used to compare groups.

**Results:** Of a total 469 patients, 108 patients were obese. Except for diabetes and hypertension, there were no additional significant differences at baseline between obese and non-obese patients. Regarding EC, obese showed lower chronotropic index at all three moments (p<0.001), but improved at T2 and T3, like the non-obese group (T1-obese: 60.3±17.0% vs non-obese: 70.8±18.9%; T2-obese: 70.5±13.7% vs non-obese: 76.6±17.7%; T3-obese: 74.6±16.7% vs non-obese: 77.6±17.7%, within-groups partial Eta square 0.176, p<0.001). The same results
Conclusions: of a greater referral of obese patients to CRP. The benefit persisted after 12 months of follow-up. This data highlights the importance of the program, a maximal CPET (RER 0.90). 1

Dynamics of chronic heart failure in patients with rapidly progressive left ventricular remodelling after STEMI

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Purpose: to study the dynamics of laboratory and functional manifestations of chronic heart failure at 24 weeks in patients with rapidly progressive remodeling of the left ventricle (LV) remodeling after acute myocardial infarction (AMI) with LT-segment elevation (STEMI).

Methods: The study included 62 patients with STEMI. A prerequisite was the presence of hemodynamically significant stenosis of one coronary artery based on the result of coronary angiography. The present study was carried out without a washout period with the full scope of pharmacotherapy after the AMI. All patients underwent echocardiography by MyLab 90 (Esaote, Italy) with the evaluation of end-diastolic volume index (EDV index). Then, the patients were divided into two groups. The first group included 31 people without echocardiographic evidence of left ventricular remodeling and dynamics of EDV index < 8% at 6 months after STEMI. Group 2 consisted of 31 patients with rapidly progressive LV remodeling (EDV index increase > 8%). Compared groups were matched for age, sex, number of comorbidities.

Results: at baseline compared subjects did not differ in the level of BNP: group 1 – 143.1 (16.4; 48.2) pg/ml, in group 2 – 32.6 (19.2; 53.6) pg/ml. After 24 weeks in patients without an abnormal growth of EDV index dynamics of BNP was not revealed: 26.6 (18.6; 52.7) pg/ml in patients with rapidly progressive LV remodeling the values increased to 53.7 (27.0; 96.6) pg/ml (p < 0.05). According to the results of the six-minute walk test in group 1 the improvement 6MWT- obese was 2.3 min vs non-obese: 9.4 min; intensity: T1- obese 7.8 ± 2.2 min vs non-obese: 9.2 ± 2.2 min; T3- obese: 9.4 ± 1.8 min vs non-obese: 11.0 ± 2.2 min. T1- obese 7.8 ± 2.2 min vs non-obese: 9.2 ± 2.2 min; T3- obese: 9.4 ± 1.8 min vs non-obese: 11.0 ± 2.2 min. T3- obese 9.4 ± 1.8 min vs non-obese: 11.0 ± 2.2 min.

Conclusion: Cardiac rehabilitation in patients with heart failure reduced ejection fraction compared to patients with coronary artery disease preserved ejection fraction: a long term follow up

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Background: Patients with exercise intolerance induced by heart failure reduced ejection fraction (HFREF) benefit from cardiac rehabilitation as exercise reverses the early pathological remodeling therewith a statistically significant improvement in exercise tolerance in the absence of changes in laboratory signs of heart failure.

Methods: The database was searched and 181 patients (CHF: n=35; CAD: n=146) were included between 2004 and 2010. All patients followed an endurance training program in the cardiac rehabilitation centre (38s, 3m, 3x60'/wk, 90%HR@RCP). During the first 24 sessions, the patients trained 5x8 min on the treadmills, 15 min in the swimming pool and 45 min in informal physical activity. After the first 3 weeks, the duration was extended to 10 min on the treadmills and 30 min in informal physical activity. The patients were included between 2004 and 2010. All patients followed an endurance training program in the cardiac rehabilitation centre (38s, 3m, 3x60'/wk, 90%HR@RCP).

Results: Baseline characteristics of both populations are given for patients with HFREF: (age: 54.8 ± 11.7; EF: 42.2 ± 7.8) and CAD: (age: 59.0 ± 10.1; EF: 58.0 ± 9.5). Both groups significantly improved peak VO2, VE/VO2 slope, HR-RR, Peak PETCO2, half-time of peak VO2, and OUES after 3 months of cardiac rehabilitation. The EQ5D improved significantly in the group with CAD. The patients with CAD improved peak VO2 significantly more (P=0.032) compared to the patients with HFREF. Secondary parameters improved significantly in both groups, only for peakV/VO2 the patients with HFREF improved significantly (P < 0.001) more. Moreover, the mortality rate was registered during 3 years after 6 months of follow-up and survival analyses were performed. Significance was set P < 0.05.

Conclusion: Heart failure is highly prevalent in myocardial infarction survivors and is a major cause of morbidity, mortality and re-hospitalizations. Cardiac rehabilitation, as exercise training and CHF self-care counseling have each been shown to improve clinical status and clinical outcomes in CHF. The aim of this study was to evaluate the usefulness of exercise based in house cardiac rehabilitation in patients with heart failure with preserved ejection fraction (HFpEF) after myocardial infarction.

Results: Of 1854 patients who were admitted to our three weeks in- hospital secondary prevention program – exercised based cardiac rehabilitation, we analyzed a total of 199 patients who were admitted early after coronary revascularization (percutaneous coronary interventions or coronary bypass surgery) with HFpEF. The majority of patients were males (84%). The oldest patient was 81 years of age. We noted risk factors and co morbidities. Patients were selected for exercise training after six minute walking test (42%) or exercise stress test (CPX). After 3 weeks in hospital cardiac rehabilitation the patients were re-tested.

Results: The major comorbidities in our patient population were as follows: diabetes, hypertension and dyslipidemia. Six minutes walking test was performed and the total distance walked ranged from 160 to 44 index dynamics of BNP was not revealed: 26.6 (18.6; 52.7) pg/ml in patients with rapidly progressive LV remodeling the values increased to 53.7 (27.0; 96.6) pg/ml (p < 0.05). 0 FC was detected in 46% of cases, 1st FC - in 48%, 2nd FC - 6%. The patients with rapidly progressive LV remodeling after STEMI showed the deterioration in BNP levels with no significant reduction in tolerance to physical exercise after 24 weeks of follow-up. While in the group without pathological remodeling there was a statistically significant improvement in exercise tolerance in the absence of changes in laboratory signs of heart failure.

Conclusion: None had acutisation of chronic heart failure (with peripheral edema and congestion). All patients fulfilled cardiac rehabilitation program.

Conclusion: The study showed usefulness and safety of exercised –based in hospital cardiac rehabilitation program in patients HFpEF. Supervised multidisciplinary cardiac rehabilitation program, including an individualized exercise
component is safe and can improve functional status and exercise tolerance in patient.

P1948
Prognostic factors for STEMI patients after cardiac rehabilitation in single academic cardiac center.
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Introduction: Cardiac rehabilitation (CR) has well-established efficiency in improving the prognosis of patients after ST-elevated myocardial infarction (STEMI).

Purpose: The main aim of our study was to analyse early and late factors which may be related to the improved prognosis of STEMI patients who participated in CR programme.

Methods: It was a retrospective analysis of STEMI patients who underwent invasive coronary angiography and percutaneous coronary intervention (PCI) after STEMI followed by CR in years 2007-2013. The group consisted of 141 patients; the average time of follow-up was 30 ± 14 months (96 months).

Results: Individual physical capacity was assessed at the beginning of CR by exercise test. Information on patients’ current activity was assessed with validated International Physical Activity Questionnaire (IPAQ). The analysed early factors included: gender, age, body mass index (BMI), hypertension, diabetes mellitus type 2, atrial fibrillation, history of previous MI or stroke, ejection fraction, type of infarction related artery, localization of MI, peak levels of troponin I (TnI), creatine kinase-MB (CK-MB) mass. Late factors included: initial metabolic equivalent of task score (METs), METs after CR, improvement of METs, number of training sessions (12 or 24). The combined end point consisted of: patient’s death or another cardiovascular event (stroke, myocardial infarction, any revascularisation).

Results: Higher BMI was associated with better prognosis of patients (Hazard Ratio HR=0.83; 95% Confidence Interval CI 0.71-0.93; p = 0.012). There was observed a trend for the relation between the improvement of METs and better prognosis of patients (HR=0.57; 95% CI 0.38-0.86; p = 0.007). No statistically significant relation between any of the early and late factors and any form of physical activity was found.

Conclusions: Increased BMI, itself a risk factor for coronary artery disease, is a positive prognostic factor for the outcome of CR (phenomenon known as the obesity paradox). Our study also shows that although the absolute value of METs achieved after CR had no significant impact, the thing that seems to improve prognosis is relative improvement of METs.

P1949
Improvement of functional capacity and other risk factors in the patient with ischemic cardiopathy through the cardiac rehabilitation program
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1University General Hospital, Cardiology Department, Guadalajara, Spain; 2University de Santa Cruz, Cardiology, Lisbon, Portugal; 3Hospital General de Ciudad Real, Nefrology, Ciudad Real, Spain; 4Medical University of Warsaw, 1st Chair and Department of Cardiology, Warsaw, Poland

Introduction: Coronary heart disease (CHD) is the leading cause of mortality in Europe, causing a significant reduction in physical, psychological and socio-occupational capacity in the short, medium and long term. Cardiac rehabilitation program (CRH) plays an important role in the recovering the patient.

Materials and methods: Observational prospective study. Included all patients with CHD from Sept/2015-Oct/2016 of the CRH. We describe CVRF, demographic, electrocardiographic, echocardiographic; prior and subsequent to the CRH. Statistical analysis SPSS 20. Categorical variables are compared with Chi2. and quantitative (expressed as means ± standard deviation) with Student’s T. Statistical significance p < 0.05.

Results: 78 patients, mean age 56.9 years, men 92.3%, 60.3% intermediate-high risk, 85% less than 55%, 54.9% at the start of the CRH, 53.9% NYHA functional class II-II, 52.6% hypertension, 67.9% dyslipidemia, 42.3% obesity, 21.8% diabetes mellitus, 56.4% smokers, 87.9% sedentary, BMI 29.6. At the end of the CRH, NYHA functional class II-II, were reduced to 11.5%. More results in Table 1.

Conclusions: The CRH in patients with CHD is associated with an improvement in functional capacity with better exercise tolerance and fraction left ventricular ejection. In addition to a reduction of resting heart rate, diastolic left ventricular dysfunction, response to exercise, lipid profile, abdominal perimeter, C-reactive protein levels; being these differences statistically significant.

Table 1.

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>PRE CRH</th>
<th>POST CRH</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional capacity (METs)</td>
<td>8.3 ± 2.5</td>
<td>10.0 ± 2.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Test of 6 minutes (meters)</td>
<td>525.3 ± 80.7</td>
<td>572.1 ± 95.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Abdominal circumference (cm)</td>
<td>163.1 ± 12.4</td>
<td>101.8 ± 12.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Systolic blood pressure at peak exercise (mmHg)</td>
<td>162.3 ± 18.4</td>
<td>158.1 ± 14.4</td>
<td>0.04</td>
</tr>
<tr>
<td>Diastolic blood pressure at peak exercise (mmHg)</td>
<td>80.9 ± 8.1</td>
<td>77.8 ± 6.8</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Resting heart rate (beats per minute)</td>
<td>71.1 ± 10.8</td>
<td>63.6 ± 9.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recovery time (beats in the first minute)</td>
<td>14.6 ± 8.2</td>
<td>18.3 ± 8.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LDL cholesterol (mg/dL)</td>
<td>85.1 ± 32.8</td>
<td>72.2 ± 26.4</td>
<td>0.003</td>
</tr>
<tr>
<td>HDL cholesterol (mg/dL)</td>
<td>39 ± 11.2</td>
<td>41.4 ± 12</td>
<td>0.005</td>
</tr>
<tr>
<td>C-Reactive protein (mg/L)</td>
<td>3.62 ± 4.2</td>
<td>2.04 ± 2.6</td>
<td>0.001</td>
</tr>
<tr>
<td>B-Type Natriuretic peptide (pg/mL)</td>
<td>77.4 ± 124.7</td>
<td>62.4 ± 90.4</td>
<td>0.08</td>
</tr>
<tr>
<td>Fraction left ventricular ejection (%)</td>
<td>56.2 ± 8.3</td>
<td>59.6 ± 7.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diastolic left ventricular dysfunction (%)</td>
<td>78.2 ± 32.1</td>
<td>&lt;0.001</td>
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P1950
Different prognostic indicators in cardiopulmonary exercise testing according to the aetiology of systolic heart failure
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Introduction: The Cardiopulmonary Exercise Testing (CPET) has an important role in the risk stratification and prognostic evaluation of patients with Heart Failure and reduced Ejection Fraction (HFREF). Several variables in CPET have been validated as independent predictors for a worse prognosis, but, their impact according to the aetiology of the HFREF has not been established.

Purpose: To evaluate the prognostic value of CPET variables in patients with HFREF according to the aetiology – Ischemic Vs Nonischemic HF.

Methods: Of all the patients submitted to CPET in our laboratory between 2009 and 2015, those with HFREF (EF ≤ 40%), NYHA functional class II-III and optimal medical therapy were selected. The following variables of the CPET were studied: Peak VO2, VE/VCO2 slope, exercise inspiratory ventilation, PetCO2 at rest and during exercise, exercise blood pressure response to effort, electrocardiogram changes, heart rate recovery at 1 min and patient reason for test termination. During a mean 44 month follow-up, the independent predictors for the composite endpoint of hospitalization for decompenated heart failure, need for heart transplant and death of any cause, in both groups of patients, were determined using a Cox Regression.

Results: A total of 123 patients were included in the study (average age of 55 ± 11 years; 80% of male gender), 57% with ischemic HFREF, with the ramped protocol test
being the most commonly used (65% of the cases). Patients with ischemic HFREF were mostly male, and had a higher mean age. The composite endpoint occurred in 35% of the total sample. In patients with ischemic HFREF the sole predictor for the composite endpoint was the Peak VO2 (HR 0.78, IC95% [0.69,0.91]; p < 0.01), while in those with nonischemic HFREF the predictors were the Peak VO2 (HR 0.64, IC95% [0.51,0.81]; p < 0.003) and the VE/VCO2 slope (HR 1.09, IC95% [1.04,1.14]; p < 0.001).

Conclusions: Of the CPET variables studied, the Peak VO2 was an independent predictor for the composite endpoint in both groups, with the VE/VCO2 slope having also been a predictor in the nonischemic HFREF patients, probably reflecting a lower ventilatory efficiency as a result of the longer chronicity of the cardiac dysfunction.

P1951
Inverse relationship between hemoglobin oxygen saturation measured by pulse oximetry at rest and exercise capacity in the patients with heart failure
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Background: Exercise capacity is a key prognostic factor in the patients with heart failure (HF). Although peak VO2 measured by maximal symptom-limited cardiopulmonary exercise test (CPET) is the most objective method to determine exercise capacity, a simple tool to predict exercise capacity is required. Hemoglobin oxygen saturation measured by pulse oximetry (SpO2) is a simple and useful tool to evaluate oxygenation. However, the relationship between SpO2 at rest and exercise capacity measured by CPET is unclear.

Purpose: To investigate the relationship between SpO2 at rest and exercise capacity measured by maximal symptom-limited CPET in the patients with HF.

Methods: We examined the association between SpO2 and exercise capacity among patients with HF (age ≥ 65 ± 13.3, NYHA II and III, cardiomyopathy 43%, valvular heart disease 35%, ischemic heart disease 17%) who underwent symptom-limited maximal exercise test in our institute.

Results: Peak VO2 weight and peak respiratory exchange ratio were 16.2 ± 5.6 ml/min/kg and 1.2 ± 0.1, respectively. SpO2 at rest inversely correlated with peak VO2 weight (r = -0.43, P = 0.003). Compared with the patients who had preserved exercise capacity (peak VO2 weight ≥ 11.0 ml/min/kg, n = 39), the patients who had low exercise capacity (peak VO2 weight < 11.0 ml/min/kg, n = 7) showed significantly higher SpO2 at rest (99.9 ± 0.8 vs. 98.1 ± 1.6, P = 0.03). Multiple regression analysis revealed that higher SpO2 at rest (β = -0.29, P = 0.006), age, BMI and lower hemoglobin, sodium are independent predictors of lower peak VO2 weight.

Conclusion: In patients with HF, higher SpO2 at rest may detect lower exercise capacity.

P1952
Functional testing: comparing the results of 6-minute walk test with handgrip and postural tests
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Introduction: 6-minute walk test (6MWT) is most widely used for testing functional capacity of heart failure patients. Some patients can’t perform it well or at all due to other non-cardiac comorbidities.

Purpose: We wanted to test the correlation of 6MWT with other functional tests (handgrip test, postural tests).

Methods: We performed 6MWT in 30 hemodialysis patients. They performed the test three times in the same setting (before hemodialysis). Handgrip test was performed before hemodialysis three times in three different positions (standing-up, sitting down, lying down) using both arms. Postural testing was performed before hemodialysis using the postural test protocol (balance tests, gait speed, chair stand test). Positional influence on handgrip test results was tested with one-way repeated measures ANOVA and functional tests correlation with Pearson’s correlation coefficient. We also tested the influence of AF on handgrip test results (multiple linear regression). In 22 patients with concurrent end-stage kidney disease and heart failure we evaluated possible correlations between echocardiographic E/A ratio, biomarkers and functional tests (multiple linear regression).

Results: Thirty patients (60%) male, mean age 64.4±13.3 years, mean BMI 30.1 ± 4.4 kg/m2 performed the 6MWT (mean 65 ± 18% of predicted distance), handgrip test (right arm 23 ± 10kg; left arm 22 ± 10kg), postural tests (10 ± 3 points of 12 maximum). Handgrip results were not influenced by body position (right: F(2,27)=2.286, p = 0.123, R2=0.144; left: F(2,27)=0.991, p = 0.393), but both were influenced by the presence of an AF (right: F(2,27)=2.286, p = 0.123, R2=0.144; left: F(2,27)=0.991, p = 0.393). All functional tests had a statistically significant positive correlation with each other. In 22 hemodialysis patients with heart failure (50% men, mean age 65 ± 11.7 years, mean NT-proBNP 1425 ± 1226 pg/ml, mean LVEF 57.1 ± 13.0%, 45% with HFREF), high troponin was the most important prognostic factor of lower LVEF, lower VTI and higher E/Ea. NT-proBNP was a statistically significant prognostic factor of lower LVEF and higher E/Ea. None of the tested laboratory or echocardiographic parameters were associated with hospitalization rate due to heart failure in the last two years or the results of functional tests. Low VTI was a prognostic factor of longer hospital stay due to heart failure in the last two years.

Conclusion: 6MWT can be replaced with other functional tests (handgrip test, postural test) to evaluate functional capacity. This is particularly useful in elderly disabled patients, where 6MWT results are often influenced by their disability to walk for 6 minutes continuously. In addition, handgrip test is not influenced by body position or presence of AF. In patients with concurrent end-stage kidney disease and heart failure, troponin T was a better prognostic factor of chronic heart failure and none of echocardiographic or laboratory parameters were associated with the results of functional tests.

P1953
Impact of short-term physical training on functional capacity, natriuretic peptides and endothelin in heart failure patients with diabetes mellitus
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The positive effects of physical training in patients (pts) with chronic heart failure (CHF) are reflected in improving exercise tolerance, reducing symptoms and loss hospitalization, increasing survival and improving quality of life. It has been confirmed that CHF ≥ 3 years is higher in patients with diabetes mellitus (DM), than for those who do not have DM.

Aim: To evaluate the effects of short-term physical training on physical exercise tolerance and level of markers of neuro-humoral activation and endothelial function, in CHF pts with diabetes mellitus type 2.

Patients and method: The study involved 20 pts (14 males), mean age 62.3 ± 5.7 years, mean EF 36.75 ± 3.34%, NYHA II and III with DM type 2, ≥32 compatible non-diabetic pts with CHF who were assigned to a control group. The mean duration of DM in study group was 10.2 ± 3.6 years. All patients were included in three-week rehabilitation program at the residential center, based on strict control and individually prescribed physical training. Before and after rehabilitation, all patients were underwent exercise stress test, and from the veins blood samples, biochemical parameters, atrial natriuretic peptide (ANP), brain natriuretic peptide (BNP) an endothelin (ET) were determined.

Results: At the end of rehabilitation, the concentration of neuropeptides, ANP and BNP, were significantly higher compared to the baseline values, in both groups, in a group of diabetics pts and in non-diabetic group, also. (ANP p < 0.018; BNP p < 0.042). In the group of diabetic pts, there was significantly higher value of BNP compared to the control group after rehabilitation (p = 0.033), while there was no significant difference in the values of ANP (ns), between two groups. In contrast, the concentration of ET, after rehabilitation was lower in both groups, but the statistically significance was only in the group of diabetic pts (p = 0.035). In both groups, exercise tolerance was improved (p < 0.005) as well as quality of life assessed by Minnesota Living With Heart Failure Questionnaire (p < 0.005).

Conclusion: Opposite to long, short-term exercise training induced transitory increase of ANP and BNP, and decrease of endothelin in diabetic CHF pts after cardiac rehabilitation. These effects are associated with improvement of exercise tolerance and quality of life.

P1954
Analysis of physical rehabilitation efficiency in patients with chronic heart failure
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Introduction: In the world practice, the selection of physical training intensity of CHF patients is based on anaerobic threshold achievement during cardiopulmonary test (CPET). But the majority of patients with severe CHF are not able to achieve it, that requires the use of certain indicators in the appointment of physical training. This alternative indicator can be lactate threshold, which achieved first during the CPET.

Purpose: To evaluate aerobic physical exercise efficiency in CHF patients, selected on the basis of achievement the lactate threshold during CPET.
Methods: 77 patients, CHF NYHA II-III were randomized into two groups - primary (aerobic training) and control (standard treatment of CHF). Main group - 84 patients, mean age 54 ± 12.5 years, body mass index (BMI) 26.4 ± 6.4 kg/m², among them 46 patients (72%) had III CHF functional class and 18 patients (28%) - II CHF functional class. The control group - 13 patients, age 53 ± 17 years, BMI was 25.4 ± 6.8 kg/m², 12 patients had III CHF functional class, 1 patient - I. The original estimated results of physical examination, laboratory parameters, CPET, quality of life (QOL), exercise tolerance (ET) was assessed at baseline and after 1,3,6 months of follow-up. The CPET served on treadmill using hardware "Oxycon Pro" , Jaeger, Germany. Echocardiography (EchoCG) were performed at baseline and after 6 months. The data were statistically processed using software package "Statistika, 6.0."

Results: In the main group after 6 months of training EF increased by 7.5 ± 0.5% and E/e diastolic volume decreased by 6 ± 2.6 ml/m². VO2 peak increased by 4.4 ml/min/kg. In the control group showed an increase EF 4 ± 1.1%, E/e diastolic volume decreased by 68 ± 14.4 ml/kg, the change of QOL 7.25 ± 2.72 points, VO2 peak increased by 1.7 ml/m²/kg. Revealed a strong positive correlation between the initial values of VO2 peak and EF (r=0.4, p<0.05), and between baseline levels of sodium, hemoglobin and the of physical rehabilitation efficiency (Na±=0.41, p<0.05), HB±=0.45, p<0.05). There was a positive impact of the initial content of red blood cells (6±=0.6, p=0.03), sodium (Na±=0.4, p=0.05). LV EF (r=0.5, p=0.05) and level VE at the peak of exercise load (r=0.5, p=0.01) on training efficiency.Conclusion. Aerobic physical exercise in CHF patients, selected on the basis of lactate threshold achievement during the CPET, is effective in improving values of CPET, EchoCG, QOL and increasing exercise tolerance.

P1955
Randomised pilot study into the effects of low frequency electrical muscle stimulation in advanced heart failure patients

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Background: Chronic heart failure patients have limited treatment options and struggle to adhere to exercise training programmes. Low Frequency Electrical Muscle Stimulation (LF-EMS) may have the potential to reduce breathlessness and increase exercise capacity in this cohort. However, the practical feasibility of a randomised controlled trial (RCT) of LF-EMS in this debilitated population has not been established.

Methods: Using a double blind, randomised study design, 60 severe heart failure patients (New York Heart Association class III-IV) were assigned to 8 weeks (5 x 60 min) of LF-EMS (skin level stimulation only) of the quadriceps and hamstrings muscles. Participants used the LF-EMS straps at home and were supervised weekly. Recruitment, adherence and tolerability to the intervention were measured during the trial as well as physiological outcomes (6 minute walk, quadriceps strength, quality of life and physical activity).

Results: 12 (20%) of the 60 patients (4 LF-EMS, 8 SHAM) withdrew. Reasons for dropout were: deterioration in health (n=1) and found the stimulation intolerable (n=3). Forty One patients (68.3 %), adhered to the protocol for at least 70% of the sessions. The physiological measures indicated improvement in the LF-EMS group in 6 minute walk distance, and quality of life, although not significantly.

Conclusion: Chronic heart failure patients can be recruited to and adhere to LF-EMS studies and find it tolerable. A larger Randomised Controlled Trial (RCT) in the advanced heart failure population is therefore feasible.

P1956
Residual pulmonary hypertension after endarterectomy: what remains to be clarified?

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Introduction: Chronic thromboembolic pulmonary hypertension (CTEPH) is potentially curable by pulmonary endarterectomy (PE). However, residual pulmonary hypertension (PH) after surgery is common, and its impact on long-term outcome is unknown.

Objectives: Evaluate the impact of residual PH and its predictors, as well as the predictors of functional improvement and decrease in NT-proBNP levels.

Methods: Longitudinal analysis of CTEPH patients followed in a reference center for the treatment of PH, submitted to PE abroad. Logistic regression was used to identify predictors of residual PH and of improvement in functional class, NT-proBNP levels and 6-minute walk test (6MWT) distance.

Results: Twenty-one patients (62% females, age 54 ± 12 years) were included. Before surgery 86% were in WHO functional class III or IV, the mean distance walked in the 6MWT was 352 ± 157 meters, NT-proBNP was 11.0 ± 5.4 WU. After surgery, 57.9% of the patients had residual PH (NT-proBNP ≥ 13 mmHg and pulmonary vascular resistance (PVR) was 11.0 ± 5.4 WU). During a follow-up of 972 ± 802 days, cardiovascular mortality was 4.8% (n=1). The presence of residual PH was not associated with overall or cardiovascular mortality, and both functional class improvement and NT-proBNP decrease were similar in patients with and without
residual PH. However, patients with residual PH were more likely to have an increase in 6MWT distance above the mean (90 meters) (p = 0.038). Echocardiographic PASP >81 mmHg (OR 16.5, 95% CI 1.1-235.2, p = 0.043) and invasive PASP >67 mmHg (OR 13.3, 95% CI 1.05-169.6, p = 0.046) were preoperative predictors of improvement of at least 2 functional classes, whereas sildenafil therapy (OR 21.0, 95% CI 1.5-293.3, p = 0.024) was a predictor of increased distance in 6MWT >90 meters. On the other hand, right ventricular systolic dysfunction (OR 20.0, 95% CI 1.4-292.4, p = 0.027), distance in 6MWT < 300 meters (OR 55.0, IC 95% 2.8-1068.4, p = 0.008), and cardiac index < 1.95 L/min/m² (OR 22.0, 95% CI 1.5-314.3, p = 0.023) were predictors of a decrease in NT-proBNP levels above the mean (100 pg/mL).

Conclusions: Although the majority of patients submitted to PE maintain residual PH, this is not associated with increased mortality or lack of clinical or laboratory improvement. It remains unclear which hemodynamic cut-offs predict long-term outcomes. The study also suggests that patients with worse clinical, echocardiographic and hemodynamic profile before surgery are those with greater benefit after intervention.

P1957
Circulating biomarkers for the detection of the pre-capillary component in patients with pulmonary hypertension due to left heart diseases

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Pulmonary hypertension due to left heart diseases (PH-LHD) is a prevalent disease, which supposes important morbidity and mortality and is associated with right ventricular function impairment. PH-LHD can be classified in post-capillary PH or combined PH, attending to the presence or not of a pre-capillary component (PCP). This component implies the existence of intrinsic pulmonary vascular disease, with serious consequences for the right chambers. It is assumed that in pre-capillary PH-LHD an endothelial dysfunction occurs playing a key role for its development.

The aim of this study is to assess if there is an association among the blood levels of several circulating biomarkers and the presence of PCP. Fifty-five patients with advanced heart failure who had a right heart catheterization (RHC) were included. A blood sample from the pulmonary trunk was drawn. Fourteen proteins related with the physiopathological mechanisms of PH-LHD were selected (von Willebrand factor, ADMA, ET-1, VEGF, angiopoietinlike4 –ANGPLT4-, cathapsin B, galectin 1, TIMP2, MMP7, osteonectin, NT-proBNP, troponin T, fibrinogen and D-dimers and their levels measured by enzimoimmunoassay (ELISA). Protein levels association with PCP (considered as a transpulmonary gradient –TPG- ≥12 mmHg or a diastolic pressures difference –DPD- ≥ 7 mmHg) was analysed using T-student test.

Among the included patients, 25 had dilated cardiomyopathy (DCM) and 30 had ischemic cardiomyopathy (ICM). In the DCM group, two proteins achieved significance differences; osteonectin (p < 0.01) when PCP presence was measured by using the DPD. In the ICM group three were the proteins that achieved differences; TIMP-2 (p = 0.01) using TPG, and VEGF (p = 0.02) and D-Dimers (p = 0.03) using DPD.

There are several proteins that could be of potential use as biomarkers for detection of the PCP. Based on the aetiology of the heart failure, the selected proteins would be ANGPTL-4 and osteonectin for DCM, and TIMP-2, VEGF and D-Dimers for ICM.

P1958
The valuable cardiac magnetic resonance imaging parameter for the noninvasive assessment of pulmonary hypertension severity

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Pulmonary hypertension characterized by structural and mechanical changes in pulmonary vascular bed. Invasively calculated pulmonary artery (PA) stiffness indexes are associated with mortality in pulmonary hypertension. CMR-derived pulmonary artery distensibility (PAD) index reflects vascular remodeling in patients with pulmonary hypertension (PH). The aim of the study was to evaluate the relationship between noninvasive PAD index and invasive PA stiffness indices and basic determinants of PH severity.

Methods: We included 48 pts with PH (mean age 42 ± 14 yrs, m/f: 13/35); 27 idiopathic pulmonary arterial hypertension (IPAH) pts, 5 scleroderma (Sc) PAH pts, 6 pts corrected congenital heart disease (CHD) and 10 pts with inoperable CTPEH. All pts underwent 6-min walk test (6MWT), right heart catheterization (RHC), ECHO, CMR, cardiopulmonary exercise testing (CPX) and serum NT-proBNP level. PA stiffness index and elastic modulus were calculated using data from RHC and CMR. PA distensibility index (%) were derived from cross-sectional images of the main pulmonary artery on CMRI and was defined as [maximal cross sectional area (CSA) - minimum CSA]/ minimum CSA

Results: We revealed increased PA stiffness index 6.1 (4.6–10.2) and elastic modulus 424 mm Hg (254–678), decreased PAD index in PH pts 10% (9–16.5). There was a significant negative correlation between PAD and elastic modulus (r = -0.91; p < 0.001), also ECHO signs of RV systolic dysfunction (lower TAPSE (1.7 ± 0.4 cm versus 2.0 ± 0.4 cm; p = 0.06), tricuspid annular systolic velocity (10±2 versus 12±0.4 cm/sec; p = 0.07), global RV myocardial deformation (13 ± 4 versus 21 ± 5%; p<0.001) and RV fractional area change (24 ± 7% versus 37 ± 7%; p<0.001) and reduced cardiac output which were determined by RHC (4.0 ± 1.1 versus 4.9 ± 1.2 l/min; p < 0.05). Decreased PAD index < 20 % was associated with VO2peak reduction (15 ± 4 vs 20 ± 4 ml/kg/min, respectively; p = 0.04).

Conclusions: Noninvasive CMRI-derived PA distensibility index strongly correlated with PA stiffness indexes, and may be used for noninvasive assessment of PH severity and progression.
Interalveolar and alveolar pulmonary edema is the result of elevated pulmonary veins pressures. The early and correct diagnosis of venous pulmonary hypertension prevents the one of the most common reasons for hospitalization of patients with heart failure and decreases high risk of mortality. The aim of the study was the development early non-invasive diagnostic venous pulmonary hypertension. We investigated pulmonary vein’s maximum diameter during atrial systole and pulmonary vein’s maximal diameter during heart’s diastole by transthoracic echocardiography in 92 chronic heart failure patients (65.4 ± 6.4 years) with preserved left ventricular ejection fraction, complicated by hypertensive disease. All patients hadn’t chronic and acute respiratory diseases. The patients were divided into 2 groups: 50 heart failure patients with X-ray signs of pulmonary venous congestion, and 42 heart failure patients with normal pulmonary X-ray pattern. The control group is a 34 people (45.2 ± 3.9 years) without cardiovascular diseases. Values are expressed as mean ± SEM. T-test was used when comparing means. p < 0.05 was considered statistically significant.

In the present study, we visualized three pulmonary veins: left superior pulmonary vein, left lower pulmonary vein and right upper pulmonary veins by the transthoracic echocardiography. The maximal pulmonary vein’s diameter of heart failure patients with X-ray signs of pulmonary venous congestion was increased compared to patients of the control group (24.7 ± 1.1 mm vs 14.7 ± 0.2 mm (p < 0.001)) and heart failure patients with normal pulmonary X-ray pattern (24.7 ± 1.1 mm vs 15.8 ± 0.6 mm (p < 0.001)). The minimal diameter of visible pulmonary vein during atrial systole of heart failure patients with X-ray signs of pulmonary venous congestion was increased compared to patients of the control group (14.1 ± 1.0 mm vs 12.4 ± 0.3 mm (p < 0.001)) and heart failure patients with normal pulmonary X-ray pattern (14.1 ± 1.0 mm vs 7.5 ± 0.7 mm (p < 0.001)).

The pulmonary vein diameter during heart’s diastole is more than 18 mm and the pulmonary vein diameter during atrial systole is greater than 9 mm were observed in the 95% heart failure patients with X-ray signs of pulmonary venous congestion. Thus, if heart failure patients have maximal pulmonary vein’s diameter more than 18 mm, and minimal pulmonary vein’s diameter greater than 9 mm we can to diagnose venous pulmonary hypertension with probability of 95%. Thus, early diagnosis of venous pulmonary hypertension by the transthoracic echocardiography allow timely will initiate therapy and decreases hospitalizations from decompensated left heart failure.

**P1960**

Prevalence of pulmonary hypertension and associated comorbidities in mexican patients hospitalized in a tertiary-referral hospital

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**Background:** Pulmonary hypertension (PH) is associated with poor quality of life and decreased survival, which vary according its severity and etiology. However, there are only a few large-scale reports on the incidence, prevalence and underlying etiologies of PH.

**Purpose:** To determine the prevalence of PH and its main comorbidities in Mexican patients hospitalized in a tertiary-referral hospital.

**Methods:** A cross-sectional study was conducted in hospitalized patient between the years 2014-2016. Comorbidities were assessed according to International Statistical Classification of Diseases and Related Health Problems 10th Revision. Subjects older than 18 years were included; subjects with congestive heart disease were excluded.

**Results:** We included 8,681 patients (age 49.85 ± 17.90 years). PH prevalence was 4.33% (n = 298). Those patients with PH were older (57.48 ± 15.19 vs. 49.58 ± 17.93, p < 0.001) ranging from 18 to 94 years; 60.7% were women. Compared with those without PH, patients with PH had a higher prevalence of cor pulmonale (19.8% vs. 1.4%, p < 0.001) and COPD (13.8% vs. 6.5%, p < 0.001), of which more than half (56.09% vs. 39.29%, p < 0.001) presented with acute exacerbation; pulmonary thromboembolism (12.8% vs. 1.9%, p < 0.001); sleep apnea (11.1% vs. 2.3%, p < 0.001); hypersensitivity pneumonitis (8.7% vs. 1.8%, p < 0.001); pulmonary fibrosis (6.7% vs. 1.5%, p < 0.001); deep vein thrombosis (3.7% vs. 1.0%, p < 0.001); ischemic heart disease (2.3% vs. 1.0%, p = 0.042); systemic lupus erythematosus (2.0% vs. 0.4%, p < 0.001). The in-hospital stay was 13.62 ± 8.58 days in the PH group and 11.90 ± 12.16 in those without PH.

**Conclusions:** PH is a condition associated with multiple comorbidities and these are related to higher morbidity and mortality, hence early detection and timely treatment is necessary to reduce economic impact and mortality.
P1694
Prevalence of prognostic factors in pulmonary hypertension
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Pulmonary hypertension (PH) is a multi-factorial condition associated with high morbidity and mortality. It requires for its diagnosis and treatment a multidisciplinary approach. In the past decades there have been many advances in the epidemiological, pathophysiological and therapeutic knowledge of the disease. However, there is little information available regarding clinical and prognostic factors in patients diagnosed with PH in Latin America.

Purpose: Determine the prevalence and clinical characteristics of adverse prognostic factors in a population with recent diagnosis of PH.

Methods: Patients with recent diagnosis of PH (≤ 7 days) confirmed by right heart catheterization, with a mean pulmonary-artery pressure (MPAP) ≥ 25 mm Hg (using a Swan Ganz Catheter) from three heart failure and pulmonary hypertension services were analyzed between March 2012 and December 2016. According to the recommendations of international guidelines, the following data were recorded: Personal data, PH group (I), clinical features: symptoms, functional class FC. Direct hemodynamic parameters: pulmonary pressures (PP), wedge pressure (WP), right atrium pressure (RA) and cardiac index (CI). Functional: 6 minute walk (6MW) test distance. Echocardiographic variables: right ventricle systolic function (RVFS), tricuspid annular plane systolic excursion (TAPSE), systolic pulmonary pressure and presence of peripheral edema (PE). Data obtained were analyzed with BioStat 5.3 program. Adverse prognostic factors identified were: history of heart failure (HF), syncope, advance functional class (III-II), performance in the 6MW test ≥ 350 m, presence of PE, TAPSE <15 RA ≥ 12 C.I ≤ 2.2.

Results: Multicenter, observational, descriptive, consecutive and prospective study. 107 patients were included. 74% women. Mean age was 58.8 (± 19 years), 33% ≥ 70. The mean delay in diagnosis was 24 months after the first sign or symptom recorded. PH group distribution: GI 63%, GII/III/IV, 28%, GIV 6% and GIV/VI. FC of presentation: 14%, II-IV0%, III4% and IV/IV0%. History of HF in 72%, syncope in 23%. 6MW mean distance walked was 320 (± 148) meters, 47% performed ≤ 350 meters. RHC; MPAP 48.3 (± 16) mmHg, RAP 9.7 mmHg (± 5.2) and CI 2.9 (± 15 mmHg 27%), CI 2.2, 7.6 meters/min/m². Echocardiographic data show: 79% impaired FSVD (42% slight, 18% moderate and 19% severe). Mean TAPSE 17.9 (± 4.4), ≤ 15 mm 37% and PE in 25%.

Conclusions: In our population with confirmed pulmonary hypertension, with a predominance of group I, we had a high presentation in over 70 years of age. At diagnosis time a high number of patients present adverse prognostic factors. This findings remark the need to use early diagnosis and therapeutic strategies.

P1695
Pulmonary hypertension due to left heart disease and etiology of heart failure
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Introduction: Heart failure (HF) is a clinical condition with a miscellaneous background. The most prevalent cause of HF in Europe is coronary artery disease (CAD). Depending on etiology of HF, its natural history may vary. Left heart disease (LHD) is the main cause of pulmonary hypertension (PH), which in turn is considered a risk factor for worse outcomes in patients with heart failure (HF).

Aim: Evaluation of HF patients with reduced ejection fraction (HFrEF) undergoing qualification for heart transplantation with and without pulmonary hypertension due to left heart disease with regard to etiology of HF.

Methods: This was a prospective analysis of 211 patients (both genders) with HFrEF (left ventricular ejection fraction <40%), with ischemic (ICM) (43%) and non-ischemic cardiomyopathy (NICM) (57%), hospitalized at a tertiary health care center, undergoing qualification process for heart transplantation. The following items were analyzed: medical history, epidemiological data, laboratory test results (including BNP), and chosen parameters obtained in echocardiography, cardiopulmonary exercise testing (COPET) and RHC (thermodilution method). PH was diagnosed according to the ESC guidelines.

Results: Mean age of analyzed population was 51.7 ± 10.3 years. Most patients were men (88%), 73% were in NYHA class 3 and 4. Patients with ICM were significantly older (p < 0.005) and without any gender differences with lower BNP level (p = 0.005) and higher mean aortic pressure measured invasively (p = 0.036). Patients presented PH and ischemic etiology of HF were older (p = 0.005), had lower BNP (p = 0.006) and TSH (p = 0.004) and higher mean pulmonary artery pressure (p = 0.035) and transpulmonary gradient (TPG) measured invasively without any significant differences in echocardiography or COPET.

Conclusions: PH occurred with the same frequency in ICM and NICM group, but...
ischemic etiologic of HF in PH patients was associated with lower level of BNP and with higher PAPm and TPG with no differences between echocardiography or CPET.

**P1966**
Experience with macitentan in patients with pulmonary hypertension in a reference hospital
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1Hospital Universitario y Politécnico La Fe, Heart and Failure and Transplant Unit, Cardiology Department, Valencia, Spain; 2Hospital Universitario y Politécnico La Fe, Pharmacy department, Valencia, Spain; 3University of Valencia, Physiotherapy Department, Valencia, Spain; 4Hospital Universitario y Politécnico La Fe, Rheumatology Department, Valencia, Spain; 5Hospital Universitario y Politécnico La Fe, Valencia, Spain; 6Instituto de Investigación Sanitaria La Fe, Valencia, Spain

On behalf of: Heart Failure and Transplant Unit. Cardiology Department

**Funding Acknowledgements:** This study was supported with grants from the Instituto de Salud Carlos III, FEDER “Unión Europea, Una forma de hacer Europa” (PA 14/0184)

**Background/Introduction:** Nowadays, analyzing security and efficacy of macitentan after administering it for any reason is considered to be of special relevance. To describe the clinical profile and the follow-up results (security and efficacy) of patients with PH treated with macitentan.

**Methods:** From the 1st of July 2015 to the 31st of December 2016 all patients treated with macitentan who were prescribed during hospitalization were retrospectively and consecutively recruited. Demographic, echocardiographic, hemodynamic and clinical data and functional status were assessed.

**Results:** 13 patients were assessed. 6 patients had group I PH and 6 had group II PH. Table 1 shows the clinical profile, treatment indication and tolerance of 13 patients. It was a well-tolerated treatment for most patients (92%), and 11 of 13 patients (85%) improved their functional class with respect to previous status without having prescribed macitentan. In the follow-up 4 deaths (31%) were registered. Causes of death are shown in table 1.

**Conclusions:** Macitentan is an approved drug for PAH. Nevertheless, our patients have also shown positive results for group II PH. It is a well-tolerated drug in most of our patients, and it has been related with an improvement of the functional class in most cases. Studies with longer follow-up and a larger sample are needed.

**RIGHT VENTRICULAR FUNCTION**

**P1967**
Exercise echocardiography to evaluate right ventricular afterload in post-pulmonary endarterectomy patients
A R Ana Rita Almeida 1; L Lopes1; MJ Loureiro1; D Repolo1; AR Pereira1; S Alegria1; F Ferreira2; P Fazendas3; H Pereira1
1Hospital Garcia de Orta, Almada, Portugal

**Introduction:** Despite near normal resting mean pulmonary artery pressures (mPAP) and pulmonary vascular resistance (PVR) after pulmonary endarterectomy (PEA), abnormal increase in right ventricular (RV) afterload may be apparent during exercise and may explain the reduced exercise capacity that persists in many patients. Right ventricular afterload is better described using measures of both resistive (PVR) and pulsatile load (pulmonary arterial compliance (PAC)).

**Purpose:** Evaluate RV afterload at rest and during exercise in patients after PEA and demonstrate that we can do this evaluation non-invasively with exercise echocardiography (EE).

**Methods:** Study using information recovered from EE. EE was done using treadmill ergometer and modified Bruce protocol until exhaustion. During exercise they went symptomatic, arterial pressure and ECG monitoring.

To evaluate RV afterload we used measures of:
• total pulmonary vascular resistance (TPVR) = mean pulmonary artery pressure (mPAP)/cardiac output (CO); for this we had to evaluate mPAP = PSAP (pulmonary systolic artery pressure) x0.6 + 2, where PSAP=RV+RA (right atrium) gradient + RA pressure estimate and CO=LVSV/left ventricular stroke volume (LVOT VTI x LVOT area) x heart rate. RA pressure estimate is ac: IVC to desima caval < 21 mm and collapsibility index (CI) > 55% - RAP = 3 mmHg; NC >21 mm and CI < 50% - RAP = 15 mmHg; Intermediate values = 8 mmHg.
• tricuspid compliance (CP) = (RVSV/3)/RVSP (right ventricular stroke volume/pulmonary systolic pressure (PPP); where RVSV=LVSV in shunt absence and PPP=PSAP-PA (pulmonary diastolic artery pressure), where PDAP=PA+RV gradient (in late diastole using pulmonary regurgitation jet) + RA pressure estimate.

We analyze results using SPSS version 21.

**Results:** The group of post PEA patients consisted of 13 patients at least 6 months after PEA, with mean age of 57.0±11.7 years, 7 females. We verified a significant increase in mPAP (16.2±5.7 at rest (R) vs 36.8±10.3 mmHg at peak exercise (PE) (p < 0.001) and in CO (5.8±1.0 at R vs 9.7±2.7 L/min at PE (p < 0.001)). The TPVR didn’t decrease (4.5±2.0 (R) vs 4.1±1.8 Wood (PE) (p = 0.512) and PAC decreased significantly (2.5±1.5 (R) vs 1.3±1.0 (PE) (p = 0.01)).

**Conclusions:** In patients after PEA, TPVR does not decrease significantly with exercise, unlike what succeeds in healthy people; and CPA decrease significantly, both factors contributing to increased in RV afterload with exercise. It is possible to study TPVR and CPA using exercise echocardiography.

**P1969**
TAPSE as a simple echocardiographic parameter predicting exercise capacity in patients with advanced heart failure
A Anna Dromhorne1; M Lipzynska1; T Rywik1; K Kozun1; K Zulewska1; K KodziszeWSka1; K Komuda1; T Zaleski1
1Institute of Cardiology, Warsaw, Poland; 2Medical University of Warsaw, Warsaw, Poland

**Funding Acknowledgements:** The study was supported by Institute of Cardiology statutory grant no. 2.45/WI/15

**Background:** Reduced physical activity is an obvious consequence of disease progression in patients with heart failure, as impaired left ventricle function leads to deterioration of mechanisms that regulate response to increased physical exertion. The aim of this study was to determine the echocardiographic factors that affect exercise capacity in patients with advanced heart failure.

**Material and methods:** Fifty patients referred for evaluation for heart transplantation – 42 men and 8 women (aged 55.5±7.6 years) with advanced heart failure (NYHA II-III/EF ≤35%, mean 21.7±5.4%) underwent complex cardiologic assessment, including laboratory tests, echocardiography, cardiopulmonary exercise test (CPX) and right heart catheterization. CPX was performed on a bicycle ergometer according to RAMP protocol 10 Watt/min, measuring i.e. maximum workload, VO2, pVO2 adjusted for age and sex, anaerobic threshold, VE/VO2 slope, PIER, VO2-HR, VO2(WR) slope. Left and right ventricle function and size were assessed using 2D-mode, tissue Doppler and speckle-tracking echocardiography. Statistical correlation between echocardiographic and capacity indexes was tested.

**Results:** Among all echocardiographic parameters, the tricuspid annular plane systolic excursion (TAPSE) and tissue Doppler-derived right ventricular systolic excursion velocity S’ were the most strongly correlated with exercise capacity indexes – statistically significant correlations were noted with, respectively, six and five out of 8 estimated parameters (for example, TAPSE positively correlated with pVO2; r=0.41, p = 0.03). Moreover, in patients whose pVO2 value was above the median value in the whole study population, TAPSE was on average 2.2mm higher than in the group with pVO2 below the median (18.04±3.14 vs. 15.83±3.28, p = 0.02). Other echocardiographic parameters were correlated with none (i.e., UEF, UEDEK), only with one (i.e., left and right ventricle GLS) to a maximum of three (i.e., RVOT dimension and RVOT ACT) capacity indexes.

**Conclusion:** Exercise capacity of patients with advanced heart failure strongly depends on ventricle function, which can be simply assessed by measuring TAPSE.

**P1970**
Exercise echocardiography to evaluate right ventricular function in post-pulmonary endarterectomy patients
A R Ana Rita Almeida 1; L Lopes1; MJ Loureiro1; D Repolo1; AR Pereira1; S Alegria1; F Ferreira2; P Fazendas3; H Pereira1
1Hospital Garcia de Orta, Almada, Portugal

**Introduction:** Right ventricle (RV) contractile reserve has not been quantified in post-pulmonary endarterectomy (PEA) patients, despite RV function being the main predictor of outcome and exercise capacity, irrespective of any change in PVR.

**Purpose:** Evaluate RV function at rest and during exercise in patients after PEA, trying to understand the mechanisms that can limit functional capacity and demonstrate that we can do this evaluation non-invasively with exercise echocardiography (EE).

**Methods:** Study using information recovered from EE. EE was done using treadmill ergometer and modified Bruce protocol until exhaustion. During exercise they went symptomatic, arterial pressure and ECG monitoring.

To evaluate RV function we used measures of: RVSV (right ventricular stroke volume indexed to body surface area) = LVSV (left ventricle stroke volume indexed to body
Conclusions: It is possible to study RV function using exercise echocardiography.

Results: As regard systolic function measured by modified Simpson’s method, ejection fraction was similar in both groups(p=0.51 vs 64.4 ± 4.6, p<0.02).

As regard diastolic function, echocardiography showed significantly lower minimal velocity of early diastolic filling (E) and ratio of maximal early to late diastolic filling (E/A) in the patient group.(46.6 ± 9.3 ms/cm vs 51.7 ± 8.5 cm/s, p<0.001).

E/e' was significantly lower in the patient group.(5.6 ± 4.9 vs 5.0 ± 3.8, p<0.001).

Conclusions: Coronary slow flow phenomenon is associated with left ventricular dysfunc.

Echocardiographic parameters

<table>
<thead>
<tr>
<th>CSFPn=100</th>
<th>Controlvaluen=50</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td>LVEDV (cm)</td>
<td>3.26 ± 0.59</td>
<td>3.14 ± 0.53</td>
</tr>
<tr>
<td>LVESD (cm)</td>
<td>5.15 ± 0.5</td>
<td>5.02 ± 0.52</td>
</tr>
<tr>
<td>EF</td>
<td>62.2 ± 5.1</td>
<td>64.4 ± 4.6</td>
</tr>
<tr>
<td>LVEDV (ml/m²)</td>
<td>101.3 ± 30.2</td>
<td>100.2 ± 26.2</td>
</tr>
<tr>
<td>LVESV (ml/m²)</td>
<td>45.7 ± 16.2</td>
<td>42.2 ± 13.2</td>
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<tr>
<td>E wave (cm)</td>
<td>54.5 ± 6.9</td>
<td>74.5 ± 12.5</td>
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<tr>
<td>A wave (cm)</td>
<td>50.5 ± 10.3</td>
<td>51.8 ± 9.1</td>
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<tr>
<td>E/E'</td>
<td>11.5 ± 0.29</td>
<td>1.44 ± 0.17</td>
</tr>
<tr>
<td>DT (ms)</td>
<td>216.3 ± 62.9</td>
<td>220.0 ± 21.1</td>
</tr>
<tr>
<td>NRT</td>
<td>100.2 ± 14.2</td>
<td>92.6 ± 16.4</td>
</tr>
<tr>
<td>e' (cm/s)</td>
<td>8.6 ± 1.67</td>
<td>14.9 ± 2.78</td>
</tr>
<tr>
<td>S' (cm/s)</td>
<td>6.4 ± 0.78</td>
<td>5.03 ± 0.83</td>
</tr>
</tbody>
</table>

Mitral stenosis is a long term complication and the most important sequel of acute rheumatic fever. The dogma is that there is no left ventricular dysfunction during mitral stenosis (MS). The aim of the study is to determine left ventricular (LV) dysfunction by tissue Doppler imaging (TDI) and speckle tracking echocardiography (STE) in MS patients who had no clinical signs of heart failure.

Methods: Our study was an observational study. The population included 44 patients with isolated mitral stenosis and mitral valve area <2 cm² (Group 1) and 44 healthy control subjects (Group 2). Standard echocardiographic methods, TDI and STE were performed to assess LV function in all participants.

Results: Mean age was 39 years old; 12 with female predominance. Left ventricular (LV) ejection fraction (EF) was in the normal ranges in both groups (60.9 ± 4.8% vs 61.75 ± 6.9%, p = 0.21). Systolic myocardial velocity was significantly lower in Group 1 than in Group 2 (10.1 ± 1.7 cm/sec vs 11.29 ± 1.6 cm/sec, p = 0.04). The peak of global longitudinal strain GLS was significantly lower in Group 1 than in Group 2 (p = 0.009). Indeed, the apical systolic strain was significantly lower in Group 1 than in Group 2 (22.49 ± 8.22% vs 26.75 ± 5.36, p < 0.001 5). The same results were found with basal and median systolic strain (p<0.001 both). There is no correlation between severity of MS and the degree of systolic dysfunction particularly between mean GLS and mitral area (r=-0.17, p = 0.31).

Conclusion: Through our study, we demonstrated that LV dysfunction in patients with isolated MS and normal EF. The speckle tracking imaging may be useful to detect LV function in early stage of mitral stenosis.

P1973

Systolic left ventricular dysfunction in isolated mitral stenosis

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Mitral stenosis is a long term complication and the most important sequel of acute rheumatic fever. The dogma is that there is no left ventricular dysfunction during mitral stenosis (MS). The aim of the study is to determine left ventricular (LV) dysfunction by tissue Doppler imaging (TDI) and speckle tracking echocardiography (STE) in MS patients who had no clinical signs of heart failure.

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Conclusion: Through our study, we demonstrated that LV dysfunction in patients with isolated MS and normal EF. The speckle tracking imaging may be useful to detect LV function in early stage of mitral stenosis.

P1974

The impact of chronic cytomegalovirus infection on left ventricular hypertrophy

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Background: Recent studies revealed a possible relationship between cytomegalovirus (CMV) infection and cardiac disease, more specific atherosclerosis, hypertension and left ventricular hypertrophy (LVH). Characterized by a lifetime latency in mieloid cell lineage cells, but with high propensity for fibroblasts and

Poster session 3 499

P1972

Left ventricular function in patients with coronary slow flow

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Background: The coronary slow flow phenomenon(CSFP) has been linked to myocardial ischemia, life-threatening arrhythmias, sudden cardiac death and recurrent ACS. Hypothesis of its mechanism including early atherosclerosis, microvesSEL dysfunction, imbalance between vasoconstrictor and vasodilatory factors and platelet function disorder were proposed. How and to what extent do these etiological factors affect left ventricular (LV) function.

Aims: To evaluate LV function in SCF patients.

Material and methods: 100 patients with CSFP and 50 subjects with angiographically normal coronary arteries constituted the control group were included in the study. LV function is assessed by echocardiography study to determine left ventricular function.

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epithelial cells, and ability to periodically reactivate in subclinical events. CMV maintains a permanent, variable inflammatory response that contributes to arterial wall damage. The aim of our cross-sectional prospective study was to demonstrate the impact of chronic cytomegalovirus infection on hypertension and left ventricular hypertrophy.

Methods: One hundred and three patients aged between 22 and 65 years old, 55 women and 48 men, mean age 55.5 years old, with or without known cardiac disease were enrolled in the study from February to December 2016. An informed consent approved by the local Ethics Committee was signed by every patient before the participation to our study. At enrollment each patient filled a questionnaire concerning risk factors for cardiac disease (cigarette smoking, alcohol, diabetes, obesity, serum cholesterol levels, family risk factors). All patients underwent blood tests to determine their cholesterol levels and a quantitative immunoenzymatic test for specific CMV IgG antibodies (Dia.Pro Diagnostic Bioprobes SRL, Italy) and all of them carried out a complete physical examination with arterial blood pressure measurement and a cardiac ultrasound. Left ventricular mass and left ventricular mass indexed to total body surface area were determined using the Devereaux measurement and a cardiac ultrasound.

Results: IgG CMV antibodies were positive in all patients enrolled in our study demonstrating a very high seroprevalence for CMV in Romanian population in the fifth decade of life. From the total of 103 patients, 76 were diagnosed with hypertension (45 women and 31 men) and only 30 with LVH (22 women and 10 men). The ROC curve for LVH and hypertension did not demonstrate a very good accuracy for CMV as a prediction factor alone for any of these two conditions, but had a higher sensitivity for LVH.

Conclusions: Our study showed that chronic CMV infection can not be considered a prediction factor alone neither for hypertension nor for left ventricular hypertrophy in a 100% positive population for IgG CMV antibodies. However, in addition to other cardiac risk factors, chronic CMV infection might bring its contribution to the severity of cardiac disease by reactivation (high titers of IgG specific antibodies) and this is why further studies need to be conducted.

P1975 Can the severity of acute dyspnea predict the type of heart failure?
R Zémaite1; J Celutkiene2; AV Inikovas1; I Jonauskiene3; A Mebazaa4

ROC curve

Background/Introduction: Dyspnea is one of the most common symptoms of acute heart failure patients presenting to emergency rooms. If the severity of acute dyspnea is associated with the type of heart failure according to the new classification of the 2016 ESC Heart failure guidelines, remains unclear.

Purpose: We aimed to determine if the severity of acute dyspnea could be a predictor of the specific type of heart failure as distinguished in the new ESC classification.

Methods: Prospective observational cohort study enrolled consecutive patients admitted to the emergency department with acute dyspnea due to decompensated heart failure (HF) and other reasons. Study parameters: left ventricular ejection fraction (LVEF), dyspnea points and presence of atrial fibrillation (AF) were collected at the time of admission. Data of 387 study patients (mean age 70.3 years) with final HF diagnosis were included in the study and divided into three groups according to LVEF measured at the time of admission or using latest available echocardiography data: HF with reduced ejection fraction (HFrEF) group with LVEF less than 40% (n = 173), HF with mid range ejection fraction (HfMfEF) with LVEF 40-49% (n = 47) and HF with preserved ejection fraction (HfPEF) with LVEF ≥50% (n = 167). Patients were asked to rate dyspnea by visual-analog dyspnea scale (VADS) from 1 to 10 points; point range of 0-3, 3-6 and 6-10 was defined as low, moderate and high intensity dyspnea, respectively. Using random number generator, 47 patients were randomly selected to each of three groups. Subsequently, data of 141 patients were analyzed using SPSS v23 statistical package with One-way ANOVA.

Results: Of 141 examined patients 65 (46.1%) were female, 76 (53.9%) were male. Heart failure with mid range ejection fraction was found in 12.1%, HFrEF in 44.7% and HfPEF in 43.2% of study population. Mean of dyspnea points in HfPEF group was 6.3 ± 2.9, in HfMfEF group 7.3 ± 2.3 and in HFrEF group 7.5 ± 7.5 with no statistically significant difference (p = 0.03).

Conclusion: In the prospective observational cohort the majority of acute HF patients complained of high intensity dyspnea with no differences of intensity between the three types of heart failure.

<table>
<thead>
<tr>
<th>Dyspnea severity</th>
<th>Gender</th>
<th>AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>F</td>
<td>M</td>
<td>-</td>
</tr>
<tr>
<td>HFrEF</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>HfMfEF</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>HfPEF</td>
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<td>9</td>
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</table>

HFPEF - HEART FAILURE WITH PRESERVED EJECTION FRACTION

P1976 Effect of drug treatment on quality of life in heart failure with preserved ejection fraction: a systematic review and meta-analysis of randomised controlled trials
S Zheng1; FTS Chan2; S Ayls3

Background: Clinical drug trials in heart failure with preserved ejection fraction (HfPEF) have failed to consistently demonstrate mortality-reducing effects. Improvements in quality of life are of equally significant clinical importance and an outcome that has not been the focus of clinical trials.

Purpose: To examine whether clinical trials in HfPEF demonstrate improvements in quality of life compared with placebo or standard medical therapy.

Methods: We systematically searched MEDLINE, Embase and CENTRAL for randomised controlled trials (Jan 1996 to May 2016) assessing pharmacological treatments in HfPEF on quality of life. Inclusions/exclusions were adjudicated and data extracted by two independent investigators. The primary efficacy outcome examined was mean difference in quality of life (measured using the Minnesota living with heart failure questionnaire) between treatment and control groups. Trials were classified by drug type: beta-blockers (BB), angiotensin-converting enzyme inhibitors (ACEi), angiotensin receptor blockers (ARB), mineralocorticoid receptor antagonists (MRA) and other drug classes.

Results: Of 3561 articles identified in the search, nine trials reported the treatment effects on quality of life as measured by the MLHQ, including a total of 3510 patients (BB: 116, ACEi: 166, ARB: 2460, MRA: 444, Other: 324). Overall estimate showed that treatment was associated with statistically improved mean difference favouring treatment group (MD: -1.63, 95% CI: -2.94 to -0.31, P=0.001) (Figure 1). By individual class, only ARBs showed statistically significant difference favouring treatment (-1.84, 95% CI: -3.55 to -0.14), with ACEi and MRA showing a non-significant trend favouring treatment.

Conclusion: While quality of life scores were improved in HfPEF patients in clinical trials, the clinical significance of this small difference is uncertain. Trends in improvements were found with other drug classes that block renin-angiotensin-aleosterone axis (ACEi and MRA), though this was limited by small numbers of participants. Our study found that few trials measured quality of life as an outcome. It will be of increasing importance to determine if there are other benefits of treatments beyond mortality-reducing effects, including their effects on hospitalisation rates and exercise capacity.

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Prognostic impact of blood pressure values in patients with heart failure with preserved ejection fraction

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1Hospital Sao Teotonio, Cardiology, Viseu, Portugal

Introduction: Arterial hypertension (HT) is an important cardiovascular risk factor, with an increased risk of morbidity and mortality, especially with the increased risk of ischemic heart disease and stroke.

Objectives: To assess the impact of blood pressure (BP) values in patients (P) with heart failure with preserved ejection fraction (HFpEF).

Methods: We identified all P admitted for HF in a single center between 01/01/2009 and 31/12/2014. Only P with HFpEF were included. We considered 2 groups, according to BP values at admission: Systolic blood pressure (sBP) < 140 mmHg (gHyper) and sBP ≥ 140 mmHg (gHypo). We excluded all P with sBP < 90 mmHg at admission and those who had intermediate sBP (between 120-139 mmHg).

Clinical, imaging and analytical parameters were evaluated. We compared in-hospital mortality (IH), the combined endpoint (death / hospitalization for HF) at 12 and 24 months (M) and the survival curves of each group.

Results: Of a total of 1006 P, 350 met the inclusion criteria, 59.7% female, 79.4 years, p < 0.05 and mean age 79.3 ± 39.4, p < 0.014. The value of BNP in gHyper on discharge was 282 ± 85.7% vs 79.4 ± 8.7 years.

In-hospital mortality was 3.7%. The combined endpoint at 12M was 46.0% and 46.0%, p = 0.001 respectively (p < 0.001). There was a trend for gHypo to have a history of ischemic heart disease more frequently (11.7% vs 5.5%, p = 0.055). Prevalence of atrial fibrillation in gHypo 65.7% vs 54.2%, p = 0.044. The two groups were similar in the remaining comorbidities.

The value of BNP in gHypo on discharge was 282 ± 79.9% vs 79.4 ± 8.7 years. The urea value on admission was 61.9 ± 180/100mmHg and all-cause mortality.

Conclusion: This study showed that although gHyper have a higher number of cardiovascular risk factors, they appear to have a more favorable short and medium-term prognosis. Survival curves showed that gHypo have a greater number of adverse events at both 12 and 24M. These results raise the hypothesis that aggressive BP control could be unfavorable in P with HFpEF.

Aims: Heart failure with preserved ejection fraction (HFpEF) is a common disease with high incidence and increasing prevalence. Patients suffer from functional limitation, poor health-related quality of life (HRQol), and reduced prognosis. A pilot study in a smaller group of HFpEF patients showed that structured, supervised exercise training (ET) improves maximal exercise capacity, diastolic function and physical quality of life. However, the long-term effects of ET on patient related outcomes remain unclear in HFpEF.

Methods: The primary objective of Ex-DHF is to investigate whether a 12-months supervised ET can improve a clinically meaningful composite outcome score in HFpEF patients. Components of the outcome score are maximal exercise capacity, NYHA functional class, global self-rated health, diastolic function, hospitalizations and all-cause mortality.

After undergoing baseline assessments to determine whether ET can be safely performed, 322 patients in 11 trial sites with stable HFpEF were randomized 1:1 to supervised ET in addition to usual care or to usual care alone. Patients randomized to ET perform supervised endurance/resistance ET (1 h 3 times/week at a certified training centre) for 12 months. At baseline and during follow-up, anthropometry, echocardiography, cardiopulmonary exercise testing and HRQoL evaluation are performed. Blood samples are collected to examine various biomarkers. Overall physical activity, training sessions, and adherence are monitored and documented throughout the study using patient diaries, heart rate monitors and accelerometers.

Conclusions: The Ex-DHF trial is the first multicentre trial to assess the long-term effects of a supervised ET program on different outcome measures in patients with HFpEF.

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The incidence of heart failure and chronic kidney disease has been steadily increasing and will further increase due to aging of the general population and better treatment of acute cardiac and renal diseases. Identification of new reliable markers for diagnosis, prognosis of mortality and prevention of hospitalization is still necessary, it is not well known whether left atrial volume index (LAVI) has predictive value for prognosis in patients with ischemic chronic heart failure with preserved ejection fraction (HFpEF) and renal dysfunction.

**Purpose:** This study was aimed to assess the association between LAVI and outcomes in ischemic HFpEF with renal dysfunction patients.

**Methods:** We enrolled a total of 243 (80.3% men, mean age 58.7 ± 9.3 years) in-hospital patients diagnosed as HFpEF due to ischemic heart disease. Clinical and echocardiographic data at baseline were collected. Glomerular filtration rate (eGFR) calculated by the formula MDRD (Modification of Diet in Renal Disease). Mean GFR was 78.1 ± 18.1 ml/min/1.73m², mean ejection fraction 59.2 ± 8.4 %.

**Results:** The patients were followed for the development of major adverse cardiovascular (CV) events, including hospital readmission for decompensated heart failure, acute myocardial infarction, sudden cardiac death, stroke.

**Conclusions:** LAVI is a predictor of major adverse CV events independent of clinical ischemic HFpEF patients with renal dysfunction.

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The comorbidity in patients with heart failure and preserved ejection fraction depending on age

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The aim of our study was to analyze the frequency of comorbid diseases and the characteristics of treatment of patients with chronic heart failure (HF) and preserved ejection fraction (EF) depending on age.

**Background:** Despite the advances in medicine, heart failure is still the most common complication of many cardiovascular diseases and a major factor of mortality of old people. Number of patients with chronic heart failure and preserved ejection fraction is increasing, but there are no approved treatment recommendations yet.

**Methods:** retrospective analysis of 198 patients with heart failure and preserved ejection fraction (m = 106 pts, f = 92 pts). Patients were divided into 3 groups according to age: 1st - 40-59 years old (n = 74); 2nd - 60-75 (n = 73); 3rd - >75 years old (n = 51). The average EF (M ± m) = (63,6 ± 6,3)%.

**Results:** Comorbidity was observed in all examined patients. 169 pts had arterial hypertension. Revealed age changes in the comorbidity: prevalence increases with age changes in renal function (29,7% in the 1st group, 26% in 2nd and 29,4% in the 3rd), hypothyroidism (25,7% in the 1st group, 38,4% in the 2nd group and 23,6% in the 3rd), COPD (2,7% in the 1st group, 15,2% in the 2nd group and 7,8% in the 3rd), anemia (16,3% in the 1st group, 32,3% in the 2nd group and 39,2% in the 3rd group), hyperuricemia (16,2% in the 1st group and 21,6% in the 3rd). Thus in all age groups more than half of patients had obesity, hypertension, stable angina and a quarter of patients - diabetes. Heart attack and atrial fibrillation are more common for patients aged 60-75 years (31,5%). End-systolic size and end-systolic volume were the highest in the second group, than may indicate bad prognostic outcome. LAVI was 12.96 cm³/m² [OR: 2.32 (95% CI: 1.37-3.95, p = 0.001)], eGFR ≤ 60 ml/min/1.73m² [OR: 6.91, 95% CI: 1.73-27.5, p = 0.006] were independent predictors for major adverse CV events in ischemic HFpEF patients with renal dysfunction.

**Conclusions:** LAVI is a predictor of major adverse CV events independent of clinical ischemic HFpEF patients with renal dysfunction.
Conclusion: study all the patients chose the “on” mode.

Results: period.

Patients were asked which mode they preferred. Echocardiographic parameters, then a randomized, double-blind crossover study was conducted with 3-month screwing into the coronary sinus. After 1 month, baseline parameters were collected, then a randomized, double-blind crossover study was conducted with 3-month duration periods (PCD on then off vs off then on). At the end of the crossover, patients were asked which mode they preferred. Echocardiographic parameters, 6-minute walking distance and Nt-proBNP levels were studied at the end of each period.

Purpose: To confirm the effects of left atrial (LA) pacing in patients with HFpEF associated with IACD.

Methods: Patients presenting with HFpEF (LVEF >50%, NYHA III, or NYHA II and 1 hospitalization for CHF during the past year) were enrolled if echocardiography showed 1) an interatrial mechanical delay > 70 ms (difference between P-A’ intervals at the mitral and tricuspid annuli); 2) a shortening of the mitral A wave duration > 30 ms (difference between the tricuspid and mitral A wave durations). After informed consent, a double chamber pacemaker (PCM) was implanted with the atrial lead screwed into the coronary sinus. After 1 month, baseline parameters were collected, then a randomized, double-blind crossover study was conducted with 3-month duration periods (PCM on then off vs off then on). At the end of the crossover, patients were asked which mode they preferred. Echocardiographic parameters, 6-minute walking distance and Nt-proBNP levels were studied at the end of each period.

Results: 15 patients were studied. 1 patient was excluded because of definitive atrial fibrillation (AF), 3 patients had acute CHF during the off period requiring the activation of the PCM. Compared to the baseline and “off” periods, the active period resulted in significant improvements of most parameters (Table). At the end of the study all the patients chose the “on” mode.

Conclusion: LA pacing in patients with HFpEF and IACD improves LA emptying, LV filling, 6-min walking distance and Nt-proBNP levels. This technique could represent a promising treatment in some selected patients.

<table>
<thead>
<tr>
<th>Trait, N (%)</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>50 (24)</td>
<td>31 (13)</td>
<td>12 (16)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Concentric remodeling</td>
<td>107 (52)</td>
<td>94 (39)</td>
<td>20 (26)</td>
<td>8 (7)</td>
</tr>
<tr>
<td>Eccentric hypertrophy</td>
<td>9 (4)</td>
<td>22 (9)</td>
<td>3 (4)</td>
<td>11 (9)</td>
</tr>
<tr>
<td>Concentric hypertrophy</td>
<td>39 (19)</td>
<td>97 (40)</td>
<td>41 (54)</td>
<td>100 (84)</td>
</tr>
<tr>
<td>Global long. strain &gt;15.6%††</td>
<td>72 (36)</td>
<td>25 (18)</td>
<td>25 (65)</td>
<td>52 (89)</td>
</tr>
<tr>
<td>LA volume index, ml/m² ≥1.11††</td>
<td>39 (23)</td>
<td>6 (3)</td>
<td>0 (0)</td>
<td>54 (52)</td>
</tr>
<tr>
<td>Cardiac structure†</td>
<td>120 (100)</td>
<td>60 (39)</td>
<td>0 (0)</td>
<td>17 (33)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>5 (0)</td>
<td>70 (63)</td>
<td>17 (36)</td>
<td>18 (35)</td>
</tr>
<tr>
<td>Grade 4</td>
<td>0 (0)</td>
<td>45 (39)</td>
<td>28 (65)</td>
<td>31 (72)</td>
</tr>
<tr>
<td>E/A average &gt;15††</td>
<td>4 (5)</td>
<td>45 (39)</td>
<td>28 (65)</td>
<td>31 (72)</td>
</tr>
<tr>
<td>RV fractional area change ≤0.45††</td>
<td>55 (82)</td>
<td>0 (0)</td>
<td>46 (73)</td>
<td>30 (34)</td>
</tr>
<tr>
<td>Primary outcome†</td>
<td>55 (27)</td>
<td>74 (30)</td>
<td>28 (37)</td>
<td>50 (42)</td>
</tr>
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Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th><em>off</em> mode</th>
<th><em>on</em> mode</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>aortic VTI (cm)</td>
<td>23.5 ± 6.1</td>
<td>23.2 ± 6.5</td>
<td>NS</td>
</tr>
<tr>
<td>mitral E wave velocity (cm/s)</td>
<td>123.8 ± 23.5</td>
<td>107.3 ± 19.4</td>
<td>0.03</td>
</tr>
<tr>
<td>mitral A wave velocity (cm/s)</td>
<td>42 ± 12.1</td>
<td>60.2 ± 14.6</td>
<td>0.0001</td>
</tr>
<tr>
<td>E/A</td>
<td>3.1 ± 0.8</td>
<td>1.8 ± 0.4</td>
<td>0.002</td>
</tr>
<tr>
<td>E/e’</td>
<td>21.5 ± 7.1</td>
<td>16.1 ± 4.1</td>
<td>0.04</td>
</tr>
<tr>
<td>mitral A wave duration (ms)</td>
<td>119 ± 25.2</td>
<td>180 ± 19.7</td>
<td>0.08</td>
</tr>
<tr>
<td>interatrial mechanical delay (ms)</td>
<td>99 ± 21</td>
<td>-46 ± 77.3</td>
<td>0.003</td>
</tr>
<tr>
<td>systolic pulmonary artery pressure (mmHg)</td>
<td>47.2 ± 10.9</td>
<td>36.6 ± 8.0</td>
<td>0.0009</td>
</tr>
<tr>
<td>Nt-proBNP (pg/mL)</td>
<td>1854 ± 1824</td>
<td>1504 ± 1574</td>
<td>0.04</td>
</tr>
<tr>
<td>6-min walking distance (m)</td>
<td>288 ± 130</td>
<td>310 ± 105</td>
<td>0.04</td>
</tr>
</tbody>
</table>

P1983

Left atrial pacing for the treatment of heart failure with preserved ejection fraction associated with interatrial dyssynchon. Results from a randomized cross-over study

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Background: Heart failure with preserved ejection fraction (HFpEF) is still an orphan disease. We recently reported that interatrial conduction delay (IACD) could be a causal factor in some patients.

Purpose: To identify complex echocardiographic phenotypes in HFpEF.

Methods: 647 patients with symptomatic HF and an LVEF >50% enrolled in the Americas underwent echocardiography. Phenotypes were identified using latent class analysis based on LV structure, global longitudinal strain, left atrial volume index (LA/Vi), diastolic dysfunction (DD), average E/E’ and RV fractional area change. The primary outcome was a composite of CV death, aborted cardiac arrest, or HF hospitalization.

Results: 4 phenotypes were identified (Table), which corresponded to subjects with little LVH, no DD and RV dysfunction (206, 31.8%); intermediate LVH with (76, 11.7%) and without DD (246, 38.0%), and significant LVH with DD (119, 18.4%). Other defining factors included LA/Vi and E/E’ average, suggesting variation in LV filling pressure. Phenotypes were associated with significantly different rates of the primary outcome (27-42%, chi-square p = 0.025).

Conclusions: Cluster-based echocardiographic phenotyping identified subpopulations of HFpEF patients with varying combinations of LVH, DD, LV filling pressure and RV function that were predictive of poor clinical outcomes.

P1984

Essentials for understanding clinical trials outcomes after interventions in heart failure patients with preserved ejection fraction. Insights from the aldo-DHF cohort.

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1Charite - Campus Virchow-Klinikum (CVK), Department of Cardiology, Berlin, Germany; 2University Medical Center Göttingen (UMG), Department of Cardiology and Pneumology, Göttingen, Germany; 1University Julius Maximilian of Würzburg, Institute for Clinical Epidemiology and Biometry, Würzburg, Germany

Background: Understanding the probability for not just randomly changes in key parameters from echocardiography (E/e’, E/a), cardiopulmonary exercise testing (CPET) (peak VO2, VE/VO2, VO2 AT) and six minute walk test (6-MWT) (walking distance, Borg scale) is very important for the interpretation of clinical trials’ results after interventions in heart failure patients with preserved ejection fraction (LVEF < 50%).

Aims: Understanding the probability for not just randomly changes in key parameters from echocardiography (E/e’, E/a), cardiopulmonary exercise testing (CPET) (peak VO2, VE/VO2, VO2 AT) and six minute walk test (6-MWT) (walking distance, Borg scale) is very important for the interpretation of clinical trials’ results after interventions in heart failure patients with preserved ejection fraction (LVEF < 50%).
Methods: We analysed the results from the repeatedly after a week performed echocardiography, CPET and 6-MWT on 422 patients of the Aldo DHF trial with a mean age 67 years and NYHA II-III. The examinations at baseline and after a week (±2/3 day) were implemented under stable clinical conditions without any changes in medication. To visualize the values of E/e', E/A, peak VO2, VE/VO2, VO2 AT, walking distance, Borg scale and their limits Bland Altman analysis were used.

Results: As the Altman plot indicates one could not find any systematic bias for the different measurements. There is a low-retest probability for 6-MWT’s distance and Borg scale as well as for the commonly used echocardiographic value E/e’ (t-test significance: 0.016). Only CPET shows a good reliability for peak VO2, VE/VO2 slope and VO2 AT (t-test significance: 0.006, 0.41 and 0.062, respectively) and e/a (t-test significance: 0.9).

Conclusion: We have to rethink our concept regarding the usefulness E/e’ for any finding in clinical trials for HFpEF populations since it is not reliable, supremely. CPET parameters in contrast to the commonly used E/e’ seem to be reliable with a high retest probability and therefore are strongly recommended for evaluation of clinical trial’s interventions in cohorts with HFpEF. Changes in value within the mean difference and the standard deviation are likely to be random findings and have no significance for any intervention’s influence. Since 95% of variations in measurements with no intervention are within the values of the upper and bottom limits of the table 1, you will expect the opportunity of ‘real’ findings beyond these limits.

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>Upper limit</th>
<th>Lower limit</th>
<th>T-test significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>E/e’</td>
<td>0.14</td>
<td>1.48</td>
<td>3.07</td>
<td>-2.72</td>
<td>0.016</td>
</tr>
<tr>
<td>E/A</td>
<td>0.001</td>
<td>0.19</td>
<td>0.38</td>
<td>-0.38</td>
<td>0.9</td>
</tr>
<tr>
<td>Peak</td>
<td>0.18</td>
<td>1.50</td>
<td>3.09</td>
<td>-2.81</td>
<td>0.062</td>
</tr>
<tr>
<td>VO2 (ml/kg/min)</td>
<td>0.65</td>
<td>3.73</td>
<td>7.36</td>
<td>-7.25</td>
<td>0.77</td>
</tr>
<tr>
<td>VE/VO2 slope</td>
<td>0.09</td>
<td>2.12</td>
<td>4.23</td>
<td>-4.06</td>
<td>0.41</td>
</tr>
<tr>
<td>VO2 AT</td>
<td>8.63</td>
<td>41.31</td>
<td>72.34</td>
<td>-89.60</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Borg scale</td>
<td>0.18</td>
<td>1.29</td>
<td>2.36</td>
<td>2.71</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Altman plots could not be uploaded.

Methods: In a four-year prospective cohort, among patients having LVEF ≥ 50%, we compared postoperative inhospital mortality after cardiothoracic surgery between HFpEF and control patients. HFpEF was defined as symptomatic HF with LVEF ≥ 50%, New York Heart Association functional class ≥ 2 and elevated BNP (above 100 pg/ml). Cox model regression was used for statistical analysis with adjustment on EuroSCORE II.

Results: 1743 patients were included, among whom 427 (24.5%) presented HFpEF. Global postoperative inhospital mortality was 4.1%. Mortality was higher among HFpEF patients (7.0% vs 3.2%, p-value < 0.001). In multivariate analysis, HFpEF was independently associated with postoperative inhospital mortality (adjusted hazard-ratio=1.6 (95CI 1.0-2.6), p = 0.049).

Conclusion: In our cohort, HFpEF was a risk factor of mortality after cardio-thoracic surgery.

P1986
Heart failure with preserved ejection fraction as risk factor of mortality after cardiothoracic surgery
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Background: Heart failure (HF) with preserved ejection fraction (HFpEF) is a syndrome that occurs in one-half of all patients with HF. While considering an important risk factor of adverse medical outcomes, its prognostic role in cardiac and thoracic surgery is still unclear. We aimed to investigate its prognostic value after cardio-thoracic surgery.

Baseline characteristics

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Control (n = 1316)</th>
<th>HFpEF (n = 427)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67.3 (+/-11.3)</td>
<td>71.5 (+/-10.8)</td>
</tr>
<tr>
<td>Male gender</td>
<td>79.5 (74.1%)</td>
<td>263 (81.6%)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>77.6 (+/-15.0)</td>
<td>74.3 (+/-15.6)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>169.7 (+/-8.9)</td>
<td>167.7 (+/-9.4)</td>
</tr>
<tr>
<td>EuroSCORE II</td>
<td>2.4 (+/-3.4)</td>
<td>4.5 (+/-5.7)</td>
</tr>
<tr>
<td>Brain natriuretic peptide (pg/ml)</td>
<td>168.7 (+/-376.4)</td>
<td>481.8 (+/-604.1)</td>
</tr>
<tr>
<td>Aortic surgery</td>
<td>58 (4.4%)</td>
<td>11 (2.6%)</td>
</tr>
<tr>
<td>Isolated CABG</td>
<td>719 (54.6%)</td>
<td>66 (15.5%)</td>
</tr>
</tbody>
</table>

Continuous data presented as mean ± standard deviation, categorical data as number (%). HFpEF: heart failure with preserved ejection fraction; CABG: coronary artery bypass surgery.
Figure 1

Methods: We prospectively included 154 consecutive patients who were admitted for HF and had a left ventricular ejection fraction (LVEF) >50%. All patients were followed during one year after hospital discharge. We analysed the information on cardiac and comorbid candidate prognostic predictors in a multivariable model to predict 1-year outcome. Then, we multiplied the model regression coefficients by 10 according to the formula: Prognostic index score = 10xβ1 (variable1) + 10xβ2 (variable2) + ... + 10xβn (variable). ROC plot analysis compared the prognostic utility of the factors related to a poor prognosis.

Results: Mean age was 81 years (SD 9) and 63% were female. The mortality rate was 25.2%. In the multivariable analysis, four variables were associated to a higher risk of mortality: age over 80 years (OR 5.27; 1.38-20.06 CI 95%, p = 0.015), plasma NT-proBNP higher than 2087 ng/l (OR 5.42; 1.79-16.38 CI 95%, p = 0.003), indication of chronic oxygen therapy (OR 3.89; 1.39-11.38 CI 95%, p = 0.010) and right ventricular systolic dysfunction (OR 5.48; 1.21-24.78 CI 95%, p = 0.027). We established three risk categories based on 50th and 75th percentiles. Table 1 summarizes the results from the risk stratification according to the amplified formula of the logistic regression coefficients model for 1-year mortality. The ROC curve (Figure 1) was 0.83 (95% CI, 0.74 to 0.92; p < 0.0001).

Conclusions: Our score, based on accessible clinical characteristics, allows the prediction of 1-year mortality among HFpEF hospitalized patients.

P1987

Possibility of the CAVI as the risk factor of development of heart failure with preserved left ventricular ejection fraction

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Backgrounds: Heart failure (HF) is pandemic with high morbidity and mortality, and is becoming a worldwide economic burden. Although many studies have been conducted to identify characteristics of patients with HF with reduced ejection fraction (HFrEF), characteristics and pathophysiological features of patients with HF with preserved ejection fraction (HFpEF) remain unclear. Hypertension (HT) and diabetes mellitus (DM) are the most important risk factors for developing HFpEF, comprehensive risk factors are still lacking. Cardio-ankle vascular index (CAVI) has been widely applied to assess arterial stiffness in patients with known cardiovascular diseases. Therefore, we investigated the relationship between CAVI and several parameters of HFpEF.

Methods: We defined the HF patients whose left ventricular EF (LVEF) was less than 50 as HFrEF, and the patients whose LVEF was more than 50 as HFpEF. We enrolled the patients who were hospitalized for acute heart failure and examined CAVI from April 2013 to March 2015. And during the same study period, HT or DM or dyslipidaemia patients with preserved LVEF who did not present with HF symptoms and had never been diagnosed or treated for HF were also enrolled as patients without HF. We excluded patients with atrial fibrillation, aortic regurgitation and also the patients whose ankle brachial index was less than 0.9, because these patients’ CAVI are unreliable. And the exclusion criteria included HFpEF. A total of 46 patients with HFpEF and 230 patients without HF were enrolled in this study.

Results: There were no differences in age (74 ± 11, 69 ± 10), sex (male: 58.7%, 58.7%) between HFpEF and without HF. The CAVI was significantly higher in patients with HFpEF compared with patients without HF (10.07 [9.00-10.60] vs. 9.18 [7.91-10.10], P = 0.001) (Fig. 1).

Conclusion: Thus, the present study demonstrated that CAVI was closely related to HFpEF, suggesting that arterial stiffness might be involved in the development of HFpEF.

Poster session 3

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P1988

Association of levels of BNP plasma with prediction of mortality in study cohort in south Brazil

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Background: The diagnosis of HF in elderly patients in clinical basis is difficult due to comorbidities. The BNP is used as a diagnostic and prognostic tool in HF, but is not sufficiently studied in the elderly.

Objective: To evaluate the association of plasma BNP levels with diagnostic accuracy of HF and long-term prognostic validation.

Methods: Six hundred and thirty-four consecutive patients presenting with suspected HF in the Emergency Room of a tertiary hospital in southern Brazil participated in this cohort study. All patients underwent BNP measurement (Biolute - POCT) as the institutional protocol were included between March 2006 and September 2012. Following the Gold Standard (Fig.1) for diagnosis of HF, consisting of history and physical examination, ECG, chest X-ray, echocardiogram Uni and Two Dimensional Color Doppler. The sample was divided into 3 groups: SHF (Systolic Heart Failure), HFPEF (Preserved Ejection Fraction Heart Failure) and NHF (In Heart Failure), and patients were followed for 78 months. The study endpoint was mortality identified by the certificate of death of the Mortality Information Service (SIM).

Results: Most patients (59.6%) were female, the mean age was 77 ± 8 years, 40.5% over 80 years. The majority (46.8%) had a diagnosis of HFpEF and BNP median 335 pg/ml, 25% presented SHF and BNP median of 573 pg/ml and 28% did not meet the criteria for NHF and median BNP 45 pg/ml (Kruskal-Wallis’s test; p < 0.005) fig. 1. Ejection fraction less than 44% was observed in 18.6%. BMI was greater than 30kg/m² in 38.6% and less than 22kg/m² at 13%. Cardiomegaly was prevalent in 72.7%, congestion in 70.7%, 52.5% had pleural effusion, and 16% BNP less than 30mmHg. Half of the deaths were caused by HF. In the group with SHF was 79 deaths (49%) with a BNP median of 800 pg/ml (Fig.2) and the 80 survivors median 383 pg/ml (p < 0.005). In HFpEF group occurred most deaths that computed 157 deaths (52% of the group) with a median of BNP 380 pg/ml and 140 survived with a median 245 pg/ml (p < 0.005). The NHF group had 40 deaths (22%) of the group) with BNP median of 595pg/ml and 138 survivors, median of 36 pg/ml (p < 0.005).Survival analysis in 78 months (6.5 years) was performed by Kaplan-Meier curve. Two hundred seventh six deaths were recorded in the total group (42%) (Fig.3). The group SHF with a 27-month mean survival time (MST), the group HFPEF with a 52-month MST, the NHF group more than 50% survived.

Conclusion: The BNP level showed association with the mortality index. BNP is an
Conclusion:
A 3-week CR program, as their lipid profile, blood pressure and exercise tolerance with HFpEF (420.7 ± 78.7 vs. 452.9 ± 14.2, p < 0.01). Maximal power during exercise test improved substantially both in HFrEF group (63.0 vs 43.40 ± 15.2, p < 0.01) and in HFpEF group (from 88.9 ± 21.2 to 127.4 ± 34.0 Watts, p < 0.01) and in HFpEF group (99.7 ± 12.1 to 130.2 ± 16.8 Watts, p < 0.0001). The distance covered in the 6-min walk test was significantly greater after the 3-week CR program, as their lipid profile, blood pressure and exercise tolerance improved.

P1990
Clinical pattern of HF-pEF and role of comorbidity in development of HF-pEF

Y Dubolazova1
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Purpose: To study clinical pattern and role of comorbidity in development of HF-pEF, to evaluate association between comorbidity and NT-proBNP and galectin-3 in HF-pEF.

Methods: 30 patients with HF-pEF (27 women, 13 men, age 65 ± 8) were included in the study. All patients were underwent physical examination, evaluation of comorbidity, clinical state rate scale, 6 minute walk test, echocardiography, tissue doppler imaging, evaluation of plasma NT-proBNP and galectin-3 levels.

Results: The mean age was 65 years. Main complaints were dyspnea and fatigue (100% and 83%). Dyspnea at rest, edema, orthopnea were found in 4%, 6%, 45% and 6% of patients. Decompensation in HF-pEF patients was accompanied by weight gain in 30%. Small bubbling rales were found in 53%, JECCH in 30%, third heart sound in 7%, jugular venous distention in 45%, hepatomegaly in 20% of HF-pEF patients. Mean exercise tolerance was 334 ± 6 minutes walk test. Dyslipidemia was found in 71%, obesity in 53% and fatty liver in 60% of patients. T2DM in 13%. Arterial hypertension was found in 93%, CAD in 40%, COPD in 16% of HF-pEF patients. History of ACS and stroke had 16% and 10% of patients. Atrial fibrillation was found in 23%, HF NYHA I-II in 53%, HF NYHA III-IV in 46%. The mean NT-proBNP level was 153.2 ± 307.8 fmol/mL. Mean glectin3 plasma level was 0.98 ± 0.8 ng/mL. The higher mean NT-proBNP level was associated with more expressed signs and symptoms of HF (p < 0.05, 95% CI). The higher mean NT-proBNP level is associated with lower exercise tolerance in HF-pEF patients (p < 0.05, 95% CI) and worse clinical state (p < 0.05, 95% CI). Direct correlation between plasma level of NT-proBNP and dyslipidemia (r=0.47, p < 0.007, 95%CI), fatty liver (r=0.42, p < 0.02, 95%CI) and obesity (r=0.34, p < 0.05, 95% CI) was found. Direct correlation between mean plasma level of glectin3 and LV EF in HF-pEF patients was found (r=0.45, p < 0.012, 95% CI). There was no correlation between glectin3 mean plasma level and signs and symptoms of HF, exercise tolerance and clinical state in HF-pEF patients.

Conclusions: Clinical pattern of HF-pEF is indistinct. Main comorbidities are obesity, hypertension, diabetes mellitus, dyslipidemia and fatty liver. Dyslipidemia and fatty liver probably could lead to development and progression of HF-pEF. NT-proBNP could be used to identify decompen- sated HF-pEF. Galectin3 cannot be used as biomarker of decomposition of HF, but can help to indentify HF-pEF patients. Combined use of NTproBNP and galectin3 allows identifying patients with decompensated HF-pEF.
Survival was better (569.9 ± 38.4 days (group 1) vs 456.1 ± 24.7 days (group 3); log-rank = 4.61; p = 0.032).

**CELLULAR BIOLOGY**

P1993

The effect of pharmacological KATP channels activation on contractile function and gene expression of isolated neonatal rat cardiomyocytes under doxorubicin induced oxidative stress

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Doxorubicin (DOX) is one of the most effective chemotherapeutic agents. This drug is anthracycline antibiotic and at the same time cardiotoxic agent due to activation of the free-radical oxidation that leads to the progressive heart failure. This requires the search of the grounded approaches for its use in pharmacological correction of cardiomyocytes and restoration of heart activity. The activator of KATP channels contracts to the doxorubicin action normalizing the biochemical indexes of oxidative stress and histological changes in the heart. The aim of the work is to study the mechanisms of the potential cardioprotector - fluoro-containing analogue of diazoxide - action on the contractile function of cardiomyocytes and gene expression in these cells under DOX induced oxidative stress. Ventricular myocytes were isolated from 3-days-old Wistar rats by enzymatic digestion. After 48-hours of cultivation cardiomyocytes were treated for 1 h with doxorubicin hydrochloride (0.5 μM) and with or without fluoro-containing analogue of diazoxide - 7-diffurochloromethy-3-methyl-1,4-benzoiazepine (40 μM). Mechanical properties of rat ventricular cells were assessed using the Myocyte Contractility Recording System IonOptix. RNA isolation was performed using phenol-chloroform extraction with guanidine isothiocyanate. cDNA was synthesized by reverse transcription. Real-time PCR was performed. The equality of variances between groups was analyzed using the Leven test. Cardiomyocytes under the administration of DOX contracted more frequently and arrhythmically compared to the control, but their shortening was significantly weaker. Cells perfused with the solution containing diazoxide analogue, demonstrated increase of the shortening amplitude compared to the control and decrease of the contraction and relaxation time. Combined action of DOX and diazoxide analogue improved cardiomyocytes contractile activity (lowered the beating rate, stabilized the rhythmicity of contractions) and increased the velocity parameters comparing to the DOX and control groups. Combined action of DOX and diazoxide analogue increased expression of mRNA of HIF-1α, GLUT-1, GLUT-4 and TERT genes and reduced the expression of HIF-3α gene expression. These results might represent a potential therapeutic approach for the protection of the heart from the doxorubicin-induced free-radical oxidation and progressive heart failure.

P1994

Role of platelet surface receptor expression and blood group in predicting risk of bleeding with aspirin

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Aspirin (ASA) is the first-line therapy for the secondary prevention of cardiovascular events and is highly variable between individuals, and is associated with varying risks of bleeding. This study examined the role of platelet surface receptors and blood group in determining this risk of bleeding attributable to ASA. Platelet GP Ib-IX-V receptor binds Von Willebrand Factor (vWF) and initiates platelet aggregation by capturing platelets to damaged subendothelium. GP Ib/IX/IIa receptor binds fibrinogen and is essential in the formation of a primary platelet plug by mediating cross-linkage of platelets. We recruited 20 healthy volunteers and administered 300mg ASA. We evaluated the standard response of ASA to Arachidonic Acid-induced platelet aggregation using Light Transmission Aggregometry, Plasma TPx82 (product of activated platelets) and Glycocalcin (soluble GP Ib normally found in plasma) were measured using ELISA. The surface expression of GP Ib/IIa and GP Ib were measured using flow cytometry. LTA and post-ASA TXB2 demonstrated standard effects of ASA on platelet aggre- gation (p < 0.0001, student t-test, n=19 and p < 0.0001, student t-test, n=20 respectively). Donors with blood group O had significantly less surface expression of GPb counts compared to non-O donors (p = 0.0288, student t-test, n=10). Inter- estingly, both groups had almost identical Glycocalcin post-ASA, suggesting that the reduced GPb expression in blood group O can't be explained by shed plasma GPb. Our results suggest for the first time that blood group plays a crucial role in platelet CD42b receptor expression, independent of plasma Glycocalcin levels. This can be used to possibly determine the individual risk of ASA bleeding.

**GENE AND CELL THERAPY**

P1995

Assessment of grafts patency and diastolic dysfunction in patients after coronary artery bypass grafting and cell-based therapy

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Background: It is very little known about influence of cell-based therapy on diastolic dysfunction in patients after coronary artery bypass grafting (CABG) and intramyocardial injection of bone marrow stem cells (BMSC).

Purpose: Assessment of grafts patency and diastolic dysfunction in patients after CABG and cell-based therapy.

Methods: Patients with coronary artery disease were randomly divided on 3 groups: group I - control n=36, patients received only CABG; group II- patients received CABG and intramyocardial injections of BMSC n=25; group 3- patients received CABG and intramyocardial and intracoronary injections of BMSC n=17.

1 year after operation clinical assessment, echocardiography and angiography was performed.

Preliminary results. All patients are alive. Decreasing of functional class of angina pectoris, graft patency, improvement of diastolic dysfunction was more dramatically achieved in patients of group 2.

Conclusion: Intramyocardial and intracoronary injections of BMSC is a safe and useful procedure during CABG for patients with coronary artery disease and diastolic dysfunction.

P1996

High-intensity lipid-lowering therapy prevents pathological left ventricle remodeling after STEMI

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According to current guidelines, statin therapy is indicated for all ACS patients regardless of the initial cholesterol level. However, the effects of different lipid-lowering regimes on left ventricular remodeling in patients after STEMI have been insufficiently studied.

The study involved 135 STEMI patients admitted an average of 4.5 hours after symptoms onset and treated with primary PTCA. Lipid-lowering treatment was prescribed immediately after hospital admittance. Patients were randomly assigned to one of four groups treated by average (group I and group II) or high (group III and group IV) lipid-lowering therapy. Group I (26 patients) was assigned to atorvastatin 10 mg / ezetimibe 10 mg combination; group II (24 patients) - to atorvastatin 40 mg, group III (42 patients) - to atorvastatin 40 mg / ezetimibe 10 mg combination, and group IV (43 patients) - to atorvastatin 80 mg. Echocardiography was performed to all the patients during the first 24 hours after symptoms onset and 90 days after MI development. LV dilatation was defined as at least 25% increase of end-diastolic volume.

Patients from groups II and IV showed a tendency to the reduction of post-MI LV dilatation after 3 month of treatment (figure 1). High intensity lipid-lowering therapy (figure 2) reduced the risk of LV remodeling by 30% (p < 0.05), that was also associated with significantly higher LDL reduction. Without initial differences,
on the 90th day the average LDL level was 1.63 ± 0.1 in pts with high intensity treatment vs. 2.21 ± 0.2 mmol/l in patients with therapy of average intensity (p < 0.01).

Conclusion: The use of high-intensity lipid-lowering therapy with achievement of target LDL levels after STEMI can reduce the incidence of post-MI LV dilatation and may prevent heart failure development.

P1997
Can we predict heart failure after anterior ST-elevated myocardial infarction?
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Objective: Patients with ST-elevated myocardial infarction (STEMI) treated by primary angioplasty (pPCI) will develop left ventricular remodeling in one third of the cases, which is main cause of heart failure (HF) and mortality. The purpose of this study is to determine early angiographic predictors.

Methods: 210 patients with first acute anterior STEMI were included. All participants underwent echocardiography after 6 months, after which they were divided into two groups: remodeling (n = 55; 26%) and non-remodeling (n = 155; 74%). The criteria for remodeling was increasing of left ventricular end-diastolic volume >20% after 6 months.

Results: The group with remodeling had more frequent MACE during one year follow-up: repeated hospitalizations (81.8% vs 22.6%; p < 0.0001), myocardial infarctions (20% vs 7.1%; p = 0.007), repeated coronary angiography (40.5% vs 18.1%; p < 0.0001), repeated PCI (30.9% vs 11%; p < 0.001) and mostly re-hospitalizations due to HF (40% vs 26%; p < 0.0001). Mortality rate was 5.5%. We identified a lot of statistically significant differences between remodeling and non-remodeling groups, among them angiographic parameters: proximal localisation of RIA (63.6% vs 43.9%, p = 0.041), occlusion of RCA (90.9% vs 69%, p = 0.001), lower TIMI flow before pPCI (average 0.9 vs 0.3, p = 0.01) and after PCI (average 2.7 vs 2.91, p = 0.03), lower blush grade after pPCI (3.55 vs 3.7, p = 0.015), no-reflow phenomenon (40% vs 1.9%, p < 0.0001) and use of GP IIb/IIIa (40% vs 24.5%, p = 0.029). The most powerful independent early predictors were: no-reflow phenomenon (OR=30.031 95% CI, p < 0.0001), repeated PCI (OR=21.6 95% CI, p < 0.0001) and Wall motion score index (OR=3.4 95% CI, p < 0.0001) by uni variant regression analysis. Also, strong predictors were incomplete ST-resolution- STR (OR 2.0 95% CI, p < 0.001) and use of GP IIb/IIIa (40% vs 24.5%, p = 0.029).

Conclusions: Some angiographic parameters as: no-reflow phenomenon, proximal localisation and occlusion of RIA, lower TIMI flow and blush grade after pPCI, use of GP IIb/IIIa can identified high-risk group for post infarction remodeling in the patients with a first acute anterior STEMI, treated by pPCI. Development of diastolic dysfunction, heart failure on admission, incomplete STR and WMSI≤2 are strong predictors too. Remodeling patients will have a more frequent incidence of MACE, heart failure and mortality.

P1998
Myocardial infarction in the elderly (about 120 cases)
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Background: Due to high mortality and the increasing aging population, acute myocardial infarction in the elderly is a public health issue; the event is often marked by severe major complications that influence the prognosis in the short and medium term.

Methods: We report a descriptive retrospective study involving 120 patients (55 men and 65 women) aged 75 or more admitted to the cardiology department Kairouan (Tunisia) for a myocardial infarction. They are collected between 2002 and 2013.

Results: The incidence of myocardial infarction in patients over 75 years between 2002 and 2013 is 14.8%, the age means of the population is 78.4±3.05 years, ranging from 75 to 94 years. Hypertension is the most common risk factor found: 65% while 32.5% were diabetics and 16.7% were smokers. Only 40.8% of the population were supported in the first 96 hours while 13.4% after 12 hours. Among 120 patients, reasons for admission to the ED included chest pain (62.5%), digestive symptoms 16.7%, dyspnea 8.3%, malaise 8.3% and vigilance disorders in 4.2% of cases. Compared with those who presented with chest pain, patients admitted for other reasons are more women (p < 0.01), diabetics (p < 0.01) having kidney failure p = 0.03), they waited longer before going to the hospital (prehospital delay > 12 hour: 31.5 % vs 6.8 % p < 0.01). Myocardial revascularization treatment was performed in 72 patients (60%). It was a thrombolysis in 35% of cases and angioplasty in 25% of cases, the remaining(40%)were treated medically. During the study period we notice an improvement in the use of reperfusion and a decrease of using medical strategy. At the hospital phase the overall mortality rate was 15.8%. The statistical logistic regression analysis has identified as significant predictors factors of mortality: female sex p = 0.04) diabetes (p = 0.01) kidney failure (p = 0.05); the anterior territory of the infarction (p = 0.02), the myocardial infarction complicated by acute heart failure (p = 0.01) or cardiac shock (p < 0.01) and finally the absence of a revascularization (p < 0.001).

Conclusion: Take charge of elderly patients with STEMI is not easy especially that atypical clinical symptom are common and severe but chronological age should not be an exclusive criteria of decision and even a factor of “loss of chance”. we should use the specific reperfusion treatments which improve the prognosis of these patients.
Objective: to evaluate the retention of patients, who had an acute coronary syndrome (ACS), to dual therapy with antiplatelet drugs (DTAD) in real clinical practice. For 25% of patients clopidogrel was canceled by doctor. Over 12 months, the retention was evaluated by the number of patients who is taking the drug. The reasons for refused treatment were: 50% of patients stopped taking drugs because of adverse drug reactions fear, 25% because of well-being, for 25% of patients clopidogrel was canceled by doctor. Conclusions: Nevertheless on the proven effectiveness of DTAD in prevention of complications after ACS and reducing the risk of death, the treatment retention to DTAD is still insufficient in real clinical practice, decreasing to 12 months after ACS until 60%. The main way to increase the treatment retention to DTAD is to hold the explaining actions to physicians by patients about the need to keep to recommendations.

VASCULAR BIOLOGY, OTHER

The senescent CD8+ T cell population is expanded in chronic kidney disease patients and correlated with arterial stiffness

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Background: Chronic kidney disease (CKD) is associated with increased arterial stiffness, which is a well-known predictor of future cardiovascular events. The underlying mechanisms of arterial stiffening in CKD are not well known. Accelerated immune aging, characterized by expansion of immunosenescent T cell fraction might be involved in the pathogenesis of arterial stiffening in CKD.

Methods: Four hundred and twenty-nine consecutive hypertensive patients with CKD (266 male, mean age 61 ± 10 years) who were enrolled in Cardiovascular and Metabolic Disease Etiology Research Center - High Risk Cohort (CMERC-HR, NCT02003781) were enrolled. Arterial stiffness was evaluated by pulse wave velocity (PWV) and the frequency of CD57+ or CD28- senescent T cells in peripheral blood lymphocytes were examined by multicolor flow cytometry.

Results: Senescent CD8+ T cell fraction showed significant tendency to increase according to CKD stages (CD8 + CD57+ T cell fraction, p<0.001; CD8 + CD28- T cell fraction, p<0.001). Multivariable analysis revealed that senescent T cells correlates with arterial stiffness. The study included 41 patients with earlier ACS and whom DTAD was recommended were during 12 months. The average age was 62.3 ± 8.7 years old, from them 23 women and 18 men. Patients were divided into 4 groups depending on the prescription of ACS. 10 patients were involved in the group 1 (1 month after ACS), 13 patients in the group 2 (3 months after ACS), 10 people in the group 3 and 4 (6 months and no more than 12 months, respectively). Treatment retention was evaluated by use of telephone survey on the number of patients who is taking the drug. Results: Treatment retention to DTAD was 90% already after 1 month after ACS, and only 60% of patients followed the recommendations for anti-thrombotic therapy by the end of the year after ACS. At the same time, retention to therapy by acetylsalicylic acid was 90% throughout the year. The retention to clopidogrel was 100% at 1 and 3 months after ACS, it decreased to 60% over 6 months, and to 30% over 12 months. The reasons for refusal treatment were: 50% of patients stopped taking drugs because of adverse drug reactions fear, 25% because of well-being, for 25% of patients clopidogrel was canceled by doctor.

Conclusions: Chronic kidney disease (CKD) is associated with increased arterial stiffness, which is a well-known predictor of future cardiovascular events. However, the underlying mechanisms of arterial stiffening in CKD are not well known. Accelerated immune aging, characterized by expansion of immunosenescent T cell fraction might be involved in the pathogenesis of arterial stiffening in CKD.
Effects due to TDM1, as demonstrated by the recovery of FS, EF and RS values. As after treatment with RAN (-17.3% of cardiac function partially recovered: FS 58 ± 2.8% versus -23.6 ± 6.7% (sham), (p < 0.01), EF decreased to 85.5 ± 3.5% versus 91.0 ± 0.8% (sham), (p > 0.05). Moreover, RS decreased to -15.6 ± 2.8% versus -23.6 ± 6.7% (sham), (p < 0.01).

In mice treated with TDM1 and, successively treated with RAN for 5 days, the index of cardiac function partially recovered: FS 58 ± 2.4% (p > 0.05), EF 88 ± 1.7% (p > 0.05), RS (35.7 ± 8.2%, p > 0.05), whereas the alteration of LS persists even after treatment with RAN (-17.3 ± 3.7%, p > 0.05).

Conclusions: Here we show that in vivo RAN post-treatment reduces cardiotoxic effects due to TDM1, as demonstrated by the recovery of FS, EF and RS values. As expected, RAN increases cell viability of HFC treated with TDM1.

Cardiotoxic effects of the novel anti-ErbB2 agent Ado trastuzumab emtansine (TDM1) is a novel antibody-drug conjugate consisting of trastuzumab (TRAS) covalently linked to the highly potent microtubule inhibitory agent DM1 via a stable thioether linker. TDM1 is used in metastatic ErbB2 positive breast cancer patients, previously treated with TRAS and taxane. Although, the potential cardiotoxic effects of TDM1 have not yet been fully elucidated, despite mechanisms of TRA-related cardiotoxicity are still unknown, they can include all the mechanisms of TRAS-related cardiotoxicity, such as blockade of ErbB2, PI3K-Akt and MAPK pathways. Furthermore, since TDM1 is also used in combination with other anti-ErbB2 agents, the risk of cardiotoxic side effects could be further increased. Here, we aim to assess the cardiotoxic side effects of TDM1 in vitro and in vivo.

Methods: To evaluate the cardiotoxic effects of TDM1 in vitro, human fetal cardiomyocytes (HFC) were treated with TDM1 for 3 days and then treated in the absence or presence of RAN for 3 days. Cell viability was assessed by cell counting and MTT assay. To evaluate cardiac function in vivo, C57BL6 mice, 2-4 months old, were daily treated with TDM1 (44.4 mg/kg/day). At day 9 and after 7 days, fractional shortening (FS) and ejection fraction (EF) were measured, by M/B mode echocardiography, and radial and longitudinal strain (RS and LS) were evaluated using 2D speckle-tracking. These measurements were repeated after 5 days of a washout period (305 mg/kg/day), started at the end of treatment.

Results: RAN reduces TDM1 toxicity in HFC, as evidenced by the higher percentage of viable cells treated with TDM1 + RAN with respect to the cells treated with TDM1 alone (p < 0.01). In vivo studies: after 7 days with TDM1 administration, FS decreased to 53.6 ± 0.9% versus 61.0 ± 0.8% (sham), (p < 0.01), and EF decreased to 85.5 ± 3.5% versus 91.0 ± 0.8% (sham), (p > 0.05). Moreover, RS decreased to 20.9 ± 3.2% versus 42.2 ± 10.1% (sham) (p < 0.01), and LS decreased to -15.6 ± 2.8% versus -23.6 ± 6.7% (sham), (p < 0.01).

In mice treated with TDM1 and, successively treated with RAN for 5 days, the index of cardiac function partially recovered: FS 58 ± 2.4% (p > 0.05), EF 88 ± 1.7% (p > 0.05), RS (35.7 ± 8.2%, p > 0.05), whereas the alteration of LS persists even after treatment with RAN (-17.3 ± 3.7%, p > 0.05).

Conclusions: Here we show that in vivo RAN post-treatment reduces cardiotoxic effects due to TDM1, as demonstrated by the recovery of FS, EF and RS values. As expected, RAN increases cell viability of HFC treated with TDM1.
P2007
Cardiotonic effect of non-peptidic pkr1 agonist against anthracycline-cardiotoxicity.
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ABSTRACT
Doxorubicin induced cardiotoxicity is a well-recognized complication of chemotherapy, and its prevention remains an important challenge in cancer survivorship. An angioinvasive hormone protein kinase via its receptor PKR1 promotes angiogenesis, differentiation of cardiac stem cells, and survival of the cardiomyocytes. PKR1 has been recently shown to protect heart against myocardial infarction in mice model. Thus, we hypothesized that PKR1 agonist can be a promising target to prevent doxorubicin-mediated cardiotoxicity.

Methods and Results: In vitro, we showed that ISO2 attenuates apoptosis induced by DOX in cardiomyocytes and human epicardial derived progenitor cells. However, ISO2 does not interfere DOX-mediated cytotoxicity in cancer cell line. In vivo, ISO2 administration in juvenile mice model promotes survival, proliferative and differentiation of WT1+ BMSCs into cardiogenic cells. Similarly, ISO2 in chronic mice model preserves vascular structure, reduces apoptosis and inflammation. ISO2 also improves systolic and diastolic parameters that impaired by DOX.

Conclusions: Multiple effects ISO2 on the activation of cardiac progenitor cells, cardiac cells survival, vascular stability and cardiac parameters show a strong cardioprotective potential of PKR1 agonist that can be used in cancer patients during anthracyclines chemotherapy.

P2008
Growth differentiation factor 15 as a predictor of acute kidney injury formation in the first days of hospitalization
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The development of acute kidney injury (AKI) in patient with acute coronary syndrome (ACS), especially in those who underwent angiography, is an actual problem, because it worsens the prognosis. In order to diagnose this condition in time, the search for biomarkers is going. Stress-induced marker growth differentiation factor 15 (GDF 15), a member of the transforming growth factor-β cytokine superfamily is being actively studied.

Purpose: to determine the prognostic significance of GDF 15 and other markers in development of AKI in patients with ACS.

Methods: 75 patients were enrolled with different forms of ACS (55 male and 18 female), mean age was 61, 8 ± 1, 3 years. All patients underwent a baseline investigation which includes: standard electrocardiography, echocardiography, angiography and determination of marker of myocardial necrosis – cardiac troponin T. Based on the results of the examination glomerular filtration rate (GFR) was calculated by Chronic Kidney Disease Epidemiology Collaboration formula (CKD-EPI). A group of patients has been selected (n = 54), their creatinine level was determined during the first 24 hours and after 48 hours. All patients were divided into two groups according to acute kidney injury network classification (AKIN): 21 patient in the first group with negative dynamic (1st stage AKIN and higher), 33 patient in the second group without creatinine dynamic. In addition, the level of GDF 15 was determined during the first day of hospitalization (normal range of GDF 15 is 1200 pg / ml).

Results: By comparing selected groups significant difference was found in creatinine level and GFR in both groups (p < 0.01; p < 0.01, respectively). The effects of various variables were assessed on formation of AKI in patients with different level of GFR. To identify the main risk factors for AKI, we have used logistic regression (LR); ejection fraction of left ventricle (area under curve (AUC) 0.7; p < 0.01; 95% confidence Interval (CI): 0.560 – 0.842), GDF 15 (AUC 0.77; p < 0.03; 95% CI: 0.53 – 0.92) and age (AUC 0.77; p < 0.01) were main risk factors for predicting development of AKI. During the statistical analysis the predictive value for estimated parameters was calculated GDF 15 = 2205 g/ml (specificity (Spe) 87%, sensitivity (Se) 65%), ejection fraction of left ventricle =< 46% (Spe 80%, Se 71 %), age =< 55 year (Spe 39 %, Se 56 %) We have developed a prognostic model to predict reduced kidney formation (AUC 0.8; p < 0.01). This model with 96% of Se and 68% of Spe can predict development of AKI in patients with different levels of GFR after ACS.

Conclusion: The prognostic multifactor model can be used in clinical practice to improve risk stratification in patients with ACS to prevent formation of AKI.

P2009
Neladenoson, a partial adenosine A1-receptor agonist, improves mitochondrial function in skeletal muscle of dogs with chronic heart failure
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Funding Acknowledgements: Bayer AG.

Background: Exercise intolerance (Ex-Int) is a feature of chronic heart failure (HF) and in particular, HF with preserved ejection fraction (HFrEF) and attributable, in part, to skeletal muscle (SM) abnormalities of fiber type composition and mitochondrial (MITO) dysfunction. In patients and dogs with HF, SM aerobic, MITO-dependent, type-I fibers decrease in number while anerobic type-II fibers increase; a maladaptation that contributes to Ex-Int. We previously showed that chronic therapy with capadenoson, a partial adenosine A1-receptor agonist (pA1RA), improves LV function in HF dogs and therapy with neladenoson (NELA), a novel pA1RA, normalizes MITO function in failing cardiomyocytes. This study examined the effects of NELA on MITO function in SM biopsies from normal (NL) dogs and dogs with microembolization-induced HF.

Methods: Fresh SM open biopsies (6 grams) were obtained from the hind leg Vas-tus Lateralis muscle of 6 NL and 6 HF anesthetized dogs. Samples were cut into thin sections, divided into 4 equal portions, and one portion each incubated in 3 (vehicle), 1, 10, and 30 nM concentration of NELA respectively for one hour at 37°C. At end of incubation, MITO were isolated from SM and their function assessed. MITO ADP-stimulated state-3 respiration (ADPresp) was measured using a Strathkine respirometer, MITO complex-IV (COX-IV) activity was measured polarographically and MITO maximum rate of ATP synthesis (ATPsyn) was measured using the bioluminescence ApoSENSOR assay kit.

Results: Increasing concentration of NELA had no effect on measures of MITO function in SM from NL dogs (Table). In SM from HF dogs, depressed levels of MITO ADPresp, ATPsyn, and COX-IV activity increased significantly in a dose-dependent manner after exposure to NELA (Table).

Conclusions: The results indicate that NELA improves MITO function of SM of dogs with HF. These improvements can potentially reduce/reverse Ex-Int in HF.

Table: MITO Function Measures

<table>
<thead>
<tr>
<th>NELA concentration (nM)</th>
<th>Vehicle</th>
<th>3 nM NELA</th>
<th>10 nM NELA</th>
<th>30 nM NELA</th>
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</thead>
<tbody>
<tr>
<td>ADPresp (RFU/mg protein)</td>
<td>164±15</td>
<td>161±16</td>
<td>165±13</td>
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<tr>
<td>ATPsyn (RFU/mg protein)</td>
<td>8835±432</td>
<td>7878±475</td>
<td>8821±524</td>
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<td>COX-IV Activity (nAtoms)</td>
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<td>2488±316</td>
<td>2545±311</td>
<td>2412±267</td>
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<tr>
<td>Oxygen/ming protein</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>

*p < 0.05 vs. vehicle

P2010
Regulation of the balance between cardiac and skeletal muscle triadin by a heart-enriched antisense long non-coding RNA
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Background: Ribonucleic acids (RNAs) are molecules with key roles in cell biology. In the recent years, the so called long non-coding RNAs (IncRNAs), which do not encode for proteins, showed multiple functions in cardiac pathophysiology and they were found to be dysregulated in the failing heart. However, their role in heart failure development is still poorly understood.

Purpose: To investigate the regulation and function of heart-enriched IncRNAs in the failing heart.

Methods: Public datasets in combination with in-house data were used to identify heart-enriched IncRNAs regulated in heart failure. Biopsies from 43 failing and 23 control human hearts, as well as different mouse organs were used for wet-lab experiments. Gene expression was assessed using quantitative PCR. GampReFs or
a CRISPR/Cas9-VPR activation approach were used to modulate the expression of lncRNAs in murine cardiomyocytes HL-1.

Results: Analysis of a lncRNA-seq dataset of 15 Caucasian tissues allowed the identification of 415 heart-enriched lncRNAs. After data mining, we selected a genome of lncRNAs in murine cardiomyocytes HL-1. Activation of the transcription of lncRNA by using specific guide RNAs in combination with a CRISPR/Cas9-VPR system resulted in an increase in the ratio between cardiac and skeletal muscle isoforms of Trdn (Figure 1b). Down-regulation of lncRNA expression using gapmers had no effect on the cardiac/skeletal muscle ratio.

Conclusion: We identified a lncRNA named TRDN-AS which regulates the balance between cardiac and skeletal muscle isoforms of TRDN at the epigenetic level. Since TRDN is associated with heart failure, these results suggest a role for TRDN-AS in the development of heart failure. Figure legend. a) Expression levels of TRDN-AS, cardiac and skeletal muscle isoforms of TRDN in left ventricular biopsies from 23 controls and 43 failing hearts. b) Regulation of TRDN isoforms by TRDN-AS. HL-1 cardiomyocytes were co-transfected with SCiP-Cas9-VPR and gRNA_Cloning Vector with (specific guide RNA, sgRNA) or without (Control) target sequence. Cells were harvested after 48h. 5 independent experiments were performed.

P2012 PPARalpha in cardiac energy metabolism regulation in chronic heart failure due to ischemic heart disease

One of the main causes of chronic heart failure (CHF) is ischemic heart disease (IHD). Cardiac ischemia is usually the result of hypoxia. The CHF progression is accompanied by alterations in cardiac energy metabolism, failing hearts become energy deprived. Recent scientific studies have shown that the cardiac energy metabolism is under the transcriptional control of nuclear receptors, such as peroxisome proliferator-activated receptors (PPARs). These transcription factors act as molecular sensors in response to extracellular and intracellular changes, regulating the expression of the target genes. The downregulation of PPAR-alpha has been shown in the studies in mice model of ischemic cardiomyopathy. Our purpose was to study the role of PPAR-alpha and target genes in the regulation of cardiac energy metabolism in ischemic heart disease.

In order to characterize the metabolic phenotype in IHD, RT-qPCR was used to measure mRNA expression of the nuclear receptor PPAR-alpha - a key regulator of fatty acid beta-oxidation, and target genes: Long-Chain Acyl-CoA Dehydrogenase (LCAD), a key enzyme of beta-oxidation; Cardiac Carnitine Palmitoyl-Transferase-1 (CPT-1, the other principal outer mitochondrial membrane fatty acid transporter); Cluster-of-Differentiation 36 (CD36, also known as Fatty-Acid Translocase (FAT)); Heart Fatty-Acid-Binding Protein (HFABP) in surgical specimens of auricle from patients with ischemic heart disease (IHD, n = 10) and human non-diseased myocardium autopsy specimens (n = 5).

Transcript expression levels of PPAR-alpha, CD36, CPT-1 and LCAD decreased in IHD in comparison to human non-diseased myocardium autopsy specimens. The significant up-regulation of HFABP in IHD was observed in the study. These data indicate the occurrence of metabolic disorders in ischemic heart disease - an energy metabolism shifting from cardiac fatty acid oxidation as a primary energy source to glucose oxidation. It can be assumed that the regulation of the cardiac energy metabolism is possibly by acting on PPAR-alpha, CD36, CPT-1, LCAD and HFABP. Whether downregulation of PPAR-alpha is an adaptive response in IHD remains unclear. It is likely that inhibitors or activators of mitochondrial fatty acid oxidation can be used for metabolic therapy of CHF due to IHD.

P2013 A single systemic injection of AAV9-hIFGBP2 prevents left ventricular hypertrophy and dysfunction in metabolic syndrome

One of the main causes of chronic heart failure (CHF) is ischemic heart disease (IHD). Cardiac ischemia is usually the result of hypoxia. The CHF progression is accompanied by alterations in cardiac energy metabolism, failing hearts become energy deprived. Recent scientific studies have shown that the cardiac energy metabolism is under the transcriptional control of nuclear receptors, such as peroxisome proliferator-activated receptors (PPARs). These transcription factors act as molecular sensors in response to extracellular and intracellular changes, regulating the expression of the target genes. The downregulation of PPAR-alpha has been shown in the studies in mice model of ischemic cardiomyopathy. Our purpose was to study the role of PPAR-alpha and target genes in the regulation of cardiac energy metabolism in ischemic heart disease.

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Methods & Results: We measured plasma IGFBP2 by ELISA and cardiac mRNA IGFBP2 expression in MetS patients by RT-qPCR. Both plasma levels and heart expression of IGFBP2 were decreased in patients with MetS vs. control patients. Further, in a C57BL/6J mouse model of diet-induced MetS, found similar left ventricular mRNA IGFBP2 expression. Finally, we demonstrated for the first time that in MetS mice with decreased cardiac IGFBP2 mRNA levels, human IGFBP2 can be induced by a single AAV-HGF1BP2 injection, and that the increased IGFBP2 prevents left ventricle wall thickening, hypertrophy and dysfunction.

Conclusions: Human plasma and cardiac IGFBP2 are decreased in MetS patients. In mice, restoration of cardiac IGFBP2 expression level prevents MetS associated left ventricular dysfunction and hypertrophy. These clinical and animal data suggest that IGFBP2 is a new cardiac marker and therapeutic target in MetS to prevent heart remodeling consistent with heart failure.

P2014 Association between the gut microbiota composition, low-grade inflammation and blood pressure in patients without heart failure from Moscow and Moscow region

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Introduction: Mechanisms of interaction between the gut microbiota composition and cardiovascular diseases are actively investigated. The aim of the study was to assess the relationship between the gut microbiota composition, inflammatory markers and level of blood pressure (BP) in apparently healthy individuals living in Moscow and Moscow region.

Materials and Methods: The study included untreated subjects aged from 25 years to 76 years carefully selected through exclusion of cardiovascular diseases by means of clinical and laboratory evaluation, ECG, treadmill test, electrocardiography, carotid ultrasound examination. Eight hundred and fifty eight subjects were screened and only 92 met the selection criteria. Highly sensitive C-reactive protein (CRP) concentration was measured (immunoturbidimetry method) and interleukin-6 (IL-6) was concentration was measured (immunoturbidimetry method) and interleukin-6 (IL-6) was measured by immunoenzyme method. DNA was isolated from 2 ml of stool samples. Preparations for further sequencing and sequencing of the V3-V4 variable regions of the 16S rRNA gene were done according to recommended protocol 16S metagenomic sequencing Library Preparation. Statistical analysis was performed on the R programming language, version 3.1.0. Statistical analysis for comparing the groups of samples was performed using the generalized linear models and Mann-Whitney test (corrected for multiple comparisons false discovery rate).

Results: 92 participants were included (26 men), arterial hypertension of 1 degree was detected in 34 participants (37%). Average SBP was 120 ± 18.6 mmHg. Gram-negative opportunistic bacteria of the genus Prevotella were more present in patients with systolic blood pressure (SBP) >140 mmHg than in normotensive subjects (10.2% vs. 2.2%, p = 0.009). It was found that SBP was higher in patients whose microbiota contained more bacteria of the genus Biautia (p = 0.002). The average CRP level among the participants was 3.50 ± 4.35 nmol/l. CRP level was ≥5.0 mg/l in 12 participants. High CRP levels were positively associated with gram-negative opportunistic pathogens of the Serratia (p = 0.001) and Prevotella (p = 0.002) genera. Prevotella was also positively associated with IL-6 (p = 0.008), which average value was 5.57 ± 5.45 pg/ml, in 24 patients it was ≥10 pg/ml.

Conclusions: The results show the relationship between the increased SBP, low-grade inflammation and higher representation of gram-negative opportunistic pathogens which are capable of producing endotoxins and genus Blautia which is able to activate the secretion of tumor necrosis factor-alpha and pro-inflammatory cytokines.

P2015 The absence of leucocyte-associated immunoglobulin-like receptor 1 (LAR1-1) does not influence cardiac repair after acute myocardial infarction in mice

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Background: Heart failure after acute myocardial infarction (MI) depends on infarct size and adverse left ventricular (LV) remodelling, both depending on extent and quality of the inflammatory response. Leucocyte-associated immunoglobulin-like receptor 1 (LAR1-1) is an inhibitory leucocyte receptor. The aim of this study was to investigate the role of LAR1-1 in the extent of inflammation, infarct size and adverse LV remodelling after MI.

Methods & Results: Wildtype (WT) and LAR1-1/- mice were either subjected to ischemia-reperfusion or permanent left coronary artery (LCA) ligation. In mice subjected to ischemia-reperfusion, infarct size (IS) was comparable between WT and LAR1-1/- mice as a percentage of the area at risk (37.8 ± 14.5 vs. 38.4 ± 12.2%, p = 0.63) and as a percentage of the LV (14.2 ± 7.4 vs. 14.9 ± 7.0%, p = 0.86). In mice subjected to permanent LCA ligation, end-diastolic (133.3 ± 19.3 vs. 132.1 ± 27.9 μL, p = 0.91) and end-systolic volumes (112.1 ± 22.5 vs. 106.8 ± 33.5 μL, p = 0.69) did not differ between both groups, as assessed by echocardiography four weeks after MI. Similarly, no differences were observed in inflammatory cell quantification or collagen deposition in the infarcted area.

Conclusion: The absence of LAR1-1 does not influence infarct size, nor does it affect inflammation, fibrosis formation and adverse LV remodelling four weeks after MI.

P2016 Association of M235T polymorphism of angiotensinogen gene and lipid parameters in heart failure patients with type 2 diabetes mellitus.

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Background: Polymorphism of angiotensinogen (AGT) gene M235T could be associated with coronary artery disease (CAD). Dyslipidemia have been reported as one of the main pathophysiologic mechanism contributing to CAD. It’s well known that arterial hypertension and CAD play an important role in unfavorable course of heart failure with preserved ejection fraction (HFpEF) development. On the other hand, the association of M235T polymorphism of AGT gene and lipid parameters in heart failure patients with type 2 diabetes mellitus (T2DM) is not well researched.

Purpose: To investigate the parameters of lipid metabolism in diabetic and non-diabetic subjects carrying different types of M235T polymorphism of AGT with HFpEF.

Methods: One hundred and thirty-three patients (58 males and 75 females; mean age 61.78 ± 9.7 years) with T2DM were enrolled. One hundred patients were carriers of 235T allele (MT + TT genotypes), 33 patients were homozygous carriers of 235M allele of M235T polymorphism. T2DM had 83 patients and 49 were patients with T2DM and without it, respectively, (p = 0.008), which average value was 5.75 ± 5.45 pg/ml, in 24 patients it was ≥10 pg/ml.

Conclusions: The results show the relationship between the increased SBP, low-grade inflammation and higher representation of gram-negative opportunistic pathogens which are capable of producing endotoxins and genus Blautia which is able to activate the secretion of tumor necrosis factor-alpha and pro-inflammatory cytokines.

P2017 Usefulness of CHADS2-VASc score in predicting stroke and death in patients with heart failure: the korean acute heart failure registry

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Background: The CHADS2-VASc score is commonly used for stroke risk stratification in patients with atrial fibrillation (AF). Its predictive accuracy in patients with heart failure (HF) is unclear.

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Purpose: To determine whether CHA2DS2-VASc predicts stroke and death in patients with HF with and without AF.

Methods: The Korean Acute Heart Failure registry (KoAHR), an ongoing, prospective observational multicenter cohort study from 2011-2014, was used in the study. We excluded patients with a diagnosis of cancer or chronic obstructive pulmonary disease before HF. The study sample comprised 1,840 patients with AF, and 2,756 patients without AF.

Results: During 1-year follow-up period, among HF patients with and without AF, the stroke occurred 3.7% (n=68) and 2.6% (n=73), respectively; incidence rate per 100 person-years without AF were 3.7, 1.1, 3.5, 3.1, 3.9, 5.7, and 6.4 for CHA2DS2-VASc of 1 through 7, respectively. The all-cause death occurred 21.6% (n=398) and 20.7% (n=570) in patients with and without AF, respectively; incidence rate per 100 person-years were as follows, for CHA2DS2-VASc scores of 1 through ≥7: 0.52–0.65, 0.62 [95% CI, 0.59–0.65], and 0.64 [95% CI, 0.61–0.66], respectively.

Conclusions: Among patients with HF, the CHA2DS2-VASc was significantly associated with and was able to modestly predict the risk of stroke and death, except stroke in patients with AF.

P2018
Clinical application of human iPSC cells for the treatment of patients with severe congestive heart failure
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Funding Acknowledgements: Grant from Japanese Government

Although heart transplantation can drastically improve the survival, shortage of the donor heart is a serious problem. The regenerative medicine of the failing heart had been long awaited. To address this question, we had developed novel methods to induce human iPSC cells from circulating human T lymphocytes using Sendai virus containing Yamanaka 4 factors. We had screened the factor that were expressed in future heart forming area of the early mouse embryo, found several growth factors and cytokines that can induce cardiomyocytes differentiation and proliferation, and applied them to human iPSC cells. We performed transdifferentiation of the metabolic enzymes and fluxome analysis using 13C-glucone and 13C-acetic acid on ES/iPSC cells and cardiomyocytes, and found that their metabolic pathways were completely different. Based on these findings, we purified cardiomyocytes using glucose-free lactate-supplemented medium. Purity of the cardiomyocytes was >99%, and they could not make teratoma formation. The transplanted cardiomyocytes using our technique can survive in the heart with more than 90%, and can show physiological growth after transplantation. Transplantation of ES/iPSC-derived cardiomyocytes into the infarcted myocardium could improve cardiac function in rat and porcine model. We expect the combination of these techniques can achieve future heart regeneration.

BASIC SCIENCE - MOLECULAR BASIS

P2019
The cell death-associated protein kinase, RIPK1, is phosphorylated in cardiomyocytes in response to pro-inflammatory cytokines or oxidative stress.
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Funding Acknowledgements: British Heart Foundation

Introduction: Myocardial infarction is associated with oxidative stress, inflammation and production of pro-inflammatory cytokines (e.g. tumour necrosis factor alpha (TNFα), interleukin-1 beta (IL-1β)). In T cells, TNFα signals via RIPK1. Ubiquitylated RIPK1 is protective, activating NFκB, p38 MAPKs and JNKs. Deubiquitylation of RIPK1 induces apoptosis, whilst phosphorylation and kinase activation switches the mode of cell death from apoptosis to an alternative, more damaging form, necroptosis.

Purpose: Our aims are to determine how RIPK1 is regulated in cardiomyocytes and its role in the cardiomyocyte response to pro-inflammatory cytokines or oxidative stress. Our hypothesis is that RIPK1 is phosphorylated and activated by these stresses, and its activation status influences cardiomyocyte survival vs. death.

Methods and results: Phosphorylation of protein kinases is associated with the appearance of reduced mobility bands on immunoblots. The effects of TNFα, IL-1β or H2O2 (a physiologically relevant oxidative stress) on RIPK1 were studied initially in neonatal rat ventricular myocytes (NRVMs). TNFα (20 ng/ml) induced appearance of reduced mobility bands (indicating multiple phosphorylations) in 5-15 min, with return to the basal state by 2 h. IL-1β (1 ng/ml) induced appearance of similar bands in 5-15 min, but the response was greater and more prolonged. H2O2 (0.2 mM) induced the same degree of response as IL-1β, but this was maximal at 1-2 h. These reduced mobility bands are consistent with phosphorylation rather than ubiquitylation in terms of relative molecular mass. Arion-exchange chromatography also indicated RIPK1 was phosphorylated. Gel filtration chromatography showed RIPK1 (74.8 kDa predicted molecular weight) elutes in a complex of 150-170 kDa in control cells and forms higher molecular weight complexes with IL-1β. The degree of RIPK1 phosphorylation in response to IL-1β was concentration-dependent. Activation of p38 MAPK was assessed by immunoblotting using phosphospecific antibodies. The concentration-dependency of p38 MAPK phosphorylation in response to IL-1β mirrored that of RIPK1 phosphorylation. Moreover, p38 MAPK inhibitors (SB203580, BIRB-766) attenuated the appearance of reduced mobility bands induced by IL-1β. The concentration-dependency for this inhibition was similar to that for inhibition of phosphorylation of MAPKAPK2 (an established p38 MAPK substrate). Adult male rat hearts were perfused in the Langendorff mode with IL-1β (15 min) in the absence/presence of SB203580. Consistent with the results from NRVMs, IL-1β induced the appearance of reduced mobility bands and this was inhibited by SB203580, confirming that the results are relevant for the adult heart.

Conclusions: RIPK1 is phosphorylated in response to IL-1β in cardiomyocytes and perfused adult rat hearts, and this is mediated via p38 MAPK signalling. Since p38 MAPK is activated downstream of RIPK1, this is likely to be a feedback system.

P2020
HFWM: Regulation of cardiac pacemaker activity by PDE4 isoforms
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Funding Acknowledgements: CORDDIM, Fondation Lefoulon-Delalande, ANR Jeune Chercheuse-Jeune Chercheur

Background: Numerous epidemiological and clinical studies have revealed a positive correlation between heart rate (HR) and cardiovascular morbimortality. The autonomic nervous system is the major extracardiac determinant of HR. During sympathetic stimulation, the activation of β-adrenergic receptors (βAR) induces an increase in cAMP levels, leading to a positive chronotropic effect. Among the 5 cAMP-PDE isoforms, PDE4 is the most abundant and a potential therapeutic target for HF. The goal of this study was to assess the role of PDE4 isoforms in cardiac pacemaker activity.

Methods: PDEA4A, PDEA4B and PDEA4D were expressed in mouse SAN. In PDE4D-, but not in PDE4B-deficient mice, Ca2+ activity in SAN. The 3 isoforms PDE4A, 4B and 4D were found to be expressed in mouse SAN. PDE4D ablation strongly perturbs normal SAN activity. Since p38-MAPK is activated downstream of RIPK1, this is likely to be a feedback system.

Conclusions: The total enzymatic PDE4 activity was determined in mouse sinoatrial node (SAN) tissue as the cAMP hydrolytic activity measured in the absence of PDE inhibitor and the fraction corresponding to PDE4 activity was assessed by including the PDE4 inhibitor Ro-20-1724 (10 µM). The in vitro pacemaker activity was assessed by measuring the spontaneous Ca2+ transients in Fluor-loaded SAN intact tissue. Images were obtained using confocal microscopy.

Results: Ro-20-1724 increased the beating rate of intact mouse SAN and increased PDE4A, 4B, 4D and 4D-44. Their respective contribution to the regulation of pacemaker activity remains ill-defined.

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University of Bonn, Germany

Poster session 3

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P2025

Evaluation of the cardiovascular profile of a novel nitroxyl donor BMS-986231 in chronically instrumented dogs with normal cardiac function and pacing-induced cardiomyopathy

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Funding Acknowledgements: Financial support for this work was provided by Bristol-Myers Squibb

Background: BMS-986231 is a novel nitroxyl (NHO) donor that releases HNO, a molecule linked to positive inotropy, lusitropy and vasodilatation

Methods: Assess BMS-986231 effects on haemodynamics and load-independent left ventricular (LV) mechano-energetic parameters in conscious, chronically instrumented normal dogs and dogs with pacing-induced heart failure (HF)

Results: BMS-986231 was given as a 180-min intravenous (IV) infusion (50 mg/kg/min) in 8 dogs with normal cardiac function (CTRL), and at 3 doses (25, 50, 75 mg/kg/min) in 6 dogs with pacing-induced cardiomyopathy (HF)


P2024

HFWM: Endogenous proteasome regulation in the myocardium supports increased systolic function upon chronic, but not acute beta-adrenergic receptor signaling

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Purpose: Aging is associated with increased risk of cardiovascular disease and death. One of the theories of aging postulates an age-dependent decline in autophagy, a major cellular repair process associated with rejuvenation. Here, we tested if dietary supplementation of the natural autophagy-inducer spermidine protects against cardiac aging

Methods: Spermidine (3mM) was supplemented in the drinking water of pre-aged (18-month-old) C57Bl/6 wild-type male mice for 5 months. Cardiomyocyte-specific autophagy-deficient male mice (Atg5-/-MLC2aCre +, 4-month-old) that were fed spermidine for 3 months were employed to test whether the effects of spermidine are autophagy-dependent. A comprehensive in vivo and in vitro cardiac characterization was performed using echocardiography, invasive hemodynamics, confocal and electron microscopy, immunoblotting, high-resolution respirometry and ultrastructural analysis of cardiomyocytes by design-based stereology. Another subset of C57Bl/6 mice was followed up for lifespan estimation and survival analysis

Results: Dietary spermidine supplementation extended median lifespan (by 10%) and exerted cardioprotective effects through reduction of cardiac hyper trophy and preservation of diastolic function in old mice. Spermidine-fed mice showed enhanced cardiac autophagy, mitophagy, mitochondrial respiration and mechano-elastic properties of cardiomyocytes in vivo, coinciding with increased tissutel phosphorylation and suppressed subclinical inflammation. Age-related effects on subcellular cardiomyocyte composition were reversed by spermidine, as reflected by increased relative mitochondrial and myofibrillar volumes and a reduced (mitochondria- and myofilibril-free) sarcoplasmic volume. Spermidine failed to protect cardioprotection in the mice that lack autophagy in cardiomyocytes. In humans, higher spermidine intake was correlated with lower blood pressure and lower risk of cardiovascular disease (e.g. fatal heart failure)

Conclusion: Our results suggest dietary intake of spermidine as a novel and feasible strategy against aging-associated cardiovascular disease.

P2027

ABAT differential methylation closely relates to left ventricular function and stroke volume in ischaemic cardiomyopathy patients

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Results: ABAT gene transfer restored the endogenous mechanism for proteasome regulation. Lmp2 gene transfer did not impact cardiac function under baseline conditions and upon isoproterenol administration for 4 days. In contrast, Lmp2 gene transfer fully restored systolic function in Lmp2 KO mice treated for 7 days with isoproterenol abait the mice were born and matured without the gene. In contrast, control gene transfer did not restore systolic function in Lmp2 KO mice treated with isoproterenol for 7 days (FS: 33% Lmp2 vs. luciferase gene transfer, p = 0.01, n=8)

Conclusions: Cardiac proteasome regulation via Lmp2 sustains systolic function during hypertrophic remodeling upon chronic beta-adrenergic receptor stimulation, but does not interfere with cardiac muscle mass or function under uncomplicated conditions and short-term beta-adrenergic receptor signaling.

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Left ventricular (LV) remodeling after myocardial infarction (MI) is a crucial determinant of the clinical course of heart failure. Matrix metalloproteinase (MMP) activation is strongly associated with LV remodeling post-MI. Elucidation of plasma membrane receptors related to the activation of specific MMPs is fundamental for treating adverse cardiac remodeling post-MI.

Purpose: The aim of current investigation was to explore the potential association between the receptor low-density lipoprotein-receptor-related protein 1 (LRP1) and MMP-9 and MMP-2 spatiotemporal expression post-MI.

Methods: A total of 46 male C57Bl/6 mice were used in this study; MI was induced occluding permanently left anterior descending coronary artery. Animals were sacrificed at 1, 10 and 21 days post-operation. In vitro studies were carried out with MEF and PEAK3 fibroblasts; cells were exposed to hypoxia in an H35 Hypoxic/Anoxic Workstation with 94% N2 and 5% CO2.

Results: Real-time PCR and Western blot analyses showed that LRP1 mRNA and protein expression levels, respectively, were significantly increased in peri-infarct and infarct zones at 10 and 21 days post-MI. Confocal microscopy demonstrated high colocalization between LRP1 and the fibroblast marker vimentin, indicating that LRP1 is mostly expressed by cardiac fibroblasts in peri-infarct and infarct areas. LRP1 also colocalized with proline-rich tyrosine kinase 2 (pPyk2) and MMP-9 in cardiac fibroblasts in ischemic areas at 10 and 21 days post-MI. Cell culture experiments revealed that both pPyk2 protein levels and MMP-9 activity were reduced to minimal levels in LRP1-deficient fibroblasts compared to control fibroblasts. These results indicate that both Pyk2 phosphorylation and MMP-9 activation require LRP1 in hypoxic fibroblasts.

Conclusion: Our results suggest that LRP1 plays a major role in MMP-9 upregulation in cardiac fibroblast post-myocardial infarction and highlight the potential role of LRP1 modulation for treatment of cardiac remodeling.
Our data indicate that the H11T alpha-mediated increase in Zeb2 in cardiomyocytes in response to ischemic stress activates cardiac fibroblasts for proper infant healing and promotes TIMP4 secretion from heart muscle cells, which activates a downstream pro-survival response in injured cardiomyocytes. These findings reveal Zeb2 as a cardioprotective factor during ischemic injury, which may hold great promise for future heart failure therapies.

P2031

HFWM: Selective HDL-raising gene transfer counteracts cardiac hypertrophy, reduces fibrosis, and improves cardiac function in mice with chronic pressure overload.

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Funding Acknowledgements: This work was supported by Onderzoeksstelsel grant OT13/390 of the KU Leuven and by grant GA31141N of the Fonds voor Wetenschappelijk Onderzoek-Vlaam.

Purpose: Epidemiological studies support an independent inverse association between high-density lipoprotein (HDL) cholesterol levels and heart failure incidence. The effect of selective HDL-raising human apo A-I gene transfer on cardiac remodelling induced by transverse aortic constriction (TAC) was evaluated.

Methods: Gene transfer with 5 x 1010 genome copies of an adeno-associated viral serotype 8-human apo A-I (AAV8-A-I) vector containing a hepatitis-specific expression cassette was performed in C57BL/6J-lcdn4 lipoprotein receptor deficient (LDLr/-) mice after 7 days of operation. Following 2 weeks was followed by TAC or sham operation two weeks later. Invasive hemodynamic measurements and morphometric and immunohistological analysis was performed 8 weeks after TAC or sham operation.

Results: Septal wall thickness was reduced by 16.5% (p < 0.001) 8 weeks after TAC in AAV8-A-I mice (n=24) compared to control TAC mice (n=39). The anti-hypertrophic effect of HDL-raising human apo A-I gene transfer was confirmed by a 16.5% (p < 0.01) reduction of cardiomyocyte cross-sectional area after TAC. Capillary density was 15.7% (p < 0.05) higher and interstitial fibrosis was 46.3% (p < 0.001) lower in AAV8-A-I TAC mice compared to control TAC mice. The lung weight in AAV8-A-I TAC mice was not increased compared to sham mice and was 13.3% (p < 0.05) lower than in control TAC mice. Atrial weight was 2.05 (p < 0.001) higher in control TAC mice than in control sham mice whereas no increase of atrial weight was observed in AAV8-A-I TAC mice. The peak rate of isovolumetric contraction was 18.4% (p < 0.01) higher in AAV8-A-I TAC mice (n=17) than in control TAC mice (n=29). Improved diastolic function following selective HDL-raising gene transfer was evidenced by a 17.5% (p < 0.05) increase of the peak rate of isovolumetric relaxation, a 15.4% (p < 0.05) shortening of the time constant of isovolumetric relaxation, and a significantly (p < 0.01) reduced end-diastolic pressure. Moreover, parameters of diastolic function were significantly (p < 0.05) better in AAV8-A-I sham mice (n=12) than in control sham mice (n=10). The 3-nitrotyrosine-positive area (%) in the myocardium quantified by immunohistochemistry was increased 7.73-fold (p < 0.001) in AAV8-A-I TAC mice compared to control AAV8-A-I TAC mice. The 3-nitrotyrosine-positive area (%) in the myocardium quantified by immunohistological analysis was increased 7.73-fold (p < 0.001) in AAV8-A-I TAC mice compared to control AAV8-A-I TAC mice.

Conclusions: Selective HDL-raising human apo A-I gene transfer exerts anti-hypertrophic effects, reduces interstitial fibrosis, and improves systolic and diastolic function in a model of pressure overload-induced cardiomyopathy.

P2032

HFWM: post-transcriptional regulators of superoxide dismutase 2 as new biomarkers of left ventricular remodelling post-myocardial infarction.

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Purpose: After myocardial infarction (MI), 30% of patients develop a left ventricular remodeling (LVR) which remains a major complication and a strong predictor of both heart failure (HF) and death after MI. Our main objective is to identify new biomarkers of this pathology.

Methods: We used an experimental HF-rat model in which MI is induced by left coronary ligation to perform a proteomic analysis of left ventricle (LV). By bioinformatic analysis with Inqtergy Pathway Analysis (IPA), we identified 13 microRNAs potentially modulated during HF. We then quantified these microRNAs in left ventricle (LV) and plasma in our rat model of HF-post-MI and in a cohort of patients with different degrees of LV (REV/E-2 study).

Results: By proteomic and phosphoproteomic analysis in a HF-rat model, we identified 45 proteins differentially modulated in LV. We then performed a bioinformatic analysis with IPA to identify molecular targets involved in their regulation. We identified 13 miRNA regulating 8 proteins, mostly involved in oxidative stress and metabolism, two main pathways involved in HF progression. We quantified in LV of HF-rats an increased levels of miR-23a-3p (x1.5, p < 0.029) at 7 days post-MI, of miR-377-5p (x3.5, p < 0.014), miR-21-3p (x2.5, p < 0.013) and miR-21-5p (x2.3, p = 0.004) at 2 months post-MI and of miR-222-3p at both time (7 days: x3, p = 0.025; 2 months: x1.1, p = 0.005). To analyze their potential as biomarkers, we quantified these miRNA in plasma and observed a decreased expression at 7 days post-MI and an increased expression at 2 months post-MI for miR-21-5p (7 days: /1.6, p = 0.002; 2 months: x6.2, p < 0.007), miR-23a-3p (7 days:x3.2, p = 0.008; 2 months: x6.6, p = 0.004) and miR-222-3p (7 days: /R; p = 0.002; 2 months: x1000, p = 0.001).

Interestingly, these 3 miRNA regulate superoxide dismutase 2 (SOD2), the major mitochondrial anti-oxidant enzyme. We then quantified an increased SOD2 expression in LV of HF rats at 2 months post-MI (x1.6, p = 0.029), without modulation at 7 days post-MI. Plasmatic levels of SOD2 were not modulated in HF-rats.

We then quantified SOD2 and its post-transcriptional regulators in human plasma of patients with or without LVR in REV/E-2 cohort. SOD2 increased in plasma of LVR patients 1 year after MI (x6.5, p = 0.049). Expression of miR-21-5p, miR-23a-3p, miR-222-3p decreased 7 days after MI (10, respectively p = 0.010; p = 0.049; p = 0.020) and increased 3 months after MI in plasma of LVR patients (10, respectively p = 0.018; p = 0.002; p = 0.007). Lastly, we demonstrated direct regulation of SOD2 by miR-222-3p by using mimic and miR-222 inhibitors in human cardiomyocytes.

Conclusion: We demonstrated for the first time the potential interest of miR-21-5p, miR23a-3p and miR-222-3p, 3 microRNAs involved in SOD2 regulation, as new biomarkers of LVR post-MI.

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associated with CD3 and CD8, suggesting that its over-expression in failing hearts was attributable to infiltrated blood lymphocytes. Finally, MIRCA was very weakly expressed or absent in plasma, serum, and oxosome-enriched plasma fractions.

Conclusion: We have characterized MIRCA, a novel circRNA predicting the development of heart failure after AMI. MIRCA is expressed by lymphocytes and may participate in the function of T regulatory cells after AMI. Further investigation of the therapeutic potential of these findings is warranted.

P2034
Saliva: linking oral health with heart failure
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Background: Heart failure (HF) is a severe complication that affects 26 million people worldwide and the incidence is growing due to an aging population. There is an urgent need for early screening program for HF hinders early detection and targeted treatment and contributes greatly to the mortality of HF. Human saliva contains a large number of circulating proteins that can serve as indicators of the body’s health and well-being. Previous research from us and others have demonstrated the possibility of detecting cardiac-specific biomarkers in saliva. These biomolecules enter saliva through diffusion, active transport or filtration.

Purpose: We aimed to investigate the diagnostic potential of saliva for HF.

Methods: Saliva samples were collected from age-matched healthy controls (n = 20) and HF patients (n = 40). We employed an unbiased approach to investigate the salivary proteomics profiles of HF patients and healthy controls using SWATH-Mass Spectrometry. Potential candidate proteins were identified based on their abundance and the biological functions. These findings have further been validated using biological and technical replications.

Results: This unbiased approach identified six candidate proteins in saliva and this panel of six proteins correlated with disease severity. These six proteins were then combined into a prediction model using logistic regression. At the optimal cut-off point, the panel demonstrated excellent diagnostic performance (sensitivity = 77.1% and specificity = 71.4% and AUC = 0.84).

Conclusion: We were able to identify proteins in human saliva that can distinguish HF patients from healthy controls. Prior to clinical implementations, these findings should be verified in larger asymptomatic patient cohorts. There is evidence that salivary proteins can be used in developing early screening/diagnosing tools for HF.

P2035
HFWM: Erthrocyte nitrosyl-hemoglobin reflects endothelial function and vascular nitric oxide bioavailability in vivo
F Dei Zotti1; I Lobysheva1; C Beauloye1; JL Balligand1
1Institute of Experimental and Clinical Research (IREC), Brussels, Belgium

On behalf of: FATH
Funding Acknowledgements: FNRS-FRIA

Reduced bioavailability of nitric oxide is a hallmark of endothelial dysfunction in metabolic and cardiovascular diseases, but its quantification in circulating blood remains a challenge. NO can form iron-nitrosyl complexes with hemoglobin (5-coordinate -HbNO) in erthrocytes (RBCs). We hypothesized that this complex, predominantly formed in vessels, reflects bioavailability of vascular NO and endothelial function in vivo. We developed a modified subtraction method using EPR to quantify it in RBCs from mouse, rat and human venous blood. We found HbNO observed in RBCs from the three species ex vivo. The circulating concentration was 425 nM in rodents and 92 nM in human venous blood. NO could be supplied from vascular or intraerythrocytic NO sources. We detected eNOS proteins in RBCs from rodent and human. To test eNOS functionally, we measured nitrate/nitrite production and HbNO formation in human RBCs and from eNOS(+/-) and eNOS(-/-) mice in vitro and its sensitivity to NO or arginine inhibitors. Nitrite and HbNO signals increased after arginine inhibition and were abrogated upon NO donor injection in human and eNOS(+/-) but insensitive to these modulators in eNOS(-/-)RBCs. HbNO signal from venous RBCs was minimally sensitive to NO inhibitor ex vivo, suggesting that intracellular NO contributes little compared with vascular eNOS or other NO sources reaching RBCs in vivo. We found that upon exposure to exogenous NO donor, the formation of HbNO was higher in hypertensive conditions (100 μM O2/18 ± 0.002 μM NO/L/mmol) compared to normoxic (0.003 ± 0.004 μM NO/L/mmol) and inversely correlated with ratios of key-to decay forms of Hb. The stability of pre-formed HbNO was higher under hypoxia (7% degradation after 30 min) of O2 vs. 49% in norm air and preserved at 21% of O2 by incubation with catalase (CAT)5 μM HbNO/L vs. 0.5 μM HbNO/L untreated controls. Furthermore, HbNO degradation had minimal effect. CAT inhibition increased ROS formation in RBCs, measured by FACS analysis of DCFDA fluorescence. This suggested that HbNO formation is sensitive to oxidative degradation, possibly by H2O2. We compared circulating HbNO levels in venous RBCs from normal volunteers or patients with cardiovascular diseases and found decreased HbNO in patients (0.14 ± 0.11 μM/L vs. 0.22 ± 0.12 μM/L in volunteers; N=38 and HbNO was significantly correlated with endothelial function (endo-PERK) and inversely correlated with major cardiovascular risk factors. We conclude that HbNO reflects exposure of RBCs to NO in vivo and is sensitive to oxidative degradation by H2O2. HbNO could be developed as a biomarker of NO bioavailability and/or oxidative stress ex vivo.

P2036
Evidence-based nursing interventions which improve heart failure patients under mechanical circulatory support outcomes: an integrative review
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1Hospital Lisbon North, Hospital Santa Maria, Lisbon, Portugal; 2ISEL, Lisbon, Portugal

Background: Heart Failure (HF) is a major and growing issue in Public Health worldwide. Mechanical Circulatory Support (MCS) has become a therapy of choice for the treatment of end-stage heart failure. However, the use of MCS is still challenging due to the high incidence of complications associated with the procedure. The aim of this review was to systematically identify the interventions that have been implemented to improve the outcomes and complications in patients with mechanical circulatory support.

Methods: A literature search strategy was conducted to identify studies that used a systematic approach in MEDLINE, CINAHL and Cochrane databases and manual search on Google and ResearchGate of original articles and literature reviews published between January 1st, 2010 and August 31st, 2016. There were 41 articles included. Theses studies related to adult HF patients with formal indication or under MCS in which the first author was a nurse. The studies included both RCTs and non-RCTs comparing patients with MCS devices such as intra-aortic balloon counterpulsation or venovenous extracorporeal membrane oxygenation or ventricular assist devices.

Results: From the 41 articles included, the nursing interventions evidence-based found in most of these articles were grouped into four domains of care: pain management, sleep disturbance, patient mobility and quality of life. The interventions were aimed to improve outcomes and reduce complications in patients with MCS devices.

Conclusion: Nursing interventions could be implemented to improve the outcomes and complications in patients with mechanical circulatory support. However, further research is needed to identify the most effective interventions in this population.
HGG, GGC, HNC, CNCL. The procedures followed the FELASA/ICLAS for use of the laboratory animals, NPHA was induced by exposure to hypobaric hypoxia. Rats were housed in a hypobaric chamber at simulated altitude of 5000 m, 10 h a day, 2 wk. (O2 concentration reduced to 10%). For exercise preconditioning rats were subjected to exercise training (aerobic swimming during 30 min/day) for a period of 2 weeks to hypoxia. Right ventricular (RV) hypertrophy was calculated as RV weight/w.h.

Methods: Depletion of estrogen was performed by oophorectomy (OVX; n = 18) in female Wistar rats. Experimental groups included SHAM or OVX rats that received a single injection of MCT (60 mg/kg, ip.) for PH induction followed by administration of vehicle or G1 (400 μg/kg/day s.c.) for 14 days after PH onset (n = 7 per group).

Results: MCT injection and estrogen loss led to a decrease in pulmonary acceleration time and an increase in RV hypertrophy in PH rats and MCT-related changes were attenuated by treatment with G1 (P < 0.05; Table 1). RV pressure (RVP) was higher in MCT-injected rats and this increase in OVX group was higher than that in G1. Reduced RVP in both SHAM and OVX rats (Table 1). G1 normalized the expression of calcium handling proteins in the RRs (Table 1). G1 reduced pulmonary arteries wall fibrosis and hypertrophy in both MCT-treated SHAM and OVX rats (P < 0.05).

Conclusion: G1 reversed cardiopulmonary dysfunction in female rats, a finding that may have important implications for the treatment of PH in women.

P2039
Improved metabolic syndrome-related right and left ventricular dysfunction by the dual ETA-ETB receptor antagonist macitentan.
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1INSERM U1096, ROUEN, France; 2Actelion Pharmaceuticals, Basel, Switzerland

Funding Acknowledgements: Actelion pharmaceuticals

Background: WHo group II pulmonary hypertension (PH due to left heart disease), represents a major health problem with significant morbidity and poor prognosis. Endothelin (ET) receptor blockade is a promising therapeutic approach, since ET-1 is a key player in PH and is probably involved in the development of left heart disease and cardiac hypertrophy and fibrosis via both ETA and ETB receptors. However, whether ET receptor blockade exerts protective effects on PH due to left heart disease is unknown.

Purpose: To evaluate the effects of dual ET receptor antagonism in a rat model of metabolic syndrome-related right and left ventricular dysfunction.

Methods: We assessed in Zucker fa/fa rats the effects of long-term (90 days) macitentan on pulmonary hypertension and left and right ventricular function.

Results: We assessed in Zucker fa/fa rats the effects of long-term (90 days) macitentan on pulmonary hypertension and left and right ventricular function.

Conclusion: G1 reversed cardiopulmonary dysfunction in female rats, a finding that may have important implications for the treatment of PH in women.

P2038
Activation of a new estrogen receptor (GPER) ameliorates cardiopulmonary dysfunction in female rats with pulmonary hypertension.
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1Federal University of Rio de Janeiro, Rio de Janeiro, Brazil; 2Wake Forest University, Winston-Salem, United States of America

Funding Acknowledgements: CNPq, CAPES, PRONEX, FAPERJ, and MCT-INOFAR

Introduction: Pulmonary hypertension (PH) is a disease of women, and induces right ventricular (RV) failure. Hypothesis: The activation of an estrogen receptor (GPER) by the agonist G1 was evaluated in monocrotaline (MCT)-induced PH female rats.

Table P2038: Cardiac remodeling and hemodynamics

<table>
<thead>
<tr>
<th>Group</th>
<th>LVEF (mmHg)</th>
<th>LVEDP (mmHg)</th>
<th>RVSP (mmHg)</th>
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<tr>
<td>Control</td>
<td>45.0 ± 0.8</td>
<td>20.7 ± 0.6</td>
<td>0.26 ± 0.26</td>
<td>Pulmonary Acceleration time (ms)</td>
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<tr>
<td>MCT</td>
<td>30.7 ± 2.3</td>
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<tr>
<td>G1</td>
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**P2037**

Table P2037: Parameters of the experimental

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<th>LVEDP</th>
<th>RVSP (mmHg)</th>
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Results: After 3 months, untreated Zucker rats presented both LV diastolic dysfunction (elevation of LV End-Diastolic Pressure (EDP) and LV End-Diastolic Pressure Volume Relation (EDPVR) without change in LVESPVR) associated with increased collagen deposition. Simultaneously, left coronary artery relaxation to acetylcholine was impaired. Zucker rats developed PH and RV dysfunction characterized by increases in RVESP and RVEDP. Macitentan significantly prevented LV and RV dysfunctions as well as coronary dysfunction, associated with a reduced LV collagen density (Lean: 0.93 ± 0.10 %; Zucker: 1.32 ± 0.13 %; p < 0.05 vs lean; Zucker + macitentan: 0.76 ± 0.06 %, p < 0.05 vs Zucker).

Conclusions: The dual ET receptor antagonist macitentan prevents LV diastolic dysfunction and reduces RV pressure in a model of PH due to left heart disease.

P2040
Benefit of combined therapy with Sildenafil and LASSBio-1359 in preventing monocrotaline-induced rat pulmonary hypertension.
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1Federal University of Rio de Janeiro, Rio de Janeiro, Brazil
Funding Acknowledgements: CNPq, CAPES, PRONEX, FAPERJ, and INC-TINOVAR
Background and Purpose: Pulmonary hypertension (PH) is characterized by enhanced pulmonary vascular resistance, subsequent right ventricle (RV) pressure overload, which ultimately results in right-sided heart failure and death. This study was designed to assess if the effectiveness of a combined therapy with sildenafil, a phosphodiesterase type 5 inhibitor (PDE5), and LASSBio-1359, a new adenosine A2A receptor (A2AR) agonist, is superior to either compound alone in mitigating monocrotaline (MCT)-induced rat PH.

Experimental Approach: For in vitro study, an isotropic analysis was performed to identify a possible synergistic relaxation effect between sildenafil and LASSBio-1359 in rat pulmonary artery (PA). For in vivo protocol, PH was induced in male Wistar rats by a single intraperitoneal injection of MCT at a dose of 60 mg/kg. Rats were divided into the following groups: control (saline injection only), MCT (100 mg/kg), MCT + sildenafil (34 μg/kg/day), MCT + LASSBio-1359 (170 μg/kg/day), MCT + combination of sildenafil and LASSBio-1359 (34 μg/kg/day each one). Fourteen days after MCT injection, rats were treated daily with oral administration of the regimen therapies or vehicle for 14 days. Cardiopulmonary system function and structure were evaluated by echocardiography. RV systolic pressure (RVSP) and pulmonary artery endothelial function were further measured.

Key Results: Isotropic analysis showed synergistic interaction between sildenafil and LASSBio-1359 in rat PA arteries. In vivo monotherapy with low-dosesages (34 μg/kg/day) of both compounds did not reverse the deleterious effect of PH on PA flow, pulmonary vascular reactivity, RV structure and function, but combined modality of a PDE5i with an A2AR agonist ameliorated all these PH-related abnormalities of the cardiopulmonary function and structure in MCT-challenged rats.

Conclusion and Implications: In vitro and in vivo synergism interaction between sildenafil and LASSBio-1359 suggest a combined use of both compounds to improve life-quality and outcomes of a higher population of patients with PH in the future.

P2041
Ivabradine improves left ventricular twist and untwist in the hypertrophied heart and preserves contraction-relaxation coupling.
M Jozwik1; J Melka1; M Rienzo1; A Bize1; L Sambon1; L Hittinger1; A Berdeaux1; JB Su1; B Bhoumedi2; B Stijn Grualet1
1INSERM U955 Equipe 03, Creteil, France; 2University Hospital of Dijon, Service d’Anesthesie Reanimation, Dijon, France
Funding Acknowledgements: INSERM, AFM, COO, SFHTA, Fondation de l’Avenir
Background: Tightly coupled and abnormal left ventricular (LV) isovolumic contraction and relaxation are observed during chronic hypertension and LV hypertrophy. These altered systolic and diastolic functions are associated with maladaptive LV responses to tachycardia. However, isovolumic periods do not reflect the whole cycle and more global assessment is needed. Interestingly, LV twist and untwist are LV myocardial deformation that occurs during the overall systole and diastole, respectively.

Purpose: To investigate contraction-relaxation coupling using LV twist and untwist analysis and to determine the effect of acute heart rate (HR) reduction with ivabradine (1 mg/kg iv) on global systolic and diastolic function in a pig model of chronic hypertension.

Methods: Eight chronically instrumented pigs received angiotensin II infusion during 28 days to induce chronic hypertension. LV function was investigated by combining hemodynamic and echocardiographic measurements. All measurements were performed at Day 0 and at Day 28 while angiotensin II infusion was stopped.

Results: Chronic infusion of angiotensin II significantly increased LV posterior and septal wall thicknesses as well as the estimated LV mass, indicating LV hypertrophy. HR increased by 15%. LV untwist was significantly reduced (-104 ± 8 vs. -154 ± 9 s-1, p < 0.05), showing global LV diastolic dysfunction. Concomitantly, LV twist was also significantly altered (11 ± 1 vs. 16 ± 1 s-1, p < 0.05), showing global LV systolic dysfunction. Interestingly, there was a strong relationship between LV twist and untwist so that the ratio between LV twist and untwist remained unchanged between Day 0 and Day 28 (0.107 ± 0.013 vs. 0.108 ± 0.012, p = NS). It suggests that contraction-relaxation coupling was preserved with the development of LV hypertrophy. In this context, ivabradine decreased HR by 25% (from 86 ± 5 to 63 ± 3 beats/min, p < 0.05) and significantly improved both LV twist (from 11 ± 1 to 14 ± 1 s-1, p < 0.05) and LV untwist (from -104 ± 8 to -146 ± 5 s-1, p = 0.005), showing that HR reduction with ivabradine improved both global systolic and diastolic LV functions. In addition, ivabradine did not alter contraction-relaxation coupling, as shown by the unchanged absolute ratio between LV twist and untwist at baseline and after ivabradine administration (0.108 ± 0.012 vs. 0.105 ± 0.004).

Conclusions: LV twist and untwist were altered in this model of chronic hypertension and LV hypertrophy but they remained tightly coupled. Acute HR reduction with ivabradine improved both LV systolic and diastolic functions without altering contraction-relaxation coupling.
The degree of pulmonary congestion measured by non-invasive lung impedance is the key determinant of heart failure hospitalizations: Lessons from the extended IMPEDANCE-HF trial.

Results of the IMPEDANCE-HF trial have shown that lung impedance (LI)-guided treatment reduces hospitalizations for heart failure (HF) and decreases HF-related mortality. The main trial was extended for an additional year to accrue more data on predictors of hospitalizations due to HF. The main aim of the study was to prove that HF patients with higher degree of long-standing pulmonary congestion are hospitalized more often.

Methods: Study population included 266 patients, with HF and LVEF ≤ 35% in New York Heart Association class II-IV. Patients were randomized (1:1) to a control group treated by clinical assessment and a monitored group whose therapy was also assisted by LI. Patients were examined and LI measured monthly in our outpatient clinics. Noninvasive LI measurements were performed with the high-sensitive device. Assessment of the degree of pulmonary congestion was by the new index LIR, measured at each visit and calculated as LIR = (1 - [currently measured LI] normal baseline [calculated for each patient]) x 100 expressed as percentage. The annual average LI for each patient was calculated as the mean of all LI measurements at each consecutive year of follow-up.

Results: The total follow-up period was 634 years in the monitored group and 483 years in the control group (p < 0.001). Groups were similar with respect to baseline characteristics. There were 228 and 431 HF hospitalizations (mean 0.54 and 1.29 per year of follow-up) in the monitored and control groups, respectively (p < 0.001). There were 54, 35, 22 and 74, 62, 49 all-cause, cardiac and HF-associated death cases in the monitored and the control groups, respectively (p < 0.001). Figure 1 shows the dynamics of pulmonary congestion in study groups during the follow-up period as represented by LIR, demonstrating a significantly lower level of pulmonary congestion in the monitored group compared with the control group during the study (p < 0.001).

Conclusions: The Extended IMPEDANCE-HF demonstrated that pre-emptive LI-guided therapy of HF patients reduced pulmonary congestion significantly more effectively than by treatment according to clinical assessment only. This effect appeared to be consistent during the whole study period. Since groups were similar with respect to baseline characteristics, we proposed that the main reason for reducing the number of HF hospitalizations and improving survival was better decongestion achieved in the monitored group.

Impact of nitrate use on morbidity and mortality in acute heart failure

Introduction: The current pharmacological treatment in acute heart failure (AHF) consists mainly of the use of diuretics in addition to vasodilators or inotropes. The drugs recently studied in AHF have shown no impact on the prognosis. For years, nitrates have been used to treat patients (P) with AHF (recommendation IIa according to the guidelines of the European Society of Cardiology of 2016) however, there is limited evidence of the impact of nitrates on mortality and morbidity of these P.

Purpose: To evaluate the prognostic impact of the early administration (first 24 hours) of intravenous nitrates in P admitted by AHF.

Methods: Retrospective study with 264 P admitted in a cardiac intensive care unit, between February 2010 and November 2016. P with adequate arterial pressure were selected for nitrates therapy (systolic arterial pressure > 90mmHg, Hg >227) and divided into 2 groups - G1: nitrates, N=103 and G2: no nitrates. Demographic, laboratory, echocardiographic variables and in-hospital mortality were compared. Clinical follow-up (5 years) was performed targeting for readmission with AHF and mortality.

Results: The population mean age was 69 ± 14 years old with a majority of male (78%). The etiology was ischemic in 28% of the P and 46% had left ventricular ejection fraction (LVEF) <35%. Readmission with AHF occurred in 42% and in-hospital mortality and during follow-up was 11% and 36%, respectively. The groups presented similar clinical and analytical characteristics: congestive HF (G1 100% vs G2 91%, p = 0.52), presence of cardiovascular risk factors, NT-proBNP values (G1 16972 ± 21511 pg/mL vs G2 19028 ± 41691 pg/mL, p = 0.357), creatinine on admission (G1 119 ± 113 μmol/L vs G2 149 ±192 μmol/L, p = 0.23), chronic kidney disease (G1 46% vs G2 44%, p = 0.25), and cardio-renal syndrome (G1 56% vs G2 57%, p = 0.23). They were similar regarding LVEF (G1 38 ± 12% vs G2 34 ± 14%, p = 0.10) and presence of coronary artery disease (G1 47% vs G2 47%, p = 0.24). There were no differences in the diuretic dosage (G1 174 ± 119mg vs G2 152 ± 97mg, p = 0.15) and in the use of noninvasive ventilation (G1 62% vs 38%, p = 0.60). In-hospital mortality (G1 56% vs G2 44%, p = 0.83) and during follow-up (G1 61% vs G2 39%, p = 0.58) were similar, however we found that patients of G1 had a shorter hospital stay (G1 11 ± 7.9 days vs G2 15 ± 15 days, p < 0.001) and a lower percentage of readmission with AHF (G1 31% vs G2 39%, p = 0.018).

Conclusions: In our population the early use of intravenous nitrates in P with AHF had no impact on mortality. However, it’s associated with a shorter hospital stay and a lower readmission rate due to AHF.

Utilization of proton pump inhibitors in patients with atrial fibrillation is associated with hospitalization for de novo acute heart failure

Background: Proton pump inhibitors (PPIs) are frequently used among patients with atrial fibrillation (AF). In patients under PPI therapy, anaemia due to both iron and vitamin B12 deficiencies may ensue.

Purpose: We aimed to evaluate the incidence of hospitalization for de novo acute heart failure (AHF) at 12-month follow-up in patients with atrial fibrillation who were under PPI therapy.

Methods: We included retrospectively 2181 consecutive patients with AF who were evaluated in our Emergency Department (ED) in a 12 month period. Among them, 423 patients were admitted for in-hospital management. Patients who had previous known heart failure (n = 101), who were under amiodipine therapy (aspirin, clopidogrel and/or ticagrelor) (n = 129), and those with the history of dyspepsia, gastroesophageal reflux, peptic ulcer disease or gastrointestinal bleeding (n = 30) were
Survival free of de novo AHF

2067
Missed opportunity to minimise risk of admission with acute decompensated heart failure (ADHF) during pre-hospital phase of care
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1St Vincent’s University Hospital, Heart Failure Unit, Dublin, Ireland; 2University Hospital North Midlands, Stoke-on-Trent, United Kingdom

**Funding Acknowledgements:** Enterprise Ireland, ResMed, Boston Scientific, Cardiomark

**Introduction:** Heart failure (HF) admission rates present a major challenge. There is a paucity of data relating to the pre-hospital phase of care prior to admission with ADHF.

**Purpose:** To achieve a more complete understanding of this pre-hospital period, which may highlight ways we can improve pre-hospital care and thereby prevent admission.

**Method:** As part of an ongoing multicentre study analysing care pathways in patients admitted to hospital with ADHF (de novo patients, DN, and recurrent admitters, RA), focus was placed on the pre-hospital period to assess duration of symptoms, numbers seeking pre-hospital medical assessment, the nature of any intervention prescribed and (for RA) reporting of weight gain. This analysis is taken from one of the study centres. Data were gathered from clinical patient surveys, conducted by a HF nurse specialist.

**Result:** Of a total of 113 patients, 57 (50.4%) were DN and 56 (49.6%) were RA. Of DN and RA, 75% (42) reported monitoring their weight and 57.1% (24) of those noted a weight gain of >2 kg over two days with their symptoms. Of those who noted a weight gain, 79.2% (19) reported it to a doctor prior to admission. There was a high number seeking pre-hospital medical assessment (via a GP-HF/general cardiology clinic). 66.7% (38) of DN and 67.9% (38) of RA. Cardiology review (general/HF) was more common in RA than DN (39.3% vs. 3.5% respectively, p = 0.000); while more DN were reviewed by a GP only than RA (63.2% vs. 28.6%, p = 0.000). Of DN who were seen by a GP only, 11.1% (4) were prescribed a HF-directed intervention (HFI), commencement of a diuretic or alteration of an established diuretic regimen) and of RA who were seen by a GP only, 12.5% (2) were prescribed an HFI.

**Conclusions:** Due to the prolonged duration of symptoms and high rate of patients seeking medical advice in the community, there is both time and opportunity in which to implement a more effective HFI. Improved patient education and recognition of HF features by GPs with streamlined access to outpatient specialist assistance may allow for earlier appropriately directed HFI, potentially reducing the risk of admission.

<table>
<thead>
<tr>
<th>De Novo (DN)</th>
<th>Recurrent Admitters (RA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-hospital Assessment(s) (no. of patients, all reviews)</td>
<td>38 (66.7%)</td>
</tr>
<tr>
<td>Pre-hospital Assessment(s) (no. of patients, GP only reviews)</td>
<td>36 (63.2%)</td>
</tr>
<tr>
<td>Treatment given by GP’s (no. of patients)</td>
<td>HFI: 4 (11.1%)</td>
</tr>
<tr>
<td>Other:</td>
<td>15 (41.7%)</td>
</tr>
<tr>
<td>Nothing:</td>
<td>18 (50%)</td>
</tr>
</tbody>
</table>

2068
The weekend effect - a distraction to actual associations with in hospital mortality - a large single centre experience
C Broughton1; S Davies1; CS Kwock1; S Anderson1; J Brough1; N Cotton1; F Umar1; A Appa1; J Clossley1; S Duckett1; D Barker1; A Patwara1; U Kadami1; M Mamas1; DK Satishkananda1
1University Hospital North Midlands, Stoke-on-Trent, United Kingdom; 2 Keele University, Stoke-on-Trent, United Kingdom

**Introduction:** The data as to whether weekend admissions increase in patient mortality in acute heart failure (AHF) admissions are conflicting. Multi-centre outcomes for weekend admissions may be confounded by multiple institutional factors. We present the largest, single centre data examining whether in hospital mortality is associated with weekend admissions in comparison to other routinely collected patient data.

**Methods:** Routinely collected hospital episode data were analysed from January 2012 - December 2016 for emergency admissions with AHF to our university teaching hospital serving a population of 600,000. Patients were identified by standardised national codes identifying AHF hospitalisation. All patients admitted on Saturday or Sunday were weekend admissions. Comparisons between survivors and all deaths, and weekday vs weekend admissions were made using unpaired Stu- dar’s t test and Chi 2 test as appropriate. P values of < 0.05 were statistically significant.

**Results:** 4417 patients were admitted during the study. 3873 survived to discharge (in hospital mortality 12.3%), 2133 (481/4417) were admitted at the weekend. The table below demonstrates comparative data for: for the total group, survivors vs. in hospital deaths, all patients weekday vs. weekend admissions. There was no significant demographic, length of stay early or late in hospital mortality differences in AHF patients admitted during the weekend. AHF patients surviving to discharge are younger, less co-morbid and have shorter lengths of stay than patients with AHF who die in hospital.

**Conclusions:** There is no evidence of a ‘weekend effect’ on in hospital mortality in nearly 4500 admissions with AHF. We have demonstrated that in hospital mortality depends more on: pre-existing patient characteristics (e.g. extreme age, number of co-morbidities) and in-patient factors reflected in the length of stay than by weekend admission date.
Biventricular unloading: an efficacious concept to rescue patients in refractory cardiogenic shock

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1 Hannover Medical School, Cardiology and Angiology, Hannover, Germany; 2 Hannover Medical School, Department of Cardiothoracic, Transplantation and Vascular Surgery, Hannover, Germany

Introduction: Extracorporeal life support (ECLS) has taken an important place in the treatment of cardiogenic shock (CS) or refractory cardiac arrest (CA). Because the decision is taken in extreme emergency, the real challenges are the good patient selection and the early reassessment. The aim of this study was to research prognostic factors of 30-days mortality before and 24h after ECLS implantation for CS or CA.

Material and methods: All patients undergoing ECLS in our tertiary center during a 2-year period were prospectively included. The ECLS were managed with a multidisciplinary protocol based on consensus. Clinico-biological data were collected just before and 24h after ECLS implantation. These data were compared between survivors and deceased at one month.

Results: 94 patients were included with predominance of males (66%) and a median age of 53 years. ECLS was implanted for CA under resuscitation (28.8%), acute CS (37.2%), CS after CA (22.3%) and CS due to end-stage heart failure (10.6%). The 30-days mortality was 56.4%. Regarding the data before the implantation, a multivariate analysis (survival Cox model at 30 days) showed the influence of AMI (RR=3.06, IC95% [1.43-6.56]), bilateral mydriasis (RR=2.87, IC95% [1.34-6.07]), and a high lactate rate (RR=1.10, IC95% [1.02-1.18]). Regarding data 24h after ECLS, bilateral mydriasis before ECLS (RR=3.06, IC95% [1.43-6.56]), a high lactate rate (RR=6.2mmol/l, IC95% [1.96-19.32]) as well as acute pulmonary edema occurrence in the first 24h (RR=2.37, IC95% [1.20-4.70]) are significative prognostic markers of mortality. CHAOD’s segmentation method represented the patients’ survival using the H24 covariables with a prevision of 76.3% and may help to stop or maintain ECLS after 24h of support (figure).

Conclusion: Simple biological and clinical parameters as initial mydriasis and a high lactate rate could help the ECLS decision. Moreover, the segmentation based on initial mydriasis, H24 lactate=6.2mmol/l and acute pulmonary edema 24h after ECLS support could serve to the early reassessment of the support for CA or CS.

Table 2068

<table>
<thead>
<tr>
<th>Total AHF admissions n=4417</th>
<th>AHF survivors=3873</th>
<th>AHF in hospital deaths n=544</th>
<th>AHF admitted on a week day n=3476</th>
<th>AHF admitted at weekend n=941</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (sd) in years</td>
<td>76.3 (13.2)</td>
<td>76.3 (13.4)**</td>
<td>83.9 (9.4)</td>
<td>76.6 (13.1)</td>
</tr>
<tr>
<td>% female</td>
<td>52</td>
<td>52</td>
<td>53</td>
<td>52</td>
</tr>
<tr>
<td>Mean number of co-morbidities (sd)</td>
<td>7.8 (10.1)</td>
<td>7.2 (9.8)**</td>
<td>11.5 (11.7)</td>
<td>7.8 (10.2)</td>
</tr>
<tr>
<td>Mean length of stay (sd) in days</td>
<td>7.5 (3.8)</td>
<td>7.3 (3.7)**</td>
<td>11.4 (2.4)</td>
<td>7.5 (3.8)</td>
</tr>
<tr>
<td>Died within 48 hrs of admission as a % of total admissions</td>
<td>2.9</td>
<td>na</td>
<td>2.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Died within 72 hrs as a % of total deaths</td>
<td>23.1</td>
<td>na</td>
<td>23.1</td>
<td>21.9</td>
</tr>
<tr>
<td>Total in hospital mortality as a % of admissions</td>
<td>12.3</td>
<td>na</td>
<td>12.3</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Comparison between demographics and early and late in hospital mortality of patients with AHF based on survival or day of admission.

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2071
Specialist input is the main determining factor for outcome in patients admitted with acute heart failure
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1John Radcliffe Hospital, Oxford, United Kingdom; 2Princess of Wales Hospital, Bridgend, United Kingdom; 3Princess of Wales Hospital, Cardiology Department, Bridgend, United Kingdom

Introduction: Acute heart failure (AHF) is associated with high mortality rates. UK national heart failure audit has highlighted higher in-patient mortality in patients who were managed by non-specialists, and the importance of specialist follow up. National heart failure audit highlighted high in-patient mortality in patients who were managed by non-specialists, and the importance of specialist follow up.

Purpose: Compare in-patient mortality rates with 30 days, 6 months and 1 year mortality rates based on place of care, and determine the effect of specialist follow up on mortality rates.

Method: Retrospective analysis of data on 250 patients who were discharged with the primary diagnosis of heart failure from year 2014–2015.

Results: In-patient mortality rate is significantly lower in patients managed in a cardiology ward compared to other medical wards (13% Vs. 23%, p value=0.03), however, 30 days, 6 months and 1 year mortality rates are not significantly different, although the trend still shows preference to the patients who were managed in the cardiology ward (30 days: 21.5% Vs. 25%, p value=0.3) (6 months: 32% Vs. 43%, p value=0.07) (1 year: 39% Vs. 46%, p value=0.16). Patients who were managed in cardiology ward were more likely to be followed up by specialists in the community (table 1). And patients who were followed up by HF specialists, regardless of the place of care were associated with significantly lower 6 months and 1 year mortality rates, compared to patients who were not followed up (6 months: 20% Vs. 35%, p value=0.04. 1 year: 26% Vs. 42%, p value=0.037).

Conclusions: In-patients mortality rate is significantly lower in AHF patients managed in cardiology ward. Similarly, specialist follow up was associated with lower mortality post discharge. These findings are likely to be attributed to better optimization of evidence based medicines, more comprehensive assessment, and patients’ monitoring. This study highlighted that importance of specialist input in the management of such complex condition.

<table>
<thead>
<tr>
<th>Cardiology ward N=158</th>
<th>Other medical ward N=92</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG</td>
<td>97%</td>
<td>88%</td>
</tr>
<tr>
<td>Echo</td>
<td>92%</td>
<td>68%</td>
</tr>
<tr>
<td>ACE Inhibitors/ACE blockers</td>
<td>70%</td>
<td>67%</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>77%</td>
<td>67%</td>
</tr>
<tr>
<td>Spironolactone/Eplerenone</td>
<td>46%</td>
<td>37%</td>
</tr>
<tr>
<td>Heart failure MDT</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>HF discharge planning</td>
<td>72%</td>
<td>60%</td>
</tr>
<tr>
<td>HF nurse follow up</td>
<td>22%</td>
<td>11%</td>
</tr>
<tr>
<td>Cardiology outpatient referral</td>
<td>34%</td>
<td>13%</td>
</tr>
</tbody>
</table>

2073
In acute heart failure with reduced ejection fraction beta blocker has no beneficial effect on 1-year mortality in patients with slow discharge heart rate
J Jin Joo Park1; CH Youn2; DJ Park3; IH Chiao1; DJ Choi1
1Seoul National University Bundang Hospital, Division of Cardiology, Seongnam, Republic of Korea; 2Hangang Sacred Hospital, Division of Cardiology, Seoul, Korea of

Funding Acknowledgements: This work was supported by Research of Korea Centers for Disease Control and Prevention [2010-E63003-00, 2011-E63002-00, 2012-E63005-00, 2013-E63003-0]

Background: Many hospitalized heart failure patients with reduced ejection fraction (HFrEF) have low heart rate at discharge. Low heart rate may be a sign for reduced sympathetic activity, and the effect of beta blockers may be reduced in those patients as well.

Methods: The Korean Acute Heart Failure (KoAHF) registry consecutively enrolled 5,625 patients hospitalized for acute HF. In this analysis we included patients with HFrEF (LVEF <40%). Low heart rate was defined as <70 beats per minute (bpm). The primary outcome was 1-year all-cause death according to the heart rate.

Results: Of 3,088 patients with HFrEF, 852 (29%) had low heart rate and 57.3% received beta blocker at discharge. There was a significant interaction between discharge heart rate and beta blocker use (p for interaction <0.001). In Kaplan-Meier survival analysis patients with beta blocker had lower 1-year all-cause mortality only in patients with high heart rate, but not in those with low heart rate (Figure). Similar findings were observed both in patients with sinus rhythm and atrial fibrillation.

In a Cox-proportional hazard regression analysis, beta blocker prescription at discharge was associated with 29% reduced risk for 1-year mortality in patients with high heart rate (hazard ratio [HR], 0.71; 95% confidence interval [CI], 0.57–0.89, p =0.003), but not in patients with low heart rate (HR, 0.91; 95% CI, 0.61–1.37; p =0.656).

Conclusions: In hospitalized patients with HFrEF every third patient has a low heart rate at discharge and the beneficial effect of beta blocker on 1-year outcomes may be limited only to patients with high heart rate at hospital discharge.

2074
Mortality According to Heart Rate

<table>
<thead>
<tr>
<th>(A) HR &lt; 70 bpm</th>
<th>(B) HR ≥ 70 bpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG</td>
<td>ECG</td>
</tr>
<tr>
<td>Echo</td>
<td>Echo</td>
</tr>
<tr>
<td>ACE Inhibitors</td>
<td>ACE Inhibitors</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>Beta blockers</td>
</tr>
<tr>
<td>Spironolactone</td>
<td>Spironolactone</td>
</tr>
<tr>
<td>Heart failure</td>
<td>Heart failure</td>
</tr>
<tr>
<td>HF discharge</td>
<td>HF discharge</td>
</tr>
<tr>
<td>HF nurse follow</td>
<td>HF nurse follow</td>
</tr>
<tr>
<td>Cardiology</td>
<td>Cardiology</td>
</tr>
</tbody>
</table>

2075
Plasma volume and its relation with glomerular filtration rate in patients admitted with acute decompensated heart failure
D David Cabrita Roque1; J Augusto2; A Sachetti3; D Faria1; A Gaspar1; I Melo1; T Bernardo1; P Magno3; A Oliveira Soares1; C Moral1
1Hospital Prof Fernando da Fonseca EPE, Cardiology, Amadora, Portugal

Background: Excessive depletion of vascular volume after diuretic therapy for acute decompensated heart failure (ADHF) is common and may lead not only to activation of the angiotensin-renin-aldosterone system but also to acute kidney injury. Our aim is to evaluate the relation between the degree of contraction of vascular volume, using the percentage of alteration in the plasma volume and the glomerular filtration rate (GFR), after the use of diuretics, in patients admitted with ADHF.

Methods: Retrospective study of 258 patients (74.2±17.3 years, 45.7% male) admitted in the emergency department between January and June 2016, for ADHF, defined by the presence of ≥2 signs or symptoms of heart failure. All the patients were treated with diuretic therapy. We evaluate the difference between admission and discharge values of hemoglobin (Hb), hematocrit (HtC), sodium (Na), and the GFR evaluated by the Modification of Diet in Renal Disease (MDRD). The relative change in plasma volume (%PV) from admission until discharge was estimated by: [%Hb admission/Hb discharge](x)100-HtC discharge/(100-HtC admission)-(1)x100.

Results: Of the 258 patients admitted with ADHF, we excluded 11.6% (n=30) for missing laboratory values or description of blood loss/need of blood transfusion during hospital stay. After diuretic therapy (average of maximum dose of furosemide administered 69.3±17.3mg), the incidence of increase in the %PV was 61% (n=159) and in the decrease was 39% (n=99). We further divide the patients in two groups according to the average %PV (2.5%): group 1 with preserved volume [%PV > 2.5% (from > 2.5% to 44%); n=101], and the group 2 with diminished volume [%PV < 2.5% from > 13.8% to ≤ 1.5%; n=127]. There were no statistically significant difference regarding %Na (average of 0.73±0.52mEq for group 1 vs. 1.52±0.54 mEq for group 2, p=0.396). Patients in the group 2 showed greater positive variations of %Hb (group 1 average of -1.34±0.78 g/dl vs. group 2 5.27±1.01 g/dl p =0.001) and in %HtC (group 1 average of -4.66±2.68% vs. group 2 2.21±3.23%, p =0.001). We also conclude that patients in the group 2, with volume contraction, where those who, during hospital stay, had the lowest GFR (average of 49.7±25.9 mL/min/1.73m2 for group 1 vs 41.8±16.8 mL/min/1.73m2 for group 2, p=0.045, statistically significant).

Conclusions: The present study establish a relation between the percentage of alteration in the plasma volume and the lowest peak value of GFR (acute kidney injury), in patients with ADHF, treated with diuretic therapy. Besides that, the values...
of hemoglobin and hematocrit seems to be the most useful laboratory values to evaluate congestion vs contraction of volume. The sequential evaluation of the percentage of variation in the PV could be a useful tool to avoid the overuse of diuretic therapy in these patients and prevent the occurrence of acute kidney injury during hospital admission.

Incidence of WRF according to group

2074
Relation between the dose of loop diuretics and worsening renal function during hospitalization for acute decompensated heart failure
D David Cabrita Roloço1; J Augusto2; A Sacchet1; D Farinha; A Gaspar1; L Melo1; T Bernardes1; J Simões1; P Magno1; A Oliveira Soares1; C Morais1
1Hospital Prof Fernando da Fonseca EPE, Cardiology, Amadora, Portugal

Background: Worsening renal function (WRF) during heart failure (HF) hospitalization is common. Loop diuretics are increasingly being considered as a potential cause of worsened HF outcomes, perhaps via WRF. However, the magnitude of worsening in renal function attributable to loop diuretics is not well defined.

Methods: Retrospective study of 258 consecutive patients admitted in the emergency department for acute decompensated heart failure. Admission, maximum and discharge values of creatinine (Cr) were collected, along with first dose, dose in the first 24 hours of admission and maximum dose of furosemide (Fur), the only loop diuretic in the hospital prescription set. We further divided each of the preceding parameters according to dose of Fur: Group 1 - Low (<40mg); Group 2 - Medium (40-80mg); and Group 3 - High (>80mg). The first Cr value or estimated glomerular filtration rate (eGFR) in the emergency department was considered baseline. A 20% relative decrease in eGFR defined WRF.

Results: We included 228 patients (45.6% male, 74.6% white, 1.38 ± 0.73mg/dl). The average initial dose of Fur was 39.6 ± 32.2mg; the average maximum dose in the first 24 hours was 88.4 ± 73.9mg and the average maximum dose was 69.7 ± 39.2mg. There were no significant association between the various doses of Fur and the incidence of WRF: initial doses of Fur (Incidence of WRF: Group 1 11.8% vs. Group 2 27.1% vs. Group 3 20.0%, p = 0.045), the maximum dose in the first 24 hours (Incidence of WRF: Group 1 15.8% vs. Group 2 27.1% vs. Group 3 20.0%, p = 0.137; figure 1), maximum dose in the first 24 hours (Incidence of WRF: Group 1 27.1% vs. Group 2 47.9% vs. Group 3 36.9%, p = 0.289; figure 2) and the maximum dose of Fur (Incidence of WRF: Group 1 12.5% vs. Group 2 19.7% vs. Group 3 34.3%, p = 0.128; figure 3).

Conclusions: While loop diuretic exposure and its dose is empirically associated with WRF among hospitalized HF patients, this study demonstrate that the association between WRF and the dose of furosemide, in three separate times during acute decompensated heart failure hospitalization, can not be made, and so, loop diuretics explain little of the variability in renal function during hospitalization.

2075
Ultrasound-guided treatment in Acute Heart Failure based on lung ultrasound and cardiac filling pressures- greater decongestion despite shorter hospitalization and improved survival
JG Oehman1
1Turku University Hospital, Cardiology, Turku, Finland

On behalf of: DYSPNEA study group

Introduction: Treatment for acute heart failure (AHF) is ineffective and hospitalizations long and expensive, as there is virtually no prognostically beneficial treatment available. Lung ultrasound (LUS) and focused echocardiography allow monitoring of pulmonary congestion and cardiac filling pressures during AHF treatment, and may be done sequentially using the same probe - Echo- and LUS-guided therapy could allow aggressive decongestive therapy in AHF while monitoring hemodynamics, but has not been studied to date.

Purpose: To investigate the efficacy and safety of ultrasound-guided therapy in AHF using a focused cardiothoracic ultrasound protocol (CaTUS), combining medial E/e', IVC index (based on diameter and respiratory variation) with LUS.

Methods: After enrolling 100 AHF patients for follow-up purposes, we enrolled an additional 20 patients who received aggressive decongestive therapy guided by CaTUS, based on a pre-specified treatment protocol. All patients had the CaTUS done on a daily basis, alongside clinical parameters and laboratory samples. The treatment protocol aimed for resolution of pulmonary congestion, normalization of E/e' and a plethoric IVC, while monitoring renal function, electrolytes and clinical parameters.

Results: Patients in the treatment arm had a significantly larger (p=0.001) reduction in all congestion parameters, i.e. E/e' (6.48 ± 2.9 vs. 2.62 ± 4.6, p = 0.001), % reduction in BNP (35.5 ± 26 vs. 16.6 ± 61, p = 0.029), IVC index (19.1 ± 1.1 vs. 0.38 ± 0.8, p = 0.001), cumulative fluid loss (0.47 ± 5.3 vs. 3.07 ± 3.0, p < 0.001(>0.05 for all) despite a significantly shorter hospitalization (3.7 ± 2.0 vs. 6.9 ± 4.2 days, p = 0.001) as compared to patients in the standard care arm. A larger proportion in the treatment arm were also asymptomatic (95 % vs. 72 %, p = 0.036) and free of any signs of pulmonary congestion on LUS (80 % vs. 53 %, p = 0.039), and had a lower mean E/e' (14.5 ± 3 vs. 18.0 ± 4.1, p = 0.001), mean IVC index (1.92 ± 1.0 vs. 1.82 ± 0.76, p = 0.005) and median (25%-75% IQ) Cr (249 [172-408] vs. 426 [242-1015], p = 0.011 at discharge, without any significant difference in any of these parameters on admission. There was a trend towards less adverse events in terms of acute kidney injury and symptomatic hypotension in the treatment arm (p = 0.617 and 0.378). Patients in the treatment arm seemed to have an improved six-month survival regarding the combined endpoint of death and re-hospitalization for AHF compared to the conventional treatment group (Figure), although the treatment group was small for prognostic purposes.

Conclusion: CaTUS-guided aggressive AHF treatment resulted in greater decongestion during shorter, and thus probably cheaper, hospitalization, and may be associated with an improved prognosis.

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European Journal of Heart Failure © 2017 European Society of Cardiology, 19 (Suppl. 5), 5–601
Introduction: Heart failure is a common reason for hospital admission. Patients presenting with pulmonary and peripheral oedema may be seen as two ends of a spectrum with many patients presenting with a mixed picture. The purpose of the present analysis is to describe patient characteristics according to the severity of oedema and NYHA class, their length of hospital stay and mortality during the index admission and after discharge.

Methods: National Audit Data were collected from April 2007 to March 2013 in more than 95% of hospitals in England & Wales. Patients with a confirmed diagnosis of heart failure were divided by severity of peripheral oedema (severe, moderate, mild and none) and NYHA class (IV, III, II/I) – creating 12 groups. Patients' characteristics and mortality during the index hospital admission for up to three years after discharge were reported.

Results: Amongst 136,790 patients, the median age was 79 years, 58% were women, 81% were treated with ACEI/ARB, 67% with beta-blockers and 40% with MRA at discharge. Only 34% of patients had breathlessness at rest or minimal exertion at the time of admission and 18% had severe peripheral oedema. Prevalence of LVSD was highest in group I-II/A (71%) and lowest in group I-IV/D (49%). Median length of index admission stay was determined by the severity of peripheral oedema rather than NYHA class: 12 days for severe, 9 days for moderate, 7 days for mild and 6 days for no peripheral oedema. The highest index admission mortality during was observed in group IV/D (18%) followed by III/D (13%) and lowest in groups I-II/A (6%). After median follow-up 344 (IQR 94-766) days, mortality was 80% for IV/D and 56% for III/D compared to 46% for I-II/A and 40% for II/I/A. Hazard ratios for death in the above groups were 2.26, 2.09, 1.49 and 1.28 respectively (for all P < 0.001) compared to group I-II/A.

Conclusion: The severity of peripheral oedema rather than of breathlessness or LVSD is the more important determinant of length of stay and prognosis in patients with heart failure. However, the prognosis of patients recently hospitalised with heart failure remains poor despite a high uptake of disease modifying medication.

Background: Dobutamine is the first-line treatment for low cardiac output syndrome (LCOS) after cardiac surgery, but induces sinus tachycardia. We aimed to assess the intravenous (i.v.) ivabradine in patients presenting LCOS with dobutamine-induced tachycardia following elective coronary artery bypass graft surgery.

Methods: In a phase 2 multi-center randomized placebo-controlled trial, i.v. ivabradine was infused in patients presenting sinus tachycardia (heart rate (HR) > 100 bpm) after dobutamine initiation. Primary endpoint was the number (%) of patients having their HR reduced between 80 and 90 bpm for > 30 minutes. Secondary endpoints were hemodynamic parameters measured by Swan-Ganz catheter.

Results: Thirteen (93%) patients treated by ivabradine reached the primary end-point, compared to 2 (40%) in the placebo group (p < 0.001). Ivabradine significantly decreased HR (112 to 80 bpm (p < 0.001) while increasing cardiac index (2.5 to 2.9 l/min/m² (p < 0.05)), stroke volume (38.0 to 60.0 ml (p < 0.001)) and systolic blood pressure (110 to 125 mmHg (p < 0.05)). These parameters remained similar in the placebo group. Five (35.7%) patients developed atrial fibrillation in the ivabradine group.

Conclusion: Intravenous ivabradine reduced HR in patients presenting with LCOS treated with dobutamine after CABG surgery, without impairing cardiac output. This beneficial effect should be confirmed with larger trials.

Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>Ivabradine group (n = 14)</th>
<th>Placebo group (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>61 [59 ; 67]</td>
<td>54 [53 ; 59]</td>
</tr>
<tr>
<td>Male gender (%)</td>
<td>11 (79)</td>
<td>5 (100)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>27.5 [25.8 ; 28.9]</td>
<td>26.2 [25.9 ; 29.7]</td>
</tr>
<tr>
<td>HR (bpm)</td>
<td>73.5 [65.0 ; 89.0]</td>
<td>75.0 [67.0 ; 77.0]</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>120 [112 ; 130]</td>
<td>115 [114 ; 125]</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>32 [25 ; 38]</td>
<td>35 [27 ; 39]</td>
</tr>
<tr>
<td>EuroSCORE</td>
<td>5.5 [4.5 ; 6.9]</td>
<td>4.0 [3.5 ; 6.5]</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>9 (64.3)</td>
<td>3 (60.0)</td>
</tr>
<tr>
<td>Diabetes (%)</td>
<td>7 [5.0]</td>
<td>2 [40.0]</td>
</tr>
<tr>
<td>Heart Failure (%)</td>
<td>7 [5.0]</td>
<td>3 [60.0]</td>
</tr>
</tbody>
</table>
| BMI: body-mass index; HR: heart rate; SBP: systolic blood pressure; LVEF: left ventricle ejection fraction.
Effect of tolvaptan administration on renal function in the acute phase of congestive heart failure

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Background: Tolvaptan has been widely used as a diuretic drug in the acute phase of congestive heart failure. However, how it affects renal function has not been clarified sufficiently.

Purpose: To clarify the effect of tolvaptan administration on renal function in the acute phase of congestive heart failure.

Methods: We retrospectively investigated 1038 consecutive patients hospitalized for congestive heart failure between February 2015 and December 2016 and enrolled 556 patients in the study sample, excluding those with end stage renal dysfunction (estimated glomerular filtration rate [eGFR] <15 mL/min/1.73m²), acute coronary syndrome, tolvaptan use prior to admission, and insufficient data.

We divided the 556 patients into two groups based on the use and non-use of tolvaptan within 2 days after admission: 111 patients (tolvaptan group) and 445 patients (non-tolvaptan group). The primary outcome measure was defined as ≥20% decline in eGFR from the value on admission, and its rate on day 3, day 7, and at the time of discharge was compared between the two groups.

Results: The mean age of the tolvaptan group was 78.3 ± 12.1 years and that of the non-tolvaptan group was 77.2 ± 13.6 years. Renal function on admission was significantly worse in the tolvaptan group than in the non-tolvaptan group (creatinine, 1.22 [0.87 to 1.72] versus 1.01 [0.80 to 1.32], p <0.001; eGFR, 38.7 [24.8 to 54.7] versus 48.7 [35.7 to 63.1], p <0.001). The figure shows creatinine, % creatinine, eGFR, and % eGFR on day 3, day 7, and at the time of discharge, respectively; shows the amount of change based on the value on admission. On day 3, ≥20% decline in eGFR was observed in 20% of the study sample (113/556 patients), and its rate was significantly lower in the tolvaptan group than in the non-tolvaptan group (10/111 patients [9.0%] versus 103/445 patients [23.2%], p <0.001). On the other hand, on day 7 and at the time of discharge, there were no significant differences between the two groups. Multivariate analysis showed that tolvaptan administration in the acute phase significantly reduced the rate of ≥20% decline in eGFR on day 3 (adjusted odds ratio, 0.35; 95% confidence interval, 0.16 to 0.71, p =0.003).

Conclusion: In the acute phase, tolvaptan administration to patients with congestive heart failure may prevent renal function from worsening.

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2079
Granulocyte colony-stimulating factor in patients with a large anterior wall acute myocardial infarction to prevent left ventricular remodeling (the RIGENERA trial): 10 years follow-up. FINAL RESULTS

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Background: Granulocyte-colony stimulating factor (G-CSF) has been clinically tested in ST-elevation myocardial infarction (STEMI) patients with controversial results.

Purpose: Aim of the study was to determine the long-term safety, feasibility and efficacy of stem cell mobilization following G-CSF as a treatment for acute myocardial infarction.

Methods: 41 patients were randomized 1:2 to G-CSF therapy (n = 14) or conventional therapy (n = 27) from June 2003 to May 2006, in order to assess the potential efficacy of G-CSF administration on cardiac function evaluated by conventional echocardiography, in patients with a first large anterior AMI and a LV ejection fraction < 50% despite successful percutaneous revascularization of the infarct-related artery. Exclusion criteria were cardiogenic shock, uncontrolled myocardial ischemia or arrhythmias, malignancies, severe infections, hematologic diseases, splenomegaly on abdominal echocardiography and age > 80 years. Patients randomized to G-CSF therapy were treated with lenograstim at a dose of 10 µg/kg/day for 5 days starting > 5 days after AMI and/or a complete revascularization. The 10 year follow-up was completed, 3 patients were lost to follow-up: the final population consisted of 38 patients (12 in G-CSF group and 26 in control group). LV function and NYHA functional class evaluation was performed at follow-up, together with quality of life and life expectancy assessed by Minnesota Living with Heart Failure Questionnaire (MLHF) and The Seattle Heart Failure Model (SHFM) respectively.

Results: No differences were found in the two groups in term of LVEF and LVESV. Remarkably, a significant increase was detected in control group when considering the difference (Delta) in LVEDV between baseline and follow up (p < 0.05). This result was coupled with a reduction in the incidence of adverse LV remodeling in the G-CSF group (46% Control vs 8% G-CSF; p = 0.01). Moreover, patients treated with G-CSF referred a better quality of life and a lower burden of symptoms, compared to control patients, as shown by MLHF score (p = 0.05) and NYHA functional class (p = 0.04). The mean life expectancy, evaluated with the SHFM, was significantly higher in the G-CSF group than control (15 ± 4 years vs 12 ± 4 years p = 0.05). At 10 years, deaths were two fold higher in the control compared to G-CSF group, although this difference was not statistically significant (19% vs 8%; p = 0.39), most likely due to the paucity of the population.

Importantly, the incidence of recurrent MI, in-stent restenosis and occurrence of malignancies was similar in G-CSF-treated patients and controls.

Conclusions: The final analysis of the 10-year data from the RIGENERA trial represent the longest available follow-up on the safety and efficacy of G-CSF treatment in STEMI patients. The administration of G-CSF is not only safe but also associated with a documented reduction of adverse ventricular remodeling after large anterior STEMI and better quality of life.

2080
Feasibility and benefit of neurohumoral blocker uptitration following cardiac resynchronization therapy

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Funding Acknowledgements: Pieter Martens is supported by a doctoral fellowship by the Research Foundation – Flanders (FWO, grant-number: 1127917N

Background: Cardiac resynchronization therapy (CRT) improves mortality and morbidity on top of optimal medical therapy in heart failure with reduced ejection fraction (HFrEF). Although CRT is considered as a step-on option after optimal medical treatment, its beneficial effects with regards to reverse remodeling, could allow for further uptitration of neurohumoral blockers despite optimal baseline of medical therapy.

Methods: Doses of angiotensin-converting enzyme inhibitors (ACE-I), angiotensin receptor blockers (ARB) and beta-blockers were retrospectively evaluated in 650 consecutive CRT patients, implanted between October, 2008, and August, 2015. All 650 patients were on individual optimal dose at the time of implant. Uptitration was calculated as the difference in percent of target dose between CRT-implantation and six month follow-up. Outcome was measured as the combined end-point of heart failure admission or all-cause mortality.

Results: Uptitration was performed in 45.4% (n = 191) of patients for ACE-I/ARB and 56.8% (n = 283) for beta-blockers, in patients who were not at maximal target dose at implantation. ACE-I/ARB were uptitrated on average 39 ± 20% of target dose and beta-blockers 44 ± 20% of target dose. During a mean follow-up of 37 ± 22 months, a total of 148 events occurred for the combined endpoint of heart failure admission and all-cause mortality. Uptitration versus no-uptitration following CRT was associated with an adjusted hazard ratio of 0.54 (0.32–0.91; p = 0.023) for ACE-I/ARB and 0.63 (0.41–0.98; p = 0.044) for beta-blocker therapy on the combined end-point of heart failure and all-cause mortality. Figure 1 illustrates the relationship between post-implant dose adaptation for ACE-I/ARBs and Beta-blockers, versus the adjusted hazard ratio for the combined endpoint depicted on a continuous scale. Patients in the uptitration group exhibited a similar low risk for death or heart failure admission as patients treated with the maximal dose at the time of CRT-implant (ACE-I/ARB p = 0.133, beta-blockers p = 0.709).

Conclusions: Following CRT, a majority of patients are capable of tolerating higher dosages of neurohumoral blockers. Uptitration of neurohumoral blockers after CRT implantation associates with improved clinical outcome, even matching patients treated with the guideline-recommended target dose at the time of implant.

2081
Relation of biological and functional LV remodeling to obstruction in hypertrophic cardiomyopathy: A rest and exercise echocardiographic study with longitudinal strain measurement

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Introduction: Outflow tract obstruction is thought to be involved in left ventricular (LV) remodeling in sarcomeric hypertrophic cardiomyopathy (HCM).

Objective: To determine the influence of obstruction to biological parameters of remodeling and global longitudinal strain (GLS) in HCM.

Material and Methods: Patients with HCM who accepted to participate to this study were included. Transthoracic echocardiography at rest and exercise with GLS measurement was carried out. Blood was sampled before and early after exercise.
Patients were divided into 3 groups according to the presence of an obstruction at rest (OHCM), effort (late obstruction: LOHCM), or none (HCM). Results: We included 40 HCM patients, 7 OHCM, 19 LOHCM and 14 NOHCM. Troponin T and NTproBNP levels at rest were significantly higher in OHCM compared to NOHCM (19.5 ± 10 vs 10 ± 6.8 ng/L, p = 0.017 and 114 ± 389 vs 520 ± 388 ngL, P = 0.005). Troponin T and NTproBNP levels at rest were correlated with the outflow tract peak gradient (r = 0.49, p < 0.001 and r = 0.46, p = 0.003, respectively). After exercise ST2, IL6, GDF15, Troponin T and NTproBNP increased significantly in OHCM + LOHCM while only NTproBNP increased in NOHCM. In multivariate analysis post-exercise Troponin T (r = 0.57, P < 0.0001) was a determinant of GLS at rest. MMP9 (r = 0.44, P = 0.001) and TGF-β (r = 0.57, P < 0.0001) were independent determinants of exercise GLS.

Conclusion: In HCM, biological parameters of remodeling are correlated to obstruction and GLS. Exercise in obstructive forms of HCM induces a significant increase in multiple biological parameters of remodeling. Troponin T level is a strong predictor of GLS alteration both at rest and exercise.

2083

Less invasive ventricular reshaping provides sustained reduction of heart failure symptoms

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Funding Acknowledgements: BioVentrix, Inc.

Background: A new technique described as Less Invasive Ventricular Enhancement (LIVE) was performed to reshape and reshape the left ventricle after anteroscapal infarction without cardiopulmonary bypass. Access in the early series was via median sternotomy and later using a hybrid transcatheater approach. We report survival, functional and echocardiographic results at 2 years.

Methods: All patients had MRI or CT demonstrating scars in the anteroseptal wall and symptoms of heart failure NYHA class III/IV. Coronary lesions were always treated before the procedure. Significant MR was an exclusion criteria. LIVE was achieved using the Bioventrix Revivent Myocardial Anchoring System. The titanium anchors were delivered to the right side of the interventricular septum. An external anchor was fitted onto a tether to allow apposition of the LV free wall to the scarred myocardial anchors. Demonstrates long term decrease in heart failure symptoms.

2084

A natriuretic peptides clearance receptor agonist reduces pulmonary artery pressures and enhances cardiac performances: new hope for PH due to HF

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Funding Acknowledgements: ECTRS Ltd

In patients with left ventricular heart failure (HF), the development of pulmonary hypertension (PH) is common and represents a strong predictor of death. PH due to HF is a disabling and life-threatening disease for which there is currently no single marketed pharmaceutical agent approved. Furthermore, despite recent advances in the pathophysiological understanding, there is as yet no prospect of cure of this deadly clinical entity, and the majority of patients continue to progress to right ventricular failure and die. There is, therefore an urgent unmet need to identify novel semi-quantitatively measured and visually scored at early and late phases of bisphosphonate scintigraphy.

Results: CA was diagnosed in 19 AL (light chain) and in 33 wt-TTR (wild type transthyretin). Among m-TTR (mutated transthyretin), 33 had CA, 5 had isolated neuropathy without CA and 3 were asymptomatic carriers. Early 99mTc-HMDP cardiac uptake was found in 68 patients whose late visual score was ≥ 1. Early uptake was undetectable in all the 57 patients with a null visual score at 3h. Early heart retention was strongly correlated to late heart retention (r = 0.914, p < 0.001). An early 99mTc-HMDP heart/mediastinum ratio > 1.115 predicts a late visual score ≥ 1 which differentiated CA from other causes of LVH (100% sensitivity, 97% specificity). Early heart/mediastinum ratio > 1.210 discriminated TTR-CA from AL with perfect accuracy (100% sensitivity and specificity).

Conclusions: Early phase 99mTc-HMDP-scintigraphy perfectly predicts late phase finding. It is accurate to differentiate TTR-CA from AL and from other causes of LVH. This could be of particular benefit for frail patients and in centres with limited availability of scintigraphy.
pharmacologically agents that will prevent the progressively increasing or reverse the already elevated pulmonary artery pressures while enhancing cardiac performance in HF. We have reported, for the first time, that a specific natriuretic peptides clearance receptors [NPR-C] agonist, the ring-deleted atrial natriuretic peptide analogue, CARN4-23 (cANF) reduces pulmonary artery pressures and enhances cardiac performance including left ventricular inotropy in mice, using a pressure-loop (P-V) conductance catheter system (Table 1). Natriuretic peptides clearance receptors' agonists may therefore represent a novel and attractive therapeutic option for PH due to HF, and have the potential to ultimately improve morbidity and mortality for millions of people affected with PH due to HF.

Conclusions:
1. 1.6, p = 0.135 (Table 1)

Effects of aortic valve opening pattern on endothelial functions after CF-LVAD implantation

Methods: Forty three CF-LVAD patients (pre-implantation NYHA class III-IV) and subjects enrolled in TOPCAT.

Background and Objective: Recent studies have shown that endothelial functions are negatively affected by decreased pulsatile flow in the arterial system following implantation of continuous flow left ventricular assist device (CF-LVAD). During systolic aortic valve opening patterns differs among CF-LVAD patients and effects on endothelial functions of these patterns have not been studied in detail. In this study after CF-LVAD implantation associations with aortic valve opening patterns and endothelial functions were investigated.

Results: Mean FMD was % 3.7 ± 0.81 and significantly lower than pre-implantation (p < 0.001). Between subgroups of aortic valve opening patterns, patients with closed and intermittent opening patterns had significantly decreased endothelial functions. (% 6.0 ± 1.16 vs. % 3.37 ± 0.91, p = 0.001; % 5.8 ± 1.61 vs. % 4.30 ± 2.46, p = 0.024 respectively) However patients with complete opening aortic valve pattern did not have any statistically different. (% 4.72 ± 1.06 vs. % 4.67 ± 1.16, p = 0.135) (Table 1)

Conclusions: Diminished pulsatile flow after CF-LVAD implantation impairs endothelial functions. Complete opening of the aortic valve in each systole may provide enough pulsatile flow to the peripheral arterial system to prevent the development of endothelial dysfunction. CF-LVAD implantation should be performed before complete loss of the left ventricular contractility reserve to save complete opening aortic valve pattern and endothelial functions.
2087
Intrarenal venous flow alterations during transition from euvolemia to intravascular volume expansion in heart failure patients with reduced ejection fraction
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Background: Diuretic capacity relates to intrinsic renal function but also to renal blood flow. Intrarenal blood flow alterations may help better understand impaired volume handling in heart failure (HF).

Objectives: To study 1) intrarenal flow patterns in chronic HF patients with reduced ejection fraction (HFREF) during the transition from euvolemia to intravascular volume overload, and 2) the relationship between intrarenal flow patterns and diuretic efficiency.

Table 2087: Outcomes by sex and treatment arm, N(%)  

<table>
<thead>
<tr>
<th></th>
<th>Americas</th>
<th>Russia/Georgia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Primary outcome</td>
<td>111(25)</td>
<td>131(30)</td>
</tr>
<tr>
<td>All-cause mortality</td>
<td>70(16)</td>
<td>112(25)</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>252(57)</td>
<td>268(61)</td>
</tr>
</tbody>
</table>

*p = 0.014, Spironolactone

Results:
In response to intravascular volume expansion VII increased significantly (0.2 ± 0.2 vs 0.7 ± 0.2; p < 0.001) (Figure 1). This was reversed after IV diuretic administration. In contrast, RI changed non-significantly after expansion (0.6 ± 0.1 to 0.7 ± 0.1; p = 0.131). There was a non-significant change in echocardiographic central venous pressure (CVP) (from initial 27 ± 17.0 mmHg to during expansion). The median VII during intravascular volume expansion was 0.74. Compared to patients with VII above the median during intravascular volume expansion, patients with lower VII generated a greater diuretic-induced amount of diuresis (0.6 ± 0.2 vs 0.4 ± 0.3 L/L; p = 0.025 and 2.5 ± 0.4 vs 1.8 ± 0.5 L/L; p = 0.001 and natriuresis (1.2 ± 0.4 vs 0.7 ± 0.5 g/24h; p = 0.002 and 5.9 ± 1.2 vs 4.1 ± 1.4 L/L; p = 0.001). The proportion of patients with a rise in VII than RI, before a significant change in cardiac filling pressures could be demonstrated. Impaired renal venous flow is correlated with less diuretic efficiency. Intrarenal venous flow patterns may be of additional interest to evaluate renal congestion.

Figure 1

Methods: Arterial resistive index (RI), venous impedance index (VII) and venous flow pattern (continuous vs discontinuous) were assessed in 40 euvolemic HFREF patients by intrarenal Doppler ultrasonography at baseline, during 3 hours of intravascular volume expansion with 1-liter hydroxyethyl starch 6%, and 1 hour after the administration of a loop diuretic. Clinical parameters, echocardiography, and laboratory values were assessed. Cumulative urine output was collected after 3 and 24 hours.

Results: In response to intravascular volume expansion VII increased significantly (0.2 ± 0.2 vs 0.7 ± 0.2; p < 0.001) (Figure 1). This was reversed after IV diuretic.

Conclusion:
In HREF patients, intravascular volume expansion results in greater rise in VII than RI, before a significant change in cardiac filling pressures could be demonstrated. Impaired renal venous flow is correlated with less diuretic efficiency. Intrarenal venous flow patterns may be of additional interest to evaluate renal congestion.

2088
Therapeutic potential of phosphodiesterase 5 inhibitors in patients with heart failure with preserved ejection fraction (HFpEF) and combined post- and pre-capillary pulmonary hypertension (Cpc-PH).
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Background: The prevalence of heart failure with preserved ejection fraction (HFpEF) is increasing and frequently associated with pulmonary hypertension (PH), which is associated with a poorer prognosis. The current ESC/ERS guidelines subordinate post-capillary PH into isolated post-capillary PH (Ipc-PH) and combined post- and pre-capillary PH (Cpc-PH). The latter is hemodynamically defined by a mean pulmonary arterial pressure (Pamp) >25 mmHg, a pulmonary artery wedge pressure (PAWP) >15 mmHg and a diastolic pressure gradient (DPG) >7 mmHg and/or a pulmonary vascular resistance (PVR) >3 WU. However, the therapeutic consequences of this subclassification are entirely unclear. Preliminary studies on phosphodiesterase 5 inhibitors (PDE5i) in PH-HFpEF yielded contradictory results. We specifically investigated the efficacy and safety of PDE5i in patients with HFpEF and Cpc-PH.

Methods: In 40 hemodynamically precisely characterized patients with HFpEF and Cpc-PH who were treated with a PDE5i (sildenafil 60 mg/d, n=24 or tadalafil 40 mg/d, n=16) for at least 12 months, the therapeutic effect on 6 minute walk distance (6MWD), WHO functional class (WHO-Fc), echocardiographic parameters, right ventricular (RV) function and laboratory parameters (NT-proBNP) was evaluated 3, 6, 9, and 12 months after the initiation of therapy.

Results: The average patient age was 73 ± 9 years, 53% were female, and comorbidities were frequent (75% atrial fibrillation, 78% arterial hypertension, 35% diabetes). Initially, 38 patients (95%) were in WHO-FC III and 2 patients (5%) in WHO-FC II. Prior to treatment initiation, Pamp was 45.6 ± 16 mmHg, PAWP 20.3 ± 8.8 mmHg, DPG 6.1 ± 1.0 mmHg, PVR 6.1 ± 0.5 WU, and RAP was 12.5 ± 1.0 mmHg. After 12 months of PDE5i therapy, the 6MWD substantially increased to 304 ± 17.7 m, resulting in a net increase of 83 m (p < 0.001). The proportion of patients in WHO-FC I/II increased from 5% at baseline to 37.5% after 12 months of therapy. In addition, there was moderate improvement in RV function at 12 months (TAPSE 18.8 ± 0.8 vs. 16.5 ± 0.7 mm at baseline, p < 0.01), and NT-proBNP levels decreased from 3.191 ± 1.0 vs. 1.0 mmHg at baseline to 2.130 ± 0.7 mmHg at 12 months (p < 0.004). Importantly, body weight of the patients remained constant throughout the observation period (71.7 ± 3 kg initially vs. 71.5 ± 2 kg at 12 months), so that the changes in measured parameters may not be attributable to optimized volume status and reduced left ventricular filling pressure. No deaths occurred in the investigated group, and the typical side effects of PDE5i (headache, flushing, nasal congestion) were observed.

Conclusion: These data indicate that precisely characterized patients with HFpEF and Cpc-PH who tolerate PDE5i may benefit from targeted therapy. A randomized study in this particular sub-population is warranted.
Endomyocardial fibrosis with a giant atrial thrombus

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Background: Endomyocardial fibrosis (EMF) is a rare type of restrictive cardiomyopathy that is seen in young people who live in tropical countries. The etiology is still unknown, being nutritional deficit and infections the most discussed hypothesis. It can affect the right, left or both ventricles, and the clinical presentation will depend on which chamber is most affected. The basic histologic lesion is endomyocardial fibrosis that involves the ventricular muscle. This will lead to high ventricular filling pressures and atrioventricular regurgitation with subsequent atrium dilatation. This dilatation is associated with arrhythmic problems and the formation of thrombus that can lead to pulmonary embolism and sudden death. The diagnosis is made with echocardiography that shows a thickened endocardium in the ventricle wall. In right EMF there is an obliteration of the trabecular layer of the right ventricle with a reduction of the diameter and a tricuspid annulus dilatation with severe regurgitation. Clinical case: The authors present the case of a 19 years-old female patient with a 2-year history of dyspnea for large efforts. She denied chest pain, fever, cough or palpitations. She did not have any specific sign on physical examination or any abnormality on laboratory evaluation. On the X-Ray she presented with cardiomegaly. The EKG presented a right axis deviation, and atrial fibrillation. Echocardiography showed endomyocardial fibrosis of the right ventricle with dilatation of the right atrium with a giant thrombus. She was put on diuretics and heart failure medication, and was proposed for cardiac surgery. Due to the high risk of embolization, the patient didn’t take anticoagulant therapy.

Conclusion: EMF is a rare cause of cardiomyopathy of unknown etiology in tropical and underdeveloped countries. It affects mostly young people in some geographical area and carries a very high burden in these communities. This is a rare condition with a low medical awareness. Since the world is going through a globalization process with a high mobility of populations, which can increase the diagnosis of EMF in developed countries, the authors are trying to raise awareness of the medical community to the existence and treatment of EMF, especially in countries that can receive patients from tropical areas.
was implanted considering that he has high risk features of sudden cardiac death such as syncope, severe hypertrophy of LV septal wall and family history of sudden cardiac death. However, the pressure gradient of 40mmHg after PPM implantation from 63mmHg before that. Symptoms of dyspnea and dizziness also markedly improved. Progression of Fabry cardiomyopathy can lead to severe conduction dysfunction such as complete AVB requiring PPM despite ERT. It needs to check ECG serially to identify the progression of conduction disturbance in patients with conduction dysfunction at baseline to prevent cardiac events. Clinical Case Corner 6 - Heart (and peripheral!) muscle disease

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Introduction and Case Report Description: Left ventricular non-compaction (LVNC), is a rare form of cardiomyopathy characterized by deep intertrabecular recesses communicating with the ventricular cavity. Since different diagnostic criteria have been proposed, final diagnosis can be challenging. We report the case of a 29-year-old woman, without known cardiovascular risk factors, family history of a brother with degenerative muscle dystrophy and a personal history of pontine stroke of unclear origin, due to the occlusion of the vertebrobasilar artery at the age of 25. No previous history of heart disease was reported. Although she had no cardiovascular symptoms at any time, she was referred to our hospital after the finding of high density monomorphic ventricular ectopic heart beats that were confirmed on an EKG Holter.

Echocardiography

2092
Cardiac amyloidosis: a difficult journey to diagnosis
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The present case refers to a 63-years-old woman, with hypertension, dyslipidemia and history of unilateral nephrectomy (for nephrolithiasis), without any other relevant medical history and no family history of cardiac diseases. She was admitted to hospital for progressive dyspnea, with a 3-month evolution time. At admission, she had evident signs of congestive heart failure (HF). Electrocardiogram showed low limb lead voltage and poor precordial R-wave progression. Echocardiogram (TTE) revealed severe left ventricular (LV) systolic dysfunction due to global hypococontractility, without dilatation of cardiac chambers, but with moderate LV hypertrophy (LVH); right ventricular function was preserved. Coronarography excluded epicardial coronary disease. For better characterization, a cardiac magnetic resonance was performed, showing a marked increase in myocardial mass with concentric LVH, global hypokinesia with severe LV dysfunction and subendocardic late gadolinium enhancement, almost circular, in all ventricular walls. Those findings were suggestive of infiltrative cardiomyopathy, with a high suspicion of amyloidosis. Laboratorial tests for amyloidosis were all negative, including serum and urinary immunofixation, free light chains (FLC) assay and nuclear imaging with DPD. Tests for another possible etiologies of infiltrative cardiomyopathy were negative as well. Bone marrow biopsy was negative and endomyocardial biopsy revealed an unspacific inflammatory infiltrate, without amyloid deposits. Rectum and abdominal fat biopsies were also negative for amyloidosis. After initial compensation, the clinical status deteriorated again, with progression to severe biventricular dysfunction. Thus, diagnostic workup was repeated and a high FLC lambda/kappa ratio, previously normal, was found. Given the high suspicion of AL cardiac amyloidosis, bone marrow biopsy was repeated, this time showing infiltration of plasma cells with positive immunohistochemistry to lambda FLC. Therefore, it was performed an immunohistochemistry review of myocardial biopsy, that revealed the deposition of lambda FLC also in myocardial tissue, making the definitive diagnosis of AL cardiac amyloidosis. Chemotherapy (Cth) with bortezomib, dexamethasone and an immunohistochemistry review of myocardial biopsy, that revealed amyloid deposition in the rectum tissue. Given the involvement of an extracardiac organ and the associated absence of hematologic response to Cth, disease progression was assumed and the patient was withdrawn from CTH evaluation. After clinical compensation, she was discharged from hospital with indication for comfort measures and 2 months later, the patient died. This case shows that the diagnosis of cardiac amyloidosis remains a clinical challenge, in a disease in which early diagnosis is fundamental to a better prognosis. Laboratory tests may be negative and even analysis of tissue biopsies may give misleading results. These difficulties may lead to delays in establishing a definitive diagnosis, with significant negative effects on the prognosis. Improvements in diagnostic approach can promote the earlier beginning of Cth, slowing the disease progression and allowing therapies, such as CTH and ASCT.

TTE: Thickened and hypertricogenic walls

2093
Non-compaction cardiomyopathy with multiple embolic events, a new association to a sarcemeric gene mutation.
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Answers and discussions: LVNC is a genetically heterogeneous disorder associated with several gene defects. It is known that MYH6, encoding myosin heavy chain 6, has a vital role in heart development. Mutations in MYH6 have been related to hypertrophic cardiomyopathy, dilated cardiomyopathy and atrial septal defects. Chain 6, has a vital role in heart development. Mutations in MYH6 have been related to hypertrophic cardiomyopathy, dilated cardiomyopathy and atrial septal defects. Yet, to our knowledge this would be the first case linked to LVNC. Regarding the prognosis, although the classic triad of heart failure, arrhythmias and embolic events has been described, possible clinical presentation are very variable and prevention and treatment of the complications are the main therapeutic goals. Conclusions and implications for clinical practice. Given that this is the first association of the disease with an MYH6 mutation, it should be considered of uncertain clinical significance. However, it is of big importance its segregation in the progenitors and family susceptible of being carrier of the mutation to determine its implication in the development of the disease. The prevention of embolic events is an issue still discussed, in the past there was a tendency of giving anticoagulants to all patients with LVNC, now days some only recommend it on determined cases like patients with LV dysfunction, atrial fibrillation and previous embolic events. Even
A challenging case of rare cardiomyopathy and its clinical implications

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Introduction: Left ventricular non-compaction or ‘sporny myocardium’ is a rare congenital cardiomyopathy characterized by prominent trabeculations and intertrabecular recesses that communicate with the ventricular cavity rather than the coronary circulation.

Case description: We present a case of 49 years old male with history of an ischemic stroke one month ago, who was admitted to hospital because of clinical signs and symptoms of left heart failure with extreme breathlessness, anxiety and profuse diaphoresis, symptoms developed in the last 12 h during an intercurrent respiratory infection. Physical examination revealed tachycardia, severe hypoxemia, the 3rd heart sound h and crackling rales extended to upper lungs with a systolic blood pressure of 170/80 mmHg. Electrocardiogram showed sinus tachycardia with QRS duration of 130 ms and negative T waves in V5, V6, DI, AVL. First echocardiographic examination at the emergency room showed a dilated left ventricle with severe systolic dysfunction and the response to initial supportive therapy was good. The levels of brain natriuretic peptide after 24 h from the acute event was 2504 pg/ml. Later transthoracic echocardiogram revealed a mobile, heterogeneous, echodense structure located in intertrabecular recesses, probably thrombi (Fig 2). The patient had no significant arrhythmias during his hospital stay. After evidenced based heart failure therapy with loop diuretics, ACE inhibitors, spironolactone and β blockers his symptoms improved significantly. Also anticoagulation therapy was added. Follow-up examinations during 6 month showed an improved exercise capacity quantified by cardiopulmonary test and BNP levels dropped with more than 70 percent. Transthoracic echocardiography revealed a better systolic function (EF calculated 34 %) with the decrease of end-systolic volume and no more thrombi were seen in the cardiac cavities after 6 month of oral anticoagulation. The patient was advised to continue the evidenced based heart failure therapy treatment with no indication at the moment for cardiac transplantation. All first-degree relatives were advised to undergo screening echocardiogram.

Conclusions: This case illustrates a rare non-compaction cardiomyopathy diagnosed at mid age after clinical presentation with de novo acute heart failure. Evidence based heart failure therapy had unexpectedly good results which could be explained by the response to neurohormonal therapy for heart failure of the non-compaction myocardium areas with beneficial effects on metabolic and adrenergic abnormalities. One of the complications of this cardiomyopathy is intraventricular thrombosis complicated in this case with ischemic stroke just one month before though there is no robust data to support it, anticoagulation therapy in our patient seems to be justified.
Background and purpose: Exercise plays an important role in preventing chronic disease and in maintaining health throughout life. Nevertheless, in some subjects intensive exercise can trigger a cardiopulmonary event (nausea, syncope or a fatal cardiovascular episode). This occurs primarily in the context of an underlying inherited or genetic cardiac disorder. The purpose of this study is to describe a case challenged by the ability to reproduce symptoms using the conventional assessment techniques.

Case description: A 28-year-old male having presented several episodes of syncope and near syncope, while playing soccer, was referred to cardiopulmonary screening. He has no family history of sudden cardiac death.

Outcome: The golden standard assessments (i.e. resting ECG, Holter monitoring, echocardiography, coronary angiography) could not detect arrhythmia or reproduce pathologies/symptoms in this case. Conversely a supplementary screening using a Cardio Pulmonary Exercise Test (CPET) reproduced symptoms, so that the subject experienced an episode of ventricular tachycardia (VT) lasting for 11 seconds at peak workload/peak VO2 and the ECG returned subsequently to normal level without intervention.

Discussion: In this case report the CPET reproduced symptoms. None of the conventional assessment techniques detected any arrhythmia or pathology/symptoms when testing at rest. Using the VO2peak and the respiratory exchange ratio as guidance is pivotal in the CPET testing. Especially for athletes, this can be important because the peak workload and VO2peak is much higher than in average subjects. There is a risk that the conventional assessment techniques are not sensitive enough when assessing athletes only presenting symptoms at peak workload.

Conclusion: and implication Measurements that are able to reproduce symptoms should be included as a supplement to conventional assessment techniques particularly in the evaluation of cardiac symptoms in relations to intense physical exercise in athletes. In patients with arrhythmia but without structural changes the CPET becomes important in reproducing symptoms. Based on the reproduced symptoms from the CPET the case subject was referred to either ablation or ICD therapy.
ACUTE HEART FAILURE

P2105

East Asia has a strikingly better survival following acute heart failure compared with Europe

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with mortality in heart failure patients discharged from internal medicine units. Comorbidities more than reduced left ventricular ejection fraction correlates

P2106

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On behalf of: the GREAT (Global Research on Acute Conditions Team) Network

Funding Acknowledgements: This study was supported by a research fellowship from Japan Heart Foundation (I.A.)

Background: Heart failure is a major health problem worldwide and trials to assess novel therapies are increasingly global. However, recent registries suggest that characteristics of acute heart failure (AHF) patients may differ between Asia and Western countries, though direct comparison of mortality after an AHF episode is scarce.

Purpose: This study sought to investigate difference in long-term mortality in AHF patients between East Asia and Europe.

Methods: From the GREAT (Global Research on Acute Conditions Team) registry, patients who were presenting with AHF to the emergency department in East Asia (Japan and Korea) and Europe (Western Europe and Czech Republic) were included in this analysis. Patients were followed up for all-cause mortality at 1-year.

Results: Of 11710 patients, there were 6961 (41%) patients from East Asia and 10159 (59%) patients from Europe. One-year all-cause mortality was lower in East Asia (18%) than in Europe (32%). Furthermore, unadjusted risk of death was lower in East Asia than in Europe (hazard ratio HR 0.53, 95%-confidence interval CI 0.49-0.56, P < 0.001). Long-term risk of death remained lower in East Asia than in Europe after adjustment (HR 0.52, 95%-CI 0.47-0.57, P < 0.001), propensity-score matching (unadjusted HR 0.50, 95%-CI 0.42-0.59, P < 0.001) and after adjusting HR 0.44, 95%-CI 0.37-0.51, P < 0.001, or in AHF patients with optimal heart failure therapies (HR 0.40, 95%-CI 0.33-0.49, P < 0.001).

Conclusions: In patients presenting with AHF to the emergency department, East Asia has a strikingly better long-term survival compared with Europe. This result will have important impact in the design and choice of recruiting countries in future event-driven AHF trials.

P2106

Comorbidities more than reduced left ventricular ejection fraction correlate with mortality in heart failure patients discharged from internal medicine units

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On behalf of: POST-SM1T Study Group

Background: There is growing awareness that comorbidities frequently accompany Heart Failure (HF) and lead to increased morbidity and mortality. While numerous studies focus on a single comorbidity, only few studies examined the prognosis impact of multiple comorbidities in HF patients. Furthermore, Left Ventricular Ejection Fraction (LVEF) is a powerful predictor of cardiovascular outcome in HF patients, but it is not clear if LVEF maintains its predictive value in old patients with multiple comorbidities.

Methods: We enrolled patients who were discharged by 23 Internal Medical Units of Tuscany, an Italian region of 3,7 million inhabitants, in a period of 30 days (30 January-28 February 2014) with the main diagnosis of HF. We recorded epidemiological, instrumental and clinical data and patients were followed over a 12-months period. We considered 7 comorbidities (diabetes mellitus, hypertension, chronic renal failure, chronic obstructive pulmonary disease, atrial fibrillation, anemia, cognitive deficit) and LVEF during hospitalization. For analysis we distinguished the patients in the three categories used in HF ESC guidelines 2016: HF with reduced, mid-range, preserved ejection fraction (HFREF, HFMREF, HFpEF, respectively). The endpoints were: a) correlation between number of comorbidities and all-cause mortality at 1, 6, 12 months; b) correlation between LVEF and all-cause mortality at 1, 6, 12 months when adjusted for > 2 comorbidities.

Results: We recruited 451 patients (M=4.43%) with a mean age of 83 + 8.4 years. Mean LVEF was 44.2 + 11. Mortality was 9.5%, 25.7%, 38.1% at 1, 6, 12 months respectively. In multivariate analysis mortality was significantly correlated with number of comorbidities (for each increase of one comorbidity RR 1.21 p = 0.07; RR 1.19 p = 0.006; RR 1.16 p = 0.008 at 1, 6, 12 months respectively). Patients with > 3 comorbidities had higher mortality compared with < 3 comorbidities at 1 (RR 2.69 p = 0.03), 6 (RR 1.63 p = 0.04), 12 (RR 1.43 p = 0.05) months respectively. Instead, when adjusted for > 2 comorbidities, LVEF did not correlate with mortality: HFREF vs HFMREF (RR 1.10 p = 0.89; RR 1.81 p = 0.13; RR 1.36 p = 0.41 at 1, 6, 12 months respectively) and HFMREF vs HFpEF (RR 0.53 p = 0.18; RR 1.03 p = 0.82; RR 0.96 p = 0.86 at 1, 6, 12 months respectively).

Conclusions: In a cohort of old HF patients discharged from Internal Medicine Units and followed over a 12-months period, mortality was significantly correlated with the number of comorbidities, whereas reduced LVEF did not correlate with mortality when adjusted for two or more comorbidities.

P2107

Liver fibrosis score predicts mortality in heart failure patients with preserved ejection fraction

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Background: Heart failure with preserved ejection fraction (HFP EF) has several pathophysiological aspects, including stiffness and/or congestion of multiple organs. Poor prognosis is expected in heart failure patients with liver stiffness, which has recently been assessed by nonalcoholic fatty liver disease fibrosis score (NFS; based on aspartate aminotransferase to alanine aminotransferase ratio, platelet counts and albumin). We aimed to investigate the impact of NFS on prognosis of HFP EF patients, with consideration for the peripheral collagen markers such as procollagen type III peptide (PIIIP), type IV collagen 7S, and hyaluronic acid.

Methods and Results: We performed prospective observational study. Consecutive 492 hospitalized HFP EF patients were divided into four groups based on their NFS: 1st-4th quartile (n = 123, respectively). The 4th quartile group had the highest levels of PIIIP, type IV collagen 7S, hyaluronic acid, and B-type natriuretic peptide (BNP). In the follow-up period (mean 1107 days), 93 deaths occurred. All-cause mortality increased in all four quartiles (8.1%, 12.2%, 23.6%, and 31.7%, P = 0.001). In the multivariable Cox proportional hazard analysis, NFS was an independent predictor of all-cause mortality in the HFP EF patients.

Conclusions: NFS, a novel indicator of liver stiffness, correlates with circulating systemic markers of fibrosis and congestion, and is associated with higher all-cause mortality.
In patients with recent ADHF and hyponatremia on admission, failure to normalize serum sodium is associated with increased risk of all-cause death and rehospitalizations during a 30-day follow-up.

Methods: A retrospective study centered on medical records of patients hospitalized for ADHF in the period April 2013 to April 2016. Data regarding serum sodium measurements had to be collected from medical records of cardiologists in two hospitals, and were then processed for statistical analysis. Results: The mean age of our population was 64.4 years (16-100), with a male predominance (64.6%). In 18 patients (1.3%) K was 3.0 mmol/L, and in 424 patients (33.9%) K was 3.5-39 mmol/L. Independent of treatment assignment, patients at high risk for hyponatremia were those with age ≥75 years (28.5%), diabetes (33.9%), male gender (25.5%), high potassium at baseline (24.5%), renal dysfunction (44.5%) (identified by creatinine ≥2 mg/dl or GFR <30 ml/min/1.73m²), symptomatic HF (26.0%) and those receiving therapy with angiotensin-converting enzyme (ACE) inhibitors (25.3%) or spironolactone (27.2%). Conclusion: Changes in potassium ion may cause life-threatening arrhythmias. The risk of hyponatremia is increased in symptomatic heart failure patients with comorbidities or combined renin-angiotensin-aldosterone system (RAAS) blockade. A favorable balance of benefit and risk requires clinical vigilance and closer laboratory monitoring, particularly among these patients.

The mean age of our cohort was 64±15 years, 63.3% were males and 35% showed coronary disease. Mean LVEF and mean RVEF were 34±5 and 41±15% respectively. During a median follow-up of 28±6 months, 16 (26.7%) patients suffered a new rehospitalization for AHF and 6 (10%) patients died. After a multivariate analysis, TPG and CO were independently associated with MACE (rehospitalization for HF and/or death): HR: 0.45 (0.20-1.00) p = 0.0054). However, no CRM parameter was independently associated with MACE.

Conclusion: PVR assessed by RHC has shown to be the only independent predictor of rehospitalization for AHF and cardiac death in patients with DCM. Whereas, no CRM parameter was associated with a higher risk of MACE.
ECG analysis showed a higher prevalence of BCRD (18.2% vs. 7.4% p = 0.033), higher ECGscore (6.3 vs. 3.7 p < 0.001) and higher presence of the S1Q3T3 pattern (36.4% vs. 21.7% p = 0.04).

Angio-CT imaging showed greater reflux of the inferior vena cava (80.6% vs. 37.9% p < 0.001), greater interventricular septum bulging (93.9% vs. 72.6% p = 0.013), higher RV/LV ratio (1.62 vs 0.05, higher RV diameter (49 vs. 43.8, p = 0.003), lower LV diameter (32 vs. 36.9 p = 0.004), higher pulmonary artery / aortic ratio (0.96 vs. 0.28 p < 0.001) and increased angiographic embolic load (Ganafi score 20.5 vs 17.3 p = 0.06).

Analytically, they had a higher prevalence of troponin I values > 0.4 ng/dL (54.5% vs. 34.7 p = 0.013).

Conclusion: P whose initial clinical presentation is with S, are associated with clinical, analytical and imaging characteristics typically associated with a worse prognosis. Thus, the presentation with S should put the hypothesis that we are facing a different approach with worse prognosis, with its implications in the approach, monitoring and therapeutic strategy.

P2113 Long-term prognosis in Takotsubo patients: not so benign
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Background: Takotsubo syndrome (TTS) is an improving diagnosis, considered benign despite recent large series found 4.1% in-hospital mortality similar to ACS, long-term prognosis is poorly appreciated.

Methods: and results: Between 10.2009 and 03.2016, 113 patients were suspected for TTC according to the Mayo Clinic criteria, and included in a prospective cohort in our tertiary hospital. Patients underwent systematic check up with cardiac MRI, urinary and plasma catecholamine, and thyroid balance to differentiate true TTS (n = 91; 80.5%) and alternative diagnosis (n = 22; 19.4%: myocarditis, spasm, ACS, pachy/endo carditis, thyrotoxicosis). 30-days mortality and late mortality were similar with a trends to be more for alternative diagnosis (1.3% vs 0.0 and 25% vs 5.5%; p = n.s.). Etiologies of death were shared between cancer (9.1%), heart failure (2.6%), stroke (1.3%) and miscellaneous condition (Table2). Long-term follow-up seems to be similar with more than 60% of NYHA1-2 patients and same re-hospitalisation rate. Moreover long-term medication were similar probably due to same comorbidities.

Conclusion: Patients with confirmed TTS have late complications which seem to be related to older age and comorbidity, and merit special attention. Thus a systematic follow-up seems to be needed.

P2114 Prognosis of pulmonary embolism: risk stratification in non-high-risk patients
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Background/Introduction: The prognostic assessment of acute pulmonary embolism (APE) in patients at low or intermediate risk takes into consideration the evaluation of right ventricle dysfunction (RVD) and/or evidence of myocardial injury. Nevertheless, the 2014 ESC guidelines recommendations on risk stratification have not been tested in real-world APE patients.

Purpose: The aim of our study was to compare the PESI classification with the ESC 2014 risk stratification model to predict all-cause mortality at 30-days in non-high-risk patients. We also evaluated the role of RVD, elevated troponin and elevated NT-proBNP in the risk stratification of patients with APE.

Methods: We have included 411 patients consecutively diagnosed with APE by computed tomographic angiography (CT-angi) in a single centre, between 2009 and 2015. RVD was evaluated with CT-angi or Echocardiography at admission. The cut-off values for troponin I and NT-proBNP were 0.04 µg/L (99th percentile) and 600 pg/mL. Cardiovascular dysfunction (CVD) was defined as the concomitant presence of RVD, elevated troponin and NT-proBNP. Multivariate analysis was performed using binary logistic regression. Discriminative power was assessed by ROC curves. The studied endpoint was all-cause mortality at 30-days.

Results: Median age was 76 years (IQR 65 – 83), 39% male. All-cause mortality at 30-days was 8.5% (n=35). RVD was present in 59% (n=243) of the patients. Troponin I and NT-proBNP were elevated in 50% (n=205) and 68% (n=280) of the patients, respectively. CVD dysfunction was present in 30.2% (n=124). According to the ESC risk stratification strategy, 6.8% (n=28), 53.8% (n=221) and 39.4% (n=160) patients were considered low, intermediate-low and intermediate-high risk, respectively. The PESI score classified 9.5% (n=44), 13.8% (n=66), 21.6% (n=100), 17.5% (n=81) and 37.6% (n=174) patients as class 1 through V, respectively. The discriminative power of the ESC classification was inferior to the PESI classification (AUC = 0.62; AUC = 0.70, respectively; difference between AUC=0.082; p=0.07). Univariate and multivariate analysis are depicted in the table. Only PESI classification and CVD remained independent predictors of all-cause mortality at 30-days. Adding CVD to the PESI classification modestly increased the discriminative power (AUC = 0.73; 95% CI 0.69 – 0.78; p = 0.001) even though AUC difference was not statistically significant (difference between AUC=0.03; p=0.16).

Conclusion: In this population, the 2014 ESC risk stratification strategy was not superior to the sole application of PESI classification. The contribution of cardiovascular dysfunction modestly for risk stratification of APE patients was modest.

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P2115 Long term survival hypertensive patients after ST-elevation myocardial infarction with preserved ejection fraction
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Purpose: The immediate and long-term mortality after myocardial infarction (MI) in patients (pts) with hypertension is increased. This is likely to be due at least in part to the frequency of complications such as acute heart failure (AHF), AHF with preserved ejection fraction (EF=40%) accounts for almost 45% of heart failure cases. However, prognostic accuracy in those pts is unknown. The aim of the present study is to focus on hypertensive patients with ACS, in order to better elucidate whether these patients are at higher risk and deserve a tailored approach for management and follow-up.

Methods: Of the 699 pts (age 54.8 ± 9 years, LVEF 49.1 ± 6.1%) who participated in a prospective study, 299 (49.3%) have history of AH. Patients were divided into 2 groups: 1 - with symptomatic AHF (Killip class II/III) during hospitalization (n = 84), 2 - without AHF (n=215). Main outcomes were cardiovascular death and nonfatal MI with a median follow-up of 5 year.

Results: Pts with AHF were likely to be elder, have history of coronary heart disease and have an anterior wall MI. Time from onset symptoms of MI was 3.9 ± 0.3 h and not differ between groups. Reperfusion therapy (TLT or PTCA) performed in 68.7%. On admission AHF pts presented with higher heart rate and glycemia, lower EF. Also AHF patients had a greater degree of LV hypertrophy and diastolic dysfunction. During hospital stay AHF pts has statistically significant ventricular tachycardia/ fibrillation (6.0 vs 0.5 %; p < 0.05), early anamnus of LV (17.9 vs 6.5% ; p = 0.01). Fig. 1 shows Kaplan-Meier estimates of survival in patients with and without signs of AHF during admission and follow-up.
Conclusions: AHF with preserved EF in hypertensive patients is a frequent complication in STEMI and a powerful and independent predictor of worse LVEF and RV dilatation.

P2117
Prognostic significance of left axis deviation in acute heart failure patients with left bundle branch block

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On behalf of: KorAHF investigators

Funding Acknowledgements: This research was supported by Research of Korea Centers for Disease Control and Prevention [2013-ES0003-00].

Purpose: The prognostic impact of left axis deviation on clinical outcomes in AHFS with LBBB is unknown. This study aimed to determine the prognostic significance of left axis deviation in patients with acute heart failure syndrome (AHFS) with left bundle branch block (LBBB).

Methods: Between March 2011 and February 2014, 292 consecutive AHFS patients with LBBB were recruited from 10 tertiary university hospitals. They were divided into groups with no left axis deviation (LAD) (n = 189) or with LAD (n = 103) groups according to QRS axis < -30 degrees. The primary outcome was all-cause mortality.

Results: The median follow up duration was 24 months (interquartile range 12 to 35 months). On multivariate analysis, the rate of all-cause death did not significantly differ between the normal axis and LAD groups (39.7% vs. 46.6%, adjusted hazard ratio (HR) 1.01, 95% confidence interval [CI] 0.66 to 1.53, p = 0.97). However, on the multiple linear regression analysis to evaluate the predictors of the LVEF, presence of LAD significantly predicted a worse LVEF (adjusted beta -3.25, 95% CI -5.82 to -0.67, p = 0.01). Right ventricle (RV) dilatation was defined as at least two of three electrocardiographic criteria (late R in lead aVR, low voltages in limb leads, and R/S ratio > 1 in lead V6) and was more frequent in the LAD group than in the normal axis group (p < 0.001).

Conclusion: Among the AHFS with LBBB patients, LAD did not predict mortality, but it could be used as a significant predictor of worse LVEF and RV dilatation.

Predictors of lower LVEF

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unadjusted Slope</th>
<th>p value</th>
<th>Adjusted Slope</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal QRS axis (reference)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAD</td>
<td>-3.03 (-5.53 to -0.52)</td>
<td>0.02</td>
<td>-3.25 (-5.82 to -0.67)</td>
<td>0.01</td>
</tr>
<tr>
<td>RAD</td>
<td>0.45 (9.47 to 10.36)</td>
<td>0.93</td>
<td>-0.20 (-10.08 to 9.67)</td>
<td>0.97</td>
</tr>
<tr>
<td>Age</td>
<td>0.18 (0.07 to 0.28)</td>
<td>0.001</td>
<td>0.16 (0.04 to 0.27)</td>
<td>0.007</td>
</tr>
<tr>
<td>Ischemic electrotole</td>
<td>2.00 (-0.44 to 4.44)</td>
<td>0.11</td>
<td>0.69 (-1.83 to 3.26)</td>
<td>0.60</td>
</tr>
<tr>
<td>Hypertension</td>
<td>2.30 (0.90 to 1.88)</td>
<td>0.16</td>
<td>0.98 (0.65 to 1.49)</td>
<td>0.94</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>2.64 (0.23 to 5.06)</td>
<td>0.03</td>
<td>1.57 (1.08 to 4.23)</td>
<td>0.24</td>
</tr>
<tr>
<td>Body mass index</td>
<td>0.98 (-1.93 to 3.79)</td>
<td>0.49</td>
<td>0.89 (-1.97 to 3.75)</td>
<td>0.54</td>
</tr>
<tr>
<td>QRS duration</td>
<td>-0.26 (-2.73 to 2.22)</td>
<td>0.84</td>
<td>-0.26 (-2.73 to 2.22)</td>
<td>0.83</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.67 (-1.58 to 4.91)</td>
<td>0.31</td>
<td>1.29 (-1.98 to 4.57)</td>
<td>0.44</td>
</tr>
</tbody>
</table>

CI = confidence interval; LAD = left axis deviation; RAD = right axis deviation
P2118
Possibility of impedance cardiography in prognosis assessment in hypertensive emergency complicated by acute heart failure
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Objective: impedance cardiography is a noninvasive modality utilized changes in impedance across the thorax to assess hemodynamic parameters. The aim of the study was to evaluate the hemodynamic profile of hypertensive emergencies patients complicated by pulmonary edema.

Design and methods: 27 patients with pulmonary edema due to hypertensive emergencies (65% females, mean age 71.5 ± 10.2 years) were selected from all patients hospitalized with hypertensive crises to emergency care hospital for evaluation of cardiac index, systemic vascular resistance (SVR), thoracic fluid content (TFC) by impedance cardiography (Cardio Screen, Germany). Patients with severe valve dysfunctions, aortic balloon pump were not eligible to the study. All patients were assessed at baseline, after 2 and 24 hours. 26 (96%) patients had arterial hypertension in the past, 20 (74%) were treated regularly. Blood pressure (BP) was measured at initial contact by first aid doctors, then at hospital just after arrival, after 2, 6, 24, 72 hours. Serum creatinine, urea, potassium and ECG, chest X-ray, neurologic examinations were done for all patients. Fundoscopy, echocardiogram, brain computer tomography were done optionally. All patients were treated with loop diuretic furosemide and nitroprusside intravenous application.

Results: mean BP at initial contact in patients with hypertensive emergencies was 209 ± 22/119 ± 17 mm Hg, after 2 hours - 178 ± 18/106 ± 21 mm Hg, after 6 hours - 159 ± 11/91 ± 11, after 24 hours - 147 ± 79/3,5 ± 5, after 72 hours - 143 ± 9/88 ± 2,7 mm Hg. So decreasing BP > 160/100 mm Hg after 6 hours was observed in 81%. Baseline, after 2 and 24 hours TFC in woman was 38 ± 7, 53 ± 9.7, 27 ± 5. In man - 45 ± 11, 38 ± 9, 31 ± 10. Baseline cardiac index 3.01 ± 1.02 l/min/m2, after 2 hours - 2,17 ± 1,06 l/min/m2. Baseline SVR was 3381,9 ± 1012,7 after 2 hours - 2502.5 = 1272,2 dyn x s x cm(-5) x m2. In-hospital mortality was 22% (n = 6). The median cardiac index in non-survivors was significantly less than for survivors. The AUC for cardiac index in predicting mortality was 0.76 (95% CI 0.51-0.91, p = 0.033). A cardiac index cut-off value < 2,5 l/min/m2 had sensitivity of 46% and specificity of 97% in lethal outcomes prediction.

Conclusions: ICG may be a helpful, noninvasive tool in noninvasive monitoring hemodynamic parameters and prognosis evaluation in patients with pulmonary edema due to hypertensive emergency.

P2119
Prognostic value of acute kidney injury and blood urea nitrogen/creatinine ratio in patients with acute heart failure
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Purpose: The aim of this retrospective study was to evaluate whether elevated admission blood urea nitrogen/creatinine ratio (BUN/Cre) or acute kidney injury (AKI) during hospitalization is predictive of in-hospital mortality in patients hospitalized with acute heart failure.

Methods: In this study we evaluated consecutive patients from the regional heart failure registry, enrolled during 2015 at our clinical county hospital with a primary diagnosis of acute heart failure. For all patients, BUN/Cre ratio was calculated at admission and correlated with clinical variables and in-hospital mortality. Afterwards patients were divided into two groups: with or without acute kidney injury (defined as an increase of serum creatinine by 3.0 mg/dl within 48 hours). For statistical analysis we used independent t test for comparison of continuous values, Pearson x 2 test for comparison of categoral values, multivariate logistic regression, survival curves and Cox regression for predictors of in-hospital mortality.

Results: A total of 184 consecutive patients with acute heart failure (males and females) were enrolled. Mean age was 69 ± 10 years and mean admission fraction was 33 ± 10%. The percentage of patients with AKI was 31% and without AKI was 69%.

The AKI group presented higher heart rate at admission compared to the non-AKI group (105 b/min vs. 95 b/min, p < 0.01). Higher admission BUN/Cre ratio was associated with worse systolic blood pressure (136 mmHg vs 149 mmHg, p < 0.016) and with the “wet and cold” clinical profile of acute heart failure (p = 0.043). Patients with AKI had a significantly worse survival profile during hospitalization (log-rank test, p < 0.0001) and Cox proportional hazards modeling showed a crude HR = 5.3 (95% CI [2.2-12.4], p < 0.0001) for in-hospital mortality. Higher admission BUN/Cre ratio proved to be a significant factor for in-hospital mortality also, with a crude HR=3 (95% CI [1.8-6], p = 0.028).

Conclusions: Acute kidney injury during hospitalization in patients with acute heart failure is responsible for worse in-hospital survival rates and is associated with increased heart rate at admission. Elevated BUN/Cre ratio at admission is linked with an increased risk for in-hospital mortality being associated with lower systolic blood pressure and the “wet and cold” clinical profile in patients with acute heart failure.

P2120
Measurement of Circulating endothelial progenitor cell and endothelial microparticles can predict the improvement of ischemic heart failure
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Introduction: Endothelial microparticles (EMP) are small vesicles shed from activated or apoptotic endothelial cell. We wonder elevated EMP and EPC level is possible to predict the improvement of ischemic heart failure.

Methods: total 354 patients (age 63.1 ± 11.2, male 256/77% who diagnosed as ischemic heart failure (EF < 45%, three vessel diseases) were divided as two group. Group 1 showed improved ejection fraction (mean 46.3 ± 1.1% ) after optimal medical therapy. Group II did not show improvement of ejection fraction (ΔEF ± 0.4%). Mean follow duration was 6.2 ± 2.1 months. EMP and endothelial progenitor cell(EPC) are determined in peripheral blood by anti CD31-PE and anti CD133-FTC. MPs were defined as CD31 + CO42- particles with a diameter < 1.5µm, being MP size calibrated with flow cytometry size calibrations. The values of EMP, EPC, and EMP/EPC ratio in patients with ischemic heart failure were compared with control group.

Results: Group I (n = 185, mean age 64.6 ± 11) and Group II (n = 169, mean age 62.1 ± 10) did not show differences in terms of medication. There were no significant differences in coronary risk factors such as age, DM, HBP, dyslipidemia, smoking between groups. The level of EMP% was lower in Group I than Group II (3.3 ± 0.71) in group I, (1.33 ± 0.96) in Group II, p = 0.03). But EPC values were similar between two groups. [0.042 ± 0.016] vs [0.049 ± 0.022, p = 0.11] and EMP/EPC ratio were significantly different [49.4 ± 14.3] in Group I vs [62.1 ± 22.2] in Group II, p = 0.02]. EMP/EPC had significant predictive value to detect the improvement of ischemic heart failure. (OR = 1.88, 1.32-1.99, p < 0.01)

Conclusion: Improvement of ischemic heart failure after optimal medical therapy might be predicted by measuring the circulating endothelial microparticle and progenitor cell ratio.

P2121
Serum potassium levels at admission and in-hospital all-cause mortality in patients hospitalised for acute heart failure (Insights from RO-AHFS registry).
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1 Institute of Cardiovascular Diseases Prof. C.C. Iuliu, Bucharest, Romania; 2Duke University Medical Center, Durham, United States of America; 1Vanderbilt University, Nashville, United States of America

On behalf of: RO-AHFS study investigators

Purpose: To assess the prognostic value of serum potassium levels at admission in patients hospitalised for AHF regarding in-hospital all-cause mortality in a “real world” national registry.

Methods: RO-AHFS was a prospective, national, multicenter registry that included 3204 consecutive patients admitted for AHF over a 12 month period. This is a post-hoc analysis of 3188 patients who had potassium levels measured at admission. We analyzed in-hospital all-cause mortality in this population stratified by quartiles of serum potassium concentration.

Results: The demographic and clinical characteristics of patients stratified by potassium levels quartiles are shown in Table 1. No linear relationship between in-hospital mortality and serum potassium levels at admission was identified (HR<0.39; 95% CI 0.73-1.26). Also, in-hospital all-cause mortality did not vary significantly across quartiles: the mortality in quartiles Q1, Q2, Q3 and Q4 was 7.9%, 7.2%, 7.8% and 8.1% (p = 0.425) respectively.

Conclusions: In the present analysis we didn’t find any relationship between in-hospital mortality and serum potassium levels at admission, finding which may be reflective to the observational nature of the registry.
Background/Introduction: The risk for and/or prognostic markers in acute heart failure (or exacerbation of chronic heart failure) – AHF - has been a constant in the last decades. Inflammation plays a major role in HF and contribute to the occurrence of adverse events. The neutrophil/lymphocyte ratio (nL/l), a simple and easy to perform marker of “inflammation”, has been considered promising in small studies including populations affected by diverse cardiovascular diseases, namely in HF.

Purpose: To evaluate the usefulness of nL/l as a predictor of prognosis [rehospitalization (reH) and mortality] in a population hospitalized for AHF.

Methods: Discharge notes of 100 patients (pts) consecutively admitted for AHF (cardiology ward, tertiary hospital center), discharged alive and prospectively followed, were analysed. Pts with infection on admission (n=45) and those with LOS >28 days (n=4) were excluded. Logistic regression analysis and Kaplan-Meier survival.

Results: Seventy five pts (58.7% men, 66.7±13.3 years) were included in the final analysis. There were no in-hospital deaths. During a mean follow up (Fup) period of 14.1±5.7 months, the reH rate for HF was 29.3% and all cause reH during follow-up. The influence of nL/l on mortality and reH during post-discharge follow-up was determined (Cox regression analysis and Kaplan-Meier survival).

A value of nL/l >5.5 on admission was a non-independent predictor of long-term mortality (AUC= 0.95, CI= 0.9-1.0, p<0.01); also NT-ProBNP >4000 pg/mL on admission did not independently predict mortality during Fup (AUC= 0.79, CI=0.65-0.93, p= 0.014).

A nL/l >4.5 was an independent predictor of both rehospitalization for HF (HR=4.16, CI 1.44-11.98, p =0.039) and all cause rehospitalization (HR= 3.16, CI 1.4-7.14, p =0.006); NT-ProBNP >4000 pg/mL (AUC= 0.68, CI= 0.57-0.79, p=0.014) was a non-independent predictor of HF rehospitalization.

Conclusion: In patients admitted to hospital with AHF, nL/l on admission revealed prognostic utility given the ability to predict future rehospitalization, although it did not show a significant association with other clinical and laboratorial parameters at admission, namely with NT-proBNP values. The nL/l may be useful as a marker of “fragility” in the identification of AHF patients who may benefit from closer follow-up in the outpatient setting.
P2125
Clinical characteristics and outcomes of acute heart failure in younger versus very elderly patients

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1Federal University of Bahia, Internal Medicine, Salvador, Brazil; 2Ana Nery Hospital, Salvador, Brazil; 3Federal University of Bahia, Faculty of Medicine, Salvador, Brazil; 4Federal University of Bahia, College of Nursing, Salvador, Brazil

Funding Acknowledgements: FAPEX – FUNDAÇÃO DE APOIO À PESQUISA E À EXTENSÃO

Background: Age has been described as an important prognosis factor in Heart Failure (HF). Nevertheless, the modern approach in pharmacotherapy and quality of care has improved hospital treatment among heart failure individuals and it is not clear if the age, by itself, is associated with worse outcomes among Acute Heart Failure (AHF) inpatients.

Purpose: To evaluate differences in baseline, treatment and prognosis aspects between younger (<45 years) and very elderly (≥75years) patients admitted for AHF.

Methods: Retrospective cohort study included data from 187 patients admitted in three tertiary cardiac referral centres for AHF management between 2009 and 2016.

Results: All the data are shown at table 1.

Conclusions: Although we noticed some differences among baseline characteristics as higher frequencies of prior comorbidities and higher prevalences of ischemic and hypertensive etiologies among very elderly patients, younger and very elderly patients showed no clinically relevant differences with regard to hospital outcomes.

Baseline and outcomes characteristics

<table>
<thead>
<tr>
<th>All (n = 187)</th>
<th>&lt;45 (n = 56)</th>
<th>&gt;75 (n = 51)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients, %</td>
<td>100</td>
<td>52.3</td>
<td>47.7</td>
</tr>
<tr>
<td>Age, mean±SD</td>
<td>59.9±14.5</td>
<td>36.2±7.2</td>
<td>80.8±4.8</td>
</tr>
<tr>
<td>LVEF, mean±SD</td>
<td>31.6±8.9</td>
<td>30.3±3.5</td>
<td>35.5±8.0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>59.2 (81)</td>
<td>41.1 (23)</td>
<td>80.9 (38)</td>
</tr>
<tr>
<td>Abnormal fibrillation</td>
<td>22.7 (22)</td>
<td>20 (11)</td>
<td>26.2 (11)</td>
</tr>
<tr>
<td>Diabetics</td>
<td>17.5 (16)</td>
<td>3.6 (2)</td>
<td>34 (16)</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>24.3 (23)</td>
<td>12.5 (7)</td>
<td>38 (18)</td>
</tr>
<tr>
<td>Heart Failure etiology, % (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic</td>
<td>25.7 (26)</td>
<td>11.1 (6)</td>
<td>42.6 (23)</td>
</tr>
<tr>
<td>Chagas Heart Disease</td>
<td>19.8 (20)</td>
<td>29.6 (16)</td>
<td>8.5 (4)</td>
</tr>
<tr>
<td>Hypertensive</td>
<td>18.8 (19)</td>
<td>9.3 (5)</td>
<td>29.8 (14)</td>
</tr>
<tr>
<td>Valvular</td>
<td>7.9 (8)</td>
<td>0 (0)</td>
<td>14.8 (8)</td>
</tr>
<tr>
<td>Length of stay median(IQR)</td>
<td>13±17</td>
<td>16±19</td>
<td>10±10</td>
</tr>
<tr>
<td>Acute Renal Failure % (n)</td>
<td>44.9 (48)</td>
<td>51.8 (29)</td>
<td>37.3 (19)</td>
</tr>
<tr>
<td>Cardiac surgery, % (n)</td>
<td>14 (15)</td>
<td>19.6 (11)</td>
<td>7.8 (4)</td>
</tr>
<tr>
<td>Electronic Device Implanted % (n)</td>
<td>5.6 (6)</td>
<td>3.6 (2)</td>
<td>7.8 (4)</td>
</tr>
<tr>
<td>Vasoactive armuse, % (n)</td>
<td>27.1 (29)</td>
<td>33.9 (19)</td>
<td>19.6 (10)</td>
</tr>
<tr>
<td>ICU % (n)</td>
<td>40.2 (43)</td>
<td>48.2 (27)</td>
<td>31.4 (16)</td>
</tr>
<tr>
<td>Death during hospital stay % (n)</td>
<td>7.5 (8)</td>
<td>7.1 (4)</td>
<td>7.8 (4)</td>
</tr>
</tbody>
</table>

P2124
Prognostic implication of changes in renal function in patients with acute decompensated heart failure

SY Jang1; NK Kim1; JH Sihn1; JH Roh2; MH Bae3; JH Lee4; DH Yang2; HS Park3; Y Choi2; SC Chee1
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Background: There are conflicting data about whether worsening renal function (WRF), as well as improving renal function (IRF), on prognosis of patients with acute decompensated heart failure.

Methods: Patients hospitalized for acute decompensated heart failure between January 2009 and June 2015 were retrospectively analyzed. Patients with initial serum creatinine more than 2.5mg/dl were excluded. A total of 846 patients (66.8% very elderly patients) were analyzed. WRF was defined as creatinine increase of ≥25% from baselines estimated glomerular filtration rate, whereas IRF was not.

Results: Among the patients, 135 and 170 patients were included in WRF and IRF, respectively. A total of 193 adverse events (22.8%) were observed during the 1-year follow-up. WRF, IRF and stationary renal function (SRF) group respectively showed 32.6%, 21.8% and 20.7% of adverse event rate. Kaplan-Meier analysis showed significant difference in prognosis among the three groups (p<0.001). The difference comes from the different prognosis between WRF and SRF (Bonferroni corrected p<0.001). Cox-proportional hazard model showed WRF was independently associated with poor prognosis (hazard ratio [HR] 1.497 [1.001-2.228], p=0.047) together with age, ischemic etiology, beta blockers, loop diuretics, natriuretic peptides, and serum hemoglobin level. However, IRF did not showed a distinct prognostic difference compared to SRF group (HR 1.000 [0.678-1.487], p=0.983).

Conclusion: WRF renal function was associated with poor prognosis in patients with acute decompensated heart failure, whereas IRF was not.
In the context of high-risk patients, vascular rehabilitation appeared to be a protective factor (OR 2.14; p < 0.05). Finally, a multivariate logistic regression analysis was performed with the clinical variables that were associated with mechanical ventilation or in-hospital mortality, with the variables of age, sex, associated comorbidity and other variables with statistical significance (p < 0.05). The analysis was carried out using the program SPSS version 21.

**Results:** The study was conducted in a total of 199 patients, with an average age of 82.7 years, of which 61.8% were women. 85% of the patients had a LVEF<40%, with an average NTproBNP of 9,103.3 pg/ml. 64.3 % of the patients had atrial fibrillation. 30.2 % of the patients were readmitted, with an average of readmissions per year of 1.45 (±0.86). In-hospital mortality during one year of follow-up was 25% of the patients. Regarding the factors associated with in-hospital mortality, older age was the most outstanding variable, OR 1.059 [1.002-1.1] (p=0.04).

**Conclusions:** In our investigation, advanced age was the main factor associated to hospital mortality. Multimorbidity and polypharmacy have been the factors most associated to hospital readmissions.

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**Poster Session 4**

**P2127**

**Pre and post hospitalization care pathways for acute heart failure patients**

O Viorel Thebaud1, DG Guja1, JP Guet1, LG Le Gloan1, NP Pirulo1, BD Delasalle1, MP Poliane1, JT Trochu1

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2Nouvelles Cliniques Nantais, Nantes, France

**Introduction:** Acute heart failure (AHF) is a serious condition with high mortality and a very high rate of early re-admissions. The aim of our study was to analyze the care pathway, general characteristics and 3-month morbidity and mortality of AHF referred to a French tertiary hospital.

**Material and Methods:** Consecutive patients hospitalized for AHF patients during two 8-week periods, autumn-winter and spring-summer were included. The overall characteristics and data specific to the care pathway were collected. A 3-month follow-up was carried out to study combined total mortality and unplanned cardiovascular re-hospitalizations at 3 months.

**Results:** 237 patients, mean age 72 ± 13 years old, 43.2% HFpEF, 39.2% HFrEF were included and followed. No significant differences were found between the patients’ characteristics between inclusion. Patients were mostly referred to the hospital by a general practitioner (27%) or a cardiologist (27%). 20.3% after an emergency call, 36.2% of the patients reached the cardiology department after an admission in the emergency department. 38.6% were admitted to the intensive care unit. The average length of hospital stay was 10.8 ± 8.1 days, 77% went back home directly, 15.2% were transferred to a rehabilitation center. An outpatient visit with a cardiologist was scheduled upon discharge for 68.9% of patients within an average of 48 ± 37 days, 10 % of the patients entered a cardiovascular rehabilitation program. 6.3% were included in a multidisciplinary management program. Combined total mortality or unplanned cardiovascular re-hospitalization was 28.9 %. Chronic heart failure (OR = 2.25; p = 0.01), early re-hospitalization (< 1 year) (OR = 2.18; p = 0.01), renal insufficiency (OR = 2.77; p = 0.001) and cardiogenic shock (OR = 2.49; p = 0.04) were identified as risk factors for this criterion. Cardiovascular rehabilitation appeared to be a protective factor (OR = 2.14; p = 0.03).

**Conclusion:** Heart failure re-hospitalization is frequent and cardiovascular mortality high after an index HF hospitalization with a limited access to an organized care plan after hospitalization, underscoring the importance of the implementation of high quality transition care and better identification of high risk patients.

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**P2128**

**Characterization of any cause dyspnea in the emergency department and factors predicting the need for mechanical ventilation**

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**Background:** Dyspnea is the most common symptom of patients presenting with acute heart failure (AHF). Despite this fact, there is no definitive data about how to correctly quantify dyspnea, and whether the parameters currently used are able to predict outcomes or measure treatment efficiency. Mechanical ventilation (MV) has been shown to ameliorate hypoxemia, correct acidosis and alleviate symptoms in acute heart failure (AHF). Despite this fact, there is no definitive data about how to correctly quantify dyspnea, and whether the parameters currently used are able to predict outcomes or measure treatment efficiency. Mechanical ventilation (MV) has been shown to ameliorate hypoxemia, correct acidosis and alleviate symptoms in acute heart failure (AHF). Despite this fact, there is no definitive data about how to correctly quantify dyspnea, and whether the parameters currently used are able to predict outcomes or measure treatment efficiency. Mechanical ventilation (MV) has been shown to ameliorate hypoxemia, correct acidosis and alleviate symptoms in acute heart failure (AHF).

**Methods:** This was a single-center, prospective, observational, cohort study, which enrolled consecutive patients presenting with dyspnea of any etiology to the emergency room (ER). Dyspnea was evaluated clinically and biologically at baseline, at 5 minutes and 30 minutes, by parameters such as respiratory rate, oxygen saturation, pH, lactate, PaO2, and a patient-subjective visual analog scale (VAS). The aim of this paper is to clinically and biologically characterize dyspnea and to determine which acute-phase parameters obtained in the ER could predict the need for mechanical ventilation.

**Results:** There were a total of 104 patients enrolled, 57.7% male, mean age 66.8 years, with the majority (65.3%) having a history of HF. The clinical profile classification of the dyspnea was: 61% dyspnea at rest, 18% paroxysmal nocturnal dyspnea, and 21% effort induced dyspnea. Mean baseline parameters were: blood pressure 143/81 mmHg, respiratory rate 23.1 bpm, pH 7.39, SaO2 93.4%, PaO2 77.9%, lactate 1.3 mmol/L, NTproBNP 5290 pg/mL, left ventricle ejection fraction 45.8%. The majority of the patients (70%) had a significant improvement of dyspnea at 30 minutes (as derived from the VAS), in contrast to 4.8% who experienced worsening symptoms. Seven patients (6.7%) required mechanical ventilation (invasive or non-invasive). The only parameters that were predictive for mechanical ventilation after multivariate analysis were PaO2<70%, HR>1.72 (CIS95% 1.58-2.91) and respiratory rate>29 bpm, HR>1.53 (CIS95% 1.19-2.53).

**Conclusions:** In AHF patients presenting with dyspnea of any etiology to ER, the need for MV can be predicted by baseline PaO2 and respiratory rate.
Results: DR was identified on clinical criteria.

Purpose: Early detection and treatment of worsening heart failure (HF) symptoms can reduce hospitalization.

Methods: Pilot study. Patients included were prescribed, loop diuretics, beta blockers, angiotensin converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) and mineralocorticoid receptor antagonists (MRAs). At the time of inviting patients to participate the community pharmacist had no prior knowledge of whether the participant had a diagnosis of HF. The screening tool was designed to identify worsening symptoms during the previous month, and included six questions pertaining to breathlessness, nocturnal breathlessness, signs of oedema, tiredness and weight gain. Participants with suspected worsening HF symptoms were referred to the local HF pharmacist who acted as triage to the general practitioner (GP) referrals.

Results: 28 patients participated out of 40 that were invited to participate, across 5 community pharmacies in North Wales over a 2-month period. 6 patients were identified with suspected HF symptoms and were all referred to their GP by the HF pharmacist. All 6 patients that were referred to a GP resulted in an intervention by the GP. The GPs interventions were: 2 patients required changes to HF therapies, 1 patient required a change to a non-HF treatment, 3 patients were referred to a cardiologist, with 1 participant subsequently diagnosed with HF with preserved ejection fraction. Retrospective review of the participants’ medical notes indicated that 16/28 had a confirmed diagnosis of HF. The screening tool had a sensitivity of 65% and the specificity of 73%.

Conclusion: The community pharmacy HF screening tool identified worsening HF symptoms in existing HF patients and also lead to the eventual new diagnosis of HF with preserved ejection fraction. A larger randomised trial is required to fully assess the outcomes of the screening tool.

P2132 Diuretic resistance in a population of acutely decompensated chronic heart failure patients

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Purpose: Loop diuretics are one of the mainstay of therapy in acutely decompensated chronic heart failure (ADCHF) patients (pts), but despite increased doses a proportion of pts represents diuretic resistance (DR) manifested with persistence of systemic congestion with important respiratory, hepatic and renal dysfunction and poor prognosis. The aim of the study was to investigate diuretic resistance in ADCHF population, and to explore a prediction model for DR development.

Methods: We prospectively analyzed clinical and laboratory data of 637 consecutive ADCHF pts, but despite increased doses a proportion of pts represents diuretic resistance (DR) manifested with persistence of systemic congestion with important respiratory, hepatic and renal dysfunction and poor prognosis. The aim of the study was to investigate diuretic resistance in ADCHF population, and to explore a prediction model for DR development.

Results: DR was identified in 116 (18.2%) pts: between DR and non DR pts there were significant differences in age (87.4 ± 6.9 vs. 65.8 ± 0.7, NS), sex (43% vs 62% vs. 59.7%, NS), diabetes (31.7% vs 30.1%, NS), but there were significant differences in MELD score (38.2 ± 7.7 vs. 16.3 ± 9.5, p < 0.001), hyponatremia (132 ± 2.7 vs 128 ± 9.3 mEq/L, p < 0.001), Charlson Comorbidity index (CCI) = 4 (88.1% vs 47.2%, p < 0.01), right ventricular dysfunction (RVEF < 25% vs 12.3 ± 0.8 mm, p < 0.01), presence of metabolic alkalosis (89.7% vs 41.5%, p < 0.001), rehospitalizations for AHF (4 vs 2 to 6 vs 2 to 3, p < 0.05). Independent predictors of DR in multivariate analysis were an abnormally high MELD score HR 2.95 (95%CI: 1.35 to 5.62), low RV function HR 2.36 (95%CI: 1.28 to 4.37), hyponatremia HR 1.83 (95%CI: 1.33 to 2.52). From ROC curve analysis for MELD score model AUC was 0.94 (95%CI: 0.90 to 0.97) indicating a good ability to discriminate patients at risk of DR.

Conclusions: In patients with STEMI treated with metabolic therapy for effective treatment of HF in patients with STEMI. Metabolic therapy not only improves the course of disease, but diminishes rehabilitation period as well.
Results: The mean (SD) of age, minimum estimated glomerular filtration rate (eGFR) and maximum potassium during admission were 71 ± 12 years, 55 ± 22 ml/min/1.73m2 and 4.5 ± 0.6 mmol/L, respectively. The proportion of males, ischemic heart disease and MRA prescription upon discharge were 67.1%, 42% and 58.2%, respectively. Patients with potassium ≥5.0 mmol/L (17.5%) showed lower prescription of MRA (45.1% vs. 58.5%, p = 0.003). In multivariate analysis, adjusting for age, ischemic heart disease, systolic blood pressure <100 mmHg, eGFR and left ventricle ejection fraction, Kmax should be to be independently asso- ciated with the odds of non-prescribing MRA. Functional form of Kmax revealed a positive and non-linear gradient of risk, with a greater magnitude of risk above 5 mmol/L as is shown in the figure below. Compared to patients with Kmax <5mmol/L those with Kmax ≥5.0 mmol/L were about two-fold increase odds of non-MRA prescription (OR=1.83; CI 95%: 1.13-2.98, p = 0.015).

Conclusion: In patients with AHF and reduced LVEF, high serum potassium levels ≤5.0 mmol/L were about two-fold increase odds of non-prescribing MRA. Functional form of Kmax revealed a positive and non-linear gradient of risk, with a greater magnitude of risk above 5 mmol/L as is shown in the figure below. Compared to patients with Kmax <5mmol/L those with Kmax ≥5.0 mmol/L were about two-fold increase odds of non-MRA prescription (OR=1.83; CI 95%: 1.13-2.98, p = 0.015).

Background/Aims: Pulmonary embolism is connected with high morbidity and morta- lity. Prognostic assessment is important for the management of patients with pulmonary embolism. Pulmonary embolism often has a nonspecific clinical presen- tation. The use of diagnostic testing in an attempt to avoid missing the potentially life-threatening diagnosis increases both cost and use of medical resources. Various score systems exist to evaluate the probability of pulmonary embolism, which can be used for risk stratification, to get the most accurate diagnosis. The aim of our study was to review the evidence for existing prognostic models in acute pulmonary embolism and determine validity and usefulness for predicting patient outcomes.

Materials and Methods: We performed a retrospective analysis of pulmonary embolism in three Hungarian emergency departments. Data from 519 patients were included for this retrospective analysis. The Wells, Geneva, Padua score systems were used to reevaluate retrospectively the risk of pulmonary embolism. The diagno- sis of pulmonary embolism was accurate, when the CT verified it. We allowed the weighted probability of the score systems. We analyzed which score system is the most specific for the risk stratification of pulmonary embolism in our cases. Data were analyzed with a SPSS 21.0 statistical software. In our study, chi-square test, Independent-Samples T-test, ANOVA, konsilation interpretation were performed. P values of < 0.05 were considered to be statistically significant.

Results: 238 (45,8 %) men and 281 (54,2 %) women patient-documentation were participated in the study. 156 patients got into the ED due to heart failure. In 68 cases (43,5 %) the CT verified pulmonary embolism. Padua score indicated in 16 cases (p = 0.2), Geneva score in 29 cases (p = 0.05) and Wells score in 6 cases (p = 0.1) a high probability of pulmonary embolism, from the 68 cases, where the CT is positive for PE.

Conclusions: Our study showed that Gentli score which was calculated from the patients complaints, medical history and physical examination had the closest cor- relation with the diagnosis. Finally we can conclude that risk-evaluation is indispens- able in acute heart failure because pulmonary embolism can be in the backround as the root cause.

P2137 Acute Heart Failure and cardiogenic shock are independent predictor for in-hospital mortality in patient admitted with ST-elevation myocardial infarction
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Despite aggressive intervention, morbidity and mortality of patients with acute coronary syndrome (ACS) remain high. Various clinical condition may contribute to the outcomes during acute phase. The aim of this study was to analyze the in-hospital outcomes predictors of patients with ST-elevation MI (STEMI). We examined 1590 consecutive patients admitted with ACS in CVCU of our National Cardiovascular Center in 2015. Multivariable logistic regression was used to analyze predictors for in-hospital mortality. Among 1590 patients, 910 (67.2%) were STEMI and 680 patients were UA/NSTEMI. Most of them are male (82.4%), below 85 years old and had hypertension (59.6%). Overall in-hospital mortality for STEMI were 6.6% (60 of 910). Revascularisation with primary percutaneous intervention (Primary PCI) were performed in 521 (67.2%) of STEMI patients, with median door to device time 83 (65-106) minutes. Fifty two (5.71%) patients received fibrinolysis treatment with door to needle time 24 (18-42) minutes with successul rate of 84.6%. Those with failed fibrinolysis underwent rescue PCI. The other 14 patients underwent urgent CABG. Among patients treated with PCI, 89.3% achieved TIMI 3 flow, while 5 (0.1%) patients have no-reflow due to high grade thrombus. About 245 (26.9%) patients were not revascularized

P2135 Patient engagement improvement following implementation of a remote monitoring system
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On behalf of: The Heart Success Program

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Introduction: The rising prevalence and cost of heart failure (HF) has increased the desire to improve self-care management skills and behaviors. This program aimed to document an improvement in patient engagement and compliance through the integration and implementation of three disparate remote monitoring systems.

Purpose: High HF readmission rates reflect patient vulnerability in the 30 days prior to hospital discharge. The inability to effectively manage and influence patient behavior, and patient's inability to identify signs of worsening HF are major hurdles to improving outcomes and minimizing readmissions. This study was designed to utilize remote monitoring technologies to foster patient self-care management skills. This is a model of supported, low touch/high tech care to bridge patients to home and help keep them out of the hospital.

Methods: Patients admitted with acute decompensated HF were enrolled over a 13 month period beginning November 2015, and agreed to be monitored for 30 days post-discharge. All patients wore a wireless cutaneous telemetry sensor. Those discharged to home performed daily health check-ins using a telehealth scale, blood pressure cuff, and pulse oximeter. Questions regarding symptoms and HF education where included in these check-ins. Patients discharged to a nursing facility performed daily health check-ins using a mobile monitoring application on a tablet. Arthritis data was monitored, and study staff notified if data met specific parameters. Telehealth check-in data was sent wirelessly, and reviewed by a nurse in a web portal. Clinically significant biometrics prompted a phone call or home visit for additional assessment and intervention. Patient surveys were administered at enrollment, and upon completion of the 30 day program. ER visits and hospital readmissions were tracked.

Results: 32 patients participated in the program with a mean age of 78.5 years, 58% being 80 years old or older. Of the participants, 7 withdrew prematurely. The readmission rate of patients that did not withdraw early was 20.8%. 100% of the patients who completed the program found it helpful based on patient surveys. Post program follow up reflected patient plans to continue monitoring activities, based on improved self-confidence and learned self-care management skills. In addition, twelve program participants and caregivers became involved in an outpatient HF support group, which led to continued engagement in disease management.

Conclusions: The use of mobile monitoring tools can be an effective way of improving HF patient engagement, ownership of disease management, and deliver strengthened partnerships between patients and healthcare providers.
due to very late onset of presentation. Most of STEMI patients who failed to survive during hospitalization more likely to have diabetes, more late presentation (>9 hours), suffered from acute heart failure (40% of 38.6%) and cardiogenic shock (7.4%). After multivariable risk adjustment, AHF and cardiogenic shock remain independent predictors for in-hospital mortality (odds ratio 7.64; 95%CI 3.41-17.13 and 11.45;95%CI (3.61-23.86 respectively).

In conclusion, we observed acute heart failure and cardiogenic shock as predictors for in-hospital mortality among STEMI patients.

P2138
Impact of the potassium concentration in drug titration of heart failure patients
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Heart failure patients have multiple comorbidities which hamper the titration of drugs with proven impact on clinical outcomes. The renin angiotensin aldosterone system (RAAS) blockade is crucial in these patients, but hyperkalemia often troubles the use of recommended drugs and dosages. New potassium lowering drugs are being evaluated in order to allow the recommended titration of the RAAS blockade. We aimed to assess the possible usefulness of these new drugs in a population of heart failure patients. We reviewed the records of 196 outpatients followed in a specialized HF clinic between January 2013 and December 2014. We excluded 108 patients with left ventricular ejection fraction (LVEF) <35%. Of the 88 patients with HF-REF (LVEF<35%), median age was 65±13.8 years, 73 (82%) were male, 33 (37%) are diabetic, 51 (57%) are hypertensive, 39 (44%) have dislipidemia, 48% have chronic kidney disease and 25 (28%) have atrial fibrillation. Median LVEF was 28.5±5.2%. Median K+ was 4.7±0.44 mmol/L and 66% of the patients had the RAAS blockade titrated. 34% were not on a titrated dosage of amiodarone-converting-enzyme inhibitors (ACEI) or angiotensin II receptor blocker (ARB) and 43 (49%) patients weren’t on a titrated mineralocorticoid receptor antagonist (MRA). Of the patients without titrated ACE/ARB, 2 were hypertensive (BT >95 mmHg), 10 had K+ <5 mmol/L and 8 had GFR <60 ml/min/1.73 m2. Most of those with high K+ (n=8), were not hypertensive or had severe chronic kidney disease (CKD). 16% of the patients without titrated MRA had K+ >5 mmol/L, 4 had hypotension and 7 had severe chronic kidney disease (GFR <30 ml/min/1.73m2). Most of the patients with K+ >5 mmol/L (n=14) were not hypertensive or had severe CKD.

In this cohort, a high level of K+ was the most probably cause to the lack of titration of the RAAS system blockade. This aspect highlights the possible clinical benefit of potassium lowering drugs on heart failure patients.

P2139
Intra-aortic balloon pump and dose of amiodarone in post-operative atrial fibrillation
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Introduction: Atrial fibrillation (AF) is the most common arrhythmia in the post-operative period of cardiac surgery, with amiodarone being the most frequently used drug for its control. However, its use is widely heterogeneous, and it is unknown which factors demand higher doses in critical patients in this context. The intra-aortic balloon pump (IABP), still frequently used after cardiac surgery, is preferably ECG-triggered, and arrhythmias are potentially a cause of inferior effectiveness.

Aim: To determine if the use of intra-aortic counter pulsation influences amiodarone doses during hospital admission in critical patients with AF after cardiac surgery.

Methods: Retrospective study of patients admitted to a level III cardiothoracic intensive care unit in the post-op period after cardiac surgery, between September 2012 and February 2015, which were medicated with amiodarone because of AF. Demographic and clinical data were analysed.

Results: We included 177 patients, predominantly male (68.6%), with mean age of 67±12.5 years. The surgery involved more than one procedure in 50.3% of the cases and, in total, 49.7% had revascularization surgery (CABG), 28.2% aortic valve surgery and 25.4% mitral valve surgery. The most frequent main diagnosis of admission to the unit were arrhythmic complications (31.1%), haemodynamic complications (25.4%) and left and/or right ventricular dysfunction (20.3%), with 20.3% of the patients having the need of IABP during their stay.

The median total dose of amiodarone was 2275 mg, with a median of 102 mg per day in hospital. Patients who had IABP had significantly higher total doses of amiodarone (481 vs 1610 mg; p = 0.016) and higher doses of amiodarone per day in hospital (813 vs 87 mg; p < 0.001).

In the multivariate analysis, with age, sex, type of surgery and main diagnosis of admission, the use of IABP was independently associated with a need of an average amiodarone dose of >200 mg per day (p = 0.025). There was also a positive correlation between the total amiodarone dose and the time with IABP (r = -0.409, p = 0.025).

Conclusion: In this population of critical patients, those who required IABP also required higher doses of amiodarone, possibly due to the need of rhythm stability for mechanical optimization.

P2140
Screening for the Improve Management of heart failure with Procalcitonin (IMPACT)-study
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Background: The IMPACT-study evaluates an advantage of PCT guided antibiotic treatment over established treatment practice in patients with acute decompensated heart failure. The primary endpoint is 90-day all-cause mortality.

Purpose: To investigate the proportion of successfully screened patients and the main reasons for non-enrollment.

Methods: Patients who present to the Emergency Department (ED) with leading symptom dyspnea and suspected or known heart failure are eligible for the study. Those patients were screened in two EDs of the Universitätsmedizin, between March 2015 and December 2016. Inclusion criteria: 1. MH-proANP>300 pmol/L; BNP>350 nl/L or NT-proBNP>1800 ng/L; 2. Patient has given written informed consent within study timelines to allow antibiotic treatment within 8 hours; 3. Adult patients (i.e. >18 years of age); 4. Hospitalization for at least 1 overnight stay planned. Exclusion criteria: 1. Patient participates in any other interventional clinical trial; 2. Trauma related shortness of breath; 3. Patient diagnosed with lung or thyroid cancer; 4. Known terminal disease with life expectancy of less than 6 months, e.g. advanced metastasized cancer disease; 5. Organ transplant requiring immunosuppression; 6. Abdominal, vascular or thoracic surgery within the last 30 days; 7. End stage/advanced HF – defined by planned heart transplantation, or cardiogenic shock; 8. Female patients who have given birth within 3 months before study enrolment; 9. Current use of antibiotics or requirement of immediate antibiotic therapy before randomisation and measurement of PCT; 10. End stage renal failure requiring dialysis; 11. Patient is not willing, or it is not possible or advisable for the patient, to follow the study schedule, including antibiotic therapy and 90 days follow up; 12. Patient has already participated in the clinical trial previously; 13. Pregnant or lactating women; 14. Patients who are institutionalized by official or judicial order; 15. Dependents of the sponsor, the CRO, the study site or the investigator.

Results: Overall, 1,918 patients were screened for the IMPACT study within 22 months. Of these, 75.9% (n=143) were enrolled. The proportion of enrolled patients differed between both study centres: 8.5% of all screened patients were enrolled at the Campus Virchow Klinikum (CVK; 112 out of 1,212) and 5.1% at the Campus Charité Mitte (CCm; 31 out of 605). The main reason for non-enrollment were low values of natriuretic peptides (36% at CVK and 30% at CCm). Other reasons for non-enrollment differed only slightly between both EDs and are depicted in figure 1.

Conclusions: The IMPACT study is the first study to evaluate the concept of PCT-guided antibiotic treatment applying a randomized design in this specific setting. Despite the high number of patients with dyspnea in the investigated EDs, many patients cannot be included especially due to low natriuretic peptide values.
P2141
Lung echocardiography in the initial evaluation of acute respiratory failure using a pocket ultrasound device: what is wrong the heart or the lungs?
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Background and purpose: Acute respiratory failure (ARF) is a very common cause of illness in the emergency department, sometimes, it is difficult to elucidate its etiology. A rapid diagnosis that allows to differentiate between the cardiac or extracardiac origin is fundamental to begin an early managed treatment. The aim of this study is to evaluate the ability of lung ultrasound (pocket device) to classify patients with respiratory failure in cardiac origin (heart failure) or not.

Methods: 46 patients with ARF (dyspnea and oximetry below 90%) admitted to our emergency unit and studied at bedside with PD included. The interstitial lung water was determined by counting the B-lines according to BLUE and FALLS protocol. According to the ultrasound analysis, the patients were classified into heart failure or not. The management of patients and the final diagnosis was made according to the clinical presentation, personal history, physical examination and the rest of complementary tests.

Results: 30 of 46 patients included were women, the mean age was 62±17 years. According to findings in pulmonary ultrasound, 21 patients (45,8%) were classified as heart failure and 25 patients as non-cardiac ARF. After clinical exams and the others complementary test, 22 patients (47,82%) had a final diagnosis of heart failure. The pulmonary ultrasound classified correctly as cardiac failure at 20 patients, with 1 false positive (sensitivity of 90%). In the non-cardiac failure group, 2 false negatives were generated by the test (specificity of 95%). Although not the objective of this study, lung echography identified 3 pneumotorax, 5 consolidative pneumonies, and 3 pleural effusions in the non-cardiac group.

Conclusion: Our results are consistent with those previously reported. Lung ultrasound evaluated with a PD may represent a fast and reliable diagnostic tool in ARF. Allowing to classify the cause as cardiac or non-cardiac, and thus instituting an early managed treatment.

P2142
Acute heart failure in the elderly: which are the main precipitating causes of heart failure? Real world evidence from the ATHENA registry
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On behalf of: ATHENA study group

Background: Heart failure (HF) is very common in the elderly population, and it is characterized by frequent re-hospitalization which worsen prognosis. In clinical trials, precipitating causes leading to hospitalisations are mainly cardiovascular. In cardiological clinical registries precipitating causes are also more frequently cardiovascular, even if the percentage of hospitalisations due to non-cardiovascular causes grows significantly. On the contrary, "real world" administrative data suggest that precipitating causes may be mainly non-cardiovascular.

Purpose: to compare precipitating causes in elderly patients hospitalised for acute HF in the settings of care of most frequent management: cardiology, internal medicine and geriatrics.

Methods: data derived from the ATHENA retrospective observational study which included elderly patients (≥ 65 years) admitted with diagnosis of acute HF (worsening or de novo) to the emergency department (ED) of a tertiary University teaching-hospital and transferred to the above described settings of care in the period 01.12.2014-12.01.2015. We evaluated the main precipitating causes of HF reported in literature comparing cardiology, geriatrics and internal medicine wards.

Results: 342 patients composed the study population; 17.9% were hospitalised in cardiology, 17.3% in geriatrics and 64.9% in internal medicine. Mean age was 83.7 years, females were 54.1%. In the attached table we report the main precipitating causes of HF.

Conclusions: In geriatric and internal medicine wards the main precipitating causes are non-cardiovascular, as pneumonia and sepsis. In cardiology, cardiovascular causes, such as ACS, are prevalent. Precipitating causes seem to be a criteria for admittance to different setting of care in elderly HF patients.

P2143
Value of systolic time intervals in the diagnosis of heart failure in the emergency department patient with undifferentiated dyspnea
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On behalf of: great network

Background: The diagnosis of heart failure in the emergency department (ED) is challenging. Our objective is to determine if systolic time intervals (STI) can predict heart failure (HF) in ED patients with dyspnea.

Methods and Results: A total of 658 patients with suspected HF were prospectively enrolled. They underwent echocardiographic measurements of left ventricular ejection fraction (LVEF), B-type natriuretic peptide (BNP) testing and computerized phonoelectrocardiography to assess STI including electromechanical activation time (EMAT), left ventricular ejection time (LVEF) and their ratio (EMAT/LVEF). Diagnostic accuracy was calculated including sensitivity, specificity, likelihood ratio and receiver operating characteristic (ROC) curve. Patients with HF (n = 402) had significantly higher EMAT and lower LVET compared to no-HF patients. ROC curve analysis showed that EMAT/LVEF at a cut-off of 0.404 had significantly higher EMAT and lower LVET compared to no-HF patients.
P2144
Pulmonary edema as a manifestation of an acute mitral insufficiency in a woman in puerperium: the unthinkable cause of pulmonary edema
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Mitrail insufficiency is not a common cause of pulmonary edema during pregnancy or the puerperium. The principal etiologies are preexistent congenital heart defect, valvular conditions not previously diagnosed, pregnancy related conditions poorly understood as peripartum cardiomyopathy and finally coronary heart disease. Coronary heart disease has increased by incidence because of the reproductive techniques and the women advanced age. The Acute coronary syndrome during pregnancy and puerperum has a high mortality range from 5-37%. The principal etiology is not the same to the observed in other situations.

In previous case series it has been reported coronary artery disease (43%), thrombus (21%), normal epicardial vessels (29%), coronary artery disease (16%). Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary syndrome. The condition affects women more commonly than men, with 70% of cases occurring in young women of childbearing age. The relationship between SCAD and gestational and puerperal period varies among populations, ranging from 0 to 18%, occurring predominantly in late pregnancy or the early postpartum period. The etiology of SCAD is poorly understood, it is interrelated with other factors including connective tissue disorders, vasculitis, extreme physical and emotional stress, and cardiac stress.

The most common coronary artery affected is the left anterior descending (LAD) branch, but there is some case series where they describes RCA, left circumflex, Obtuse marginals; most of them single vessel disease.

There is not consensus in its management, some of them are managed in a conservative way and some of them with stents or CABG. We report a single case that it presented in the emergency department as an acute pulmonary edema in the puerperium with an ST inferior acute myocardial infarction. She is a pleasant 32 year old female patient who was admitted at cardiology Ward; coming from the gynecology service. She was admitted with pre-eclampsia. She was in her 4th day after Caesarean section and presented an intense chest pain, 30 min duration, severe dyspnea with some electrocardiographic changes (ST elevation in inferior leads no right-ventricular extension; these changes were intermittent). Positive troponin (2797 ng/l), Chest X-ray with interstitial edema. At that time we decided to take an echo which was informed with severe mitral insufficiency and segmentary contractility alterations (inferior Wall).

P2145
Patterns of dyspnoea onset, clinical characteristics and the outcomes in patients with acute heart failure - implications for clinical trials
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Background and purpose: Dyspnoea is the most common presenting symptom related to hospital admission for acute heart failure (HF). We investigated whether the patterns of dyspnoea onset are associated with clinical characteristics and the outcomes.

Methods: We investigated 137 patients (mean age = 65 years, 110 [80%] men) hospitalized for acute HF, whose major reported symptom was orthopaena. Patients were divided according to the time of onset of orthopaena into 3 groups: rapid (n = 39), acute (n = 72) and subacute onset (n = 28) – i.e. within 24 hours, 2-7 days and > 7 days preceding hospital admission, respectively.

Results: On admission, patients with a rapid onset of orthopaena had higher systolic blood pressure (154 ± 28 vs. 132 ± 29 vs. 121 ± 32 mmHg, P < 0.001), faster heart rate (101 [80-140] vs. 88 [75-100] vs. 90 [72-103] beats/min, P < 0.005), more moderate-severe pulmonary congestion (69 vs. 19 vs. 8 %, P < 0.05), less moderate-severe peripheral oedema (23 vs. 58 vs. 62 %, P < 0.001), ascites (4 vs. 10 vs. 28 %, P < 0.01) and lower level of serum bilirubin (0.73 [0.59-1.14] vs. 1.13 [0.82-1.72] vs. 1.27 [0.87-2.06] mg/dL, P < 0.01) (rapid vs. acute vs. subacute onset of orthopaena, respectively). There were no differences in the history chronic HF, the presence of co-morbidities, LVEF, and serum NT-proBNP levels between groups. Those with a rapid onset received lowest dose of i.v. furosemide within first 48 hours (100 [80-160] vs.120 [80-200] vs. 200 [80-240] mg, P < 0.05), and were treated more often with i.v vasodilators (65 vs. 33 vs. 36 %, P < 0.01) (rapid vs. acute vs. subacute onset of orthopaena, respectively).

Conclusions: In patients admitted with acute HF, pattern of dyspnoea onset is associated with significant differences in clinical characteristics, in-hospital response to standard treatment and the long-term outcomes. This is relevant information for planning clinical trials in acute HF.

Poster Session 4
European Journal of Heart Failure © 2017 European Society of Cardiology, 19 (Suppl. S1), 5–601
Background: Tremendous evidence has emerged over the past decades that HF is associated with inflammation. However, anti-inflammatory therapy widely lacks positive outcomes. No reports on exploration of the molecular and cellular phenotypes of myocardial inflammation (viral, viral and autoimmune, and autoimmune types of inflammation) in patients with acute decompensated chronic heart failure (ADHF) and ischemic cardiomyopathy.

The purpose of study to determine the frequency of occurrence of inflammation and the profile of cardiotropic viruses in the myocardium by immunohistochemistry.

Methods: This open-label, nonrandomized, single-center, prospective trial—NCT02649517. This trial includes ADHF patients with ischemic systolic dysfunction underwent percutaneous coronary intervention/coronary artery bypass graft with optimal results not earlier than 6 months after surgery and acute coronary syndrome. Patients receive standard treatment of ADHF according to ESC guidelines. All patients undergo invasive coronary angiography to exclude the progression of coronary heart disease as the cause of ADHF. Endomyocardial biopsy (EMB) and following immunohistochemical analysis were performed to determine type of inflammation in the myocardium. The following parameters are assessed during hospitalization: inflammatory infiltrate in the myocardium.

Results: The subanalysis of the 12 patients (8% female, 92% men, left ventricular ejection fraction 29.17 ± 9.4%) with ADHF hospitalized from January 2015 to August 2016. The average age of our patients was 61.08 ± 7.84 years. All of the patients underwent endomyocardial biopsy, which revealed signs of myocarditis in 7 (58.33%) and no myocarditis in 5 patients (41.67%). Viruses in the myocardium were determined in 9 cases (81.82%). The most common combinations were Enterovirus with Epstein-Barr virus in 4 patients (36.36%) and Enterovirus with Human herpesvirus 6 in 4 patients (36.36%). The correlation between the inflammatory infiltrate in the myocardium and Enterovirus, and Epstein-Barr virus (p < 0.05, r = 0.00, r = 0.50) respectively. At the moment, the results showed that 7 patients hospitalized for ADHF had signs of myocarditis 58.33%.

Conclusion: The results showed the frequency of occurrence of myocardial inflammation 58.33% and cardiotropic viruses 81.82% in myocardium in patients with ADHF.

CHRONIC HEART FAILURE

P2147
Cardiac coherence by breathing in heart failure patients during cardiac rehabilitation
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Background: Heart rate variability (HRV) reflects the fluctuations in heart rate (HR) from beat to beat, measured in milliseconds, HRV is a non-invasive measure of the autonomic nervous system by assessment of the balance between sympathetic and parasympathetic influences on the intrinsic rhythm. Low HRV related to autonomic dysfunction, which is frequent in chronic heart failure (CHF) patients, is associated with increased cardiac morbidity and mortality. Since the HRV can be improved by deep breathing, as demonstrated in heart coherence training. By breathing 6 times per minute, with a respiratory frequency at 0.1 Hz, heart is synchronized with breath (state of cardiac coherence), which lead to an amplified HRV curve.

Objective: To explore the relationship between heart coherence training (HCT) and cardiac coherence ratios (low, medium, high) in CHF patients, and factors associated with it.

Method: Patients with ventricular dysfunction or 45% were randomly separated in 2 groups: one into conventional cardiac rehabilitation (no HCT group) and other into cardiac rehabilitation plus HCT (HCT group) sessions consisting of daily abdominal breathing practice, 3 sessions of 5 minutes a day, during 3 weeks. Patients with atrial fibrillation, diabetes, chronic kidney failure and depression were excluded. Coherence ratios and spectral density power were measured with a biofeedback software before and after program.

Results: 18 patients were included (10 in HCT group). Baseline characteristics were similar for both. The HCT group showed a significant increase in medium or high coherence ratios (80% vs 20%, p = 0.012). Analyze of spectral density power showed an increased in high frequencies in HCT patients, which can be considered as a reflect of parasympathetic component. In HCT group, patients had a significantly lower HR (p = 0.004), lower brain natriuretic peptide > 30% (p = 0.003) and blood sodium was higher by 3 mmol/L (p = 0.011). No differences occurred with quality of life, ejection fraction, or dyspnea.

Conclusion: In CHF patients with autonomic dysfunction, cardiac coherence by breathing exercises seems to improve coherence ratios, and as a consequence, could have a positive effect on HRV amplitude.
P2150
The effects of ferrous sulfate supplementation on left ventricular intrinsic function by global longitudinal strain in systolic heart failure patient with iron deficiency anemia

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Background: Iron deficiency is common in heart failure (HF) and associated with impairment of myocardial functional parameters and dimension of the left ventricle (LV). Spectro tracking echocardiography assesses myocardial deformation and LV systolic function by measuring global longitudinal strain (GLS). But the improvement of intrinsic LV function using GLS in systolic HF patient with iron deficiency anemia (IDA) due to oral iron treatment is not yet known.

Objectives: To evaluate improvement in intrinsic LV function measured by GLS after oral Ferrous Sulfate (FS) treatment.

Methods: This is a single center, randomized controlled trial that enrolled HF (LVEF < 50%), IDA (Ferritin < 100ng/ml) or 100-300 ng/ml with Tsat <20%) and Hb <13 g/dl patients at outpatient clinic of Harapan Kita Hospital between January to November 2016. Patients were randomized 1:1 to treatment with FS or placebo for 12 weeks. Echocardiography was performed before and after treatment to measure GLS.

Results: We performed analysis of 37 patients that complete follow up period. Treatment Group (n=21) and Control Group (n=16). There was no significant improvement in GLS in treatment group compared to control group (9.17 ± 3.71 vs -8.83 ± 4.07, p = 0.876). Interobserver variability for GLS was small with mean of difference of 0.32(95% CI: -0.09, 0.75) vs 0.106).

Conclusions: There was no significant improvement in GLS after oral FS treatment in systolic HF patient with IDA.

<table>
<thead>
<tr>
<th>Comparison of GLS between groups</th>
<th>Group</th>
<th>Pre-Treatment</th>
<th>Post-Treatment</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apical 4</td>
<td>FS</td>
<td>-8.42 ± 3.82</td>
<td>-8.79 ± 4.03</td>
<td>0.588</td>
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<tr>
<td>Chamber (%)</td>
<td>Control</td>
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<td>-8.08 ± 3.81</td>
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<tr>
<td>Apcial3</td>
<td>FS/Control</td>
<td>-7.20 ± 14.03</td>
<td>-8.04 ± 14.03</td>
<td>-3.10</td>
</tr>
<tr>
<td>Chamber (%)</td>
<td>FS</td>
<td>-8.05 ± (21.72)</td>
<td>-4.00 ± (21.72)</td>
<td>-0.736</td>
</tr>
<tr>
<td>Apcial2</td>
<td>FS</td>
<td>-8.76 ± 4.70</td>
<td>-8.96 ± 4.44</td>
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<tr>
<td>Chamber (%)</td>
<td>FS</td>
<td>-8.68 ± 3.32</td>
<td>-9.1 ± 4.01</td>
<td></td>
</tr>
<tr>
<td>GLS(%)</td>
<td>FS</td>
<td>-6.19 ± 3.73</td>
<td>-9.17 ± 3.78</td>
<td>0.876</td>
</tr>
<tr>
<td>Control</td>
<td>FS</td>
<td>-8.67 ± 3.56</td>
<td>-8.83 ± 4.07</td>
<td></td>
</tr>
</tbody>
</table>

FS: Ferrous Sulfate; GLS: Global Longitudinal Strain

P2151
Body composition in heart failure and chronic obstructive pulmonary disease patients

AG Navarrete-Penalosa1; A Orea-Tejada2; D Gonzalez-Islas2; J Verdeja-Vendrell2; A Jimenez-Cepeda2; GK Perez-Cortes2; R Sanchez-Santillan2; V Palacios-Hernandez2; B Ribes-Urbina2; A Figueroa-Hernandez2; B Torres-Montiel2
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Background: Heart Failure (HF) and Chronic Obstructive Pulmonary Disease (COPD) patients present an endothelium function imbalance. This population presents a pro-catabolic metabolism which is associated with the progression disease. Both population present a high cachexia prevalence characterized by loss skeletal muscle and fat mass. Therefore, there exists a dismish in phase angle which presents a pro-catabolic metabolism which is associated with the progression disease. Both population present a high cachexia prevalence characterized by loss skeletal muscle and fat mass. Therefore, there exists a dismish in phase angle which is sub-optimal. With increasing numbers of effective self-administered treatments available, there is a need for better understanding and management of non-adherence to medication. The purpose of this systematic review was to establish which interventions are effective in enhancing medication adherence in heart failure patients.

Methods: We conducted a systematic review of randomised controlled trials (RCTs) for medication adherence in heart failure patients. This search was performed in October 2015. We included RCTs where an intervention was compared with usual care or a clearly justified comparison group and where the intervention strategy clearly had a primary or secondary aim of increasing adherence to heart failure medication. Included trials required to have enrolled patients ≥ 18 years, with a clinical diagnosis of heart failure, who did not live at home and were treated by a healthcare professional. Two independent reviewers examined the included trials.

Results: Sixty one patients (67.8%) and 39 patients (32.2%) had mild-to-moderate and severe systolic deficiency, using cutoff values of EF <30% and ≥ 30%, respectively; 22 (28.6%) had severe diastolic deficiency using a cutoff value of peak velocity of early mitral inflow/early mitral annular velocity ratio >1.5. Those who had severe systolic deficiency had significantly lower scores for attention (Digit Span Test [DST] backward, t=2.54, p = 0.013); those with a concomitant severe diastolic dysfunction had significantly lower attention (DST backward, t=2.01, p = 0.048); verbal fluency (F=3.13, p = 0.02) and executive function (Korean-Trail Making Test Part B) (t=2.38, p = 0.02), compared with those without severe diastolic dysfunction. After controlling for age and education, HF patients with a concomitant presence of systolic and severe diastolic dysfunction had poorer cognitive function in verbal fluency than those free of severe diastolic dysfunction (F=4.45, p = 0.038, partial eta 2=0.057).

Conclusions: Poor cognitive performance, particularly executive function was more substantial in HF with systolic dysfunction when diastolic dysfunction coexisted. Monitoring and surveillance of diastolic dysfunction and cognitive screening are warranted in routine clinical practice of HF management.

P2152
Association of diastolic dysfunction and cognitive function in heart failure

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Background and purpose: Poor cognitive function is a common comorbid condition in heart failure (HF) associated with progressive deterioration of cardiac function and prolonged cerebral hyperperfusion. The relevance of cardiac functional markers to the cognitive performance was focused on systolic functional markers such as ejection fraction (EF) or cardiac output, while specific diastolic functional influence on cognitive declines in HF are lacking. To examine whether systolic and concomitant diastolic dysfunction were associated with poor cognitive performance in memory, attention, and executive function among patients with HF.

Methods: Using a correlational study design, 90 persons with HF completed face-to-face interviews for neuropsychological testing for cognitive evaluation and echocardiographic evaluation for systolic and diastolic function.

Results: Poor cognitive performance, particularly executive function was more substantial in HF with systolic dysfunction when diastolic dysfunction coexisted. Memory, attention, and executive function among patients with HF.

Conclusions: Poor cognitive performance, particularly executive function was more substantial in HF with systolic dysfunction when diastolic dysfunction coexisted. Monitoring and surveillance of diastolic dysfunction and cognitive screening are warranted in routine clinical practice of HF management.

P2153
Interventions to enhance medication adherence in older heart failure patients, a systematic review

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1University of Dundee, Ageing & Health, Dundee, United Kingdom; 2University College Dublin, Dublin, Ireland; 3National University of Ireland, School of Psychology, Galway, Ireland

Funding Acknowledgements: Chief Scientist Office, Scottish Government Health Directorates

Introduction: While there is clear evidence that pharmacotherapy improves survival and reduces hospitalisation due to heart failure, medication adherence is sub-optimal. With increasing numbers of self-administered treatments available, there is a need for better understanding and management of non-adherence to medication. The purpose of this systematic review was to establish which interventions are effective in enhancing medication adherence in heart failure patients.

Methods: We conducted a systematic review of randomised controlled trials (RCTs) searching for all-language publications in electronic databases (Medline, CINAHL, Embase, Cochrane Central Register of Controlled Trials and Psychinfo) up to the end of April 2015. We included RCTs where an intervention was compared to usual care or a clearly justified comparison group and where the intervention strategy clearly had a primary or secondary aim of increasing adherence to heart failure medication. Included trials required to have enrolled patients ≥ 18 years, with a clinical diagnosis of heart failure, who did not live at home and were treated by a healthcare professional. Two independent reviewers examined the included trials.

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lists of retrieved articles extracting study characteristics and results for adherence. Methodological quality was evaluated using the Cochrane Collaboration risk of bias tool. Studies were critically reviewed and assessed for validity of their findings.

Results: From the initial 1,801 identified papers 21 trials, containing data on 4,436 patients (mean ages 65 to 85 years), were included. The median sample size was 148 patients (range 50 to 920); the median follow-up time was 9 months with 9 of the 21 (43%) trials having follow-up times of ≥6 months. Medication adherence improvement was reported in 8 of 21 trials. Of these 8 trials were categorized as intensified patient care, with these studies specifically designed to increase the contact time between participant and health care professional. Heterogeneity of interventions and outcome measures precluded meta-analysis of results.

Conclusion: While it is possible to improve medication adherence in heart failure patients, the current literature does not allow reliable conclusions to be drawn as to the best intervention. Heterogeneity in both intervention techniques and measurement methodology leave us unable to identify reliable and efficacious intervention approaches. Future studies should aim to build on the methodologically stronger studies so that a cumulative set of findings can emerge.

P2154 Patients in NYHA III report substantial limitation to routine daily activities which may not be related to heart failure

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Background: Left ventricular assist devices (LVADs) are effective in improving survival and patient-reported outcomes in refractory heart failure (HF). Although LVAD implantation is not currently indicated in patients labeled as NYHA Class III, this physician designation may not always capture patient-reported limitations in specific activities. Furthermore, these activities may be limited by conditions other than HF. This study aimed to analyze how often patients labeled as NYHA Class III describe limitations to routine daily activities, and to determine how often these patients ascribe the major limitation of their quality of life (QOL) to HF or to combination with other medical conditions.

Methods: During routine HF clinic visits, ambulatory ppts completed questionnaires including a graded scale for self-perceived limitations to daily activities, QOL on a 5-point Likert scale, and LA size. These data were obtained from 268 patients (age range 40-90 years, mean age 75 yrs). Results: Patient symptoms were described by physicians as NYHA Class III in 162 patients. Patients who rated HF as a dominant limitation to QOL (n=97) had similar QOL (46±25 vs. 51±29, p=0.138) to the ones who rated limitation as due equally to HF and other medical condition (n=40), and the ones whose major limitation was not HF (n=25; QOL=57±8). Limitation was described for bathing by 50.3% of patients and 60.9% for dressing. There was no difference of daily activities’ limitations between groups.

Conclusion: Patients in NYHA III have substantial limitations to daily activities and to QOL. When these limitations are due to HF, it may be reasonable to consider advanced therapies. However, it is important to identify those patients with HF that have other conditions limiting their daily activity, which would not improve with HF advanced therapies.

P2155 Predictors of 6- and 12-month mortality in chronic heart failure

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Background: Despite good knowledge about predictors of long-term mortality in chronic heart failure (CHF) the comparable value of them in dependence of patients follow-up duration is still non-well investigated.

Aim: The purpose of study was to identify the predictors of 6- and 12-month mortality in CHF.

Methods: 95 clinical, echocardiographic and laboratory variables in 267 CHF patients with left ventricular ejection fraction LVEF < 40 % were analyzed. Predictors of 6- and 12-month mortality were determined in stepwise multiple logistic regression model.

Results: Table 1.

Predictors of 6- and 12-month mortality

<table>
<thead>
<tr>
<th>Predictor</th>
<th>6 month OR</th>
<th>12 month OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>UA&gt;450μmol/l</td>
<td>7.86</td>
<td>8.48</td>
</tr>
<tr>
<td>HOMA&gt;2,65</td>
<td>6.18</td>
<td>7.9</td>
</tr>
<tr>
<td>Blood lymphocyte &lt; 21%</td>
<td>5.15</td>
<td>5.4</td>
</tr>
<tr>
<td>LVEF &lt; 35%</td>
<td>3.4</td>
<td>3.59</td>
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<tr>
<td>BMI = &lt; 22kg/m²</td>
<td>3.33</td>
<td>3.125</td>
</tr>
<tr>
<td>LVEDVI</td>
<td>3.23</td>
<td>2.69</td>
</tr>
<tr>
<td>6 min walk distance &lt; 360m</td>
<td>2.66</td>
<td>2.43</td>
</tr>
<tr>
<td>LA &lt;40mm</td>
<td>2.18</td>
<td></td>
</tr>
</tbody>
</table>

* Only significant predictors are included (p < 0.05). UA - uric acid; BMI - body mass index; LVEDVI - left ventricular and diastolic volume index; HR - heart rate; SAP - systolic arterial pressure; LA - left atria size; LVEF - left ventricular ejection fraction.

P2156 The role of hibernation in potential recovery of ischemic myocardium in chronic heart failure as a manifestation of coronary artery disease

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Background: The aim of this study was to investigate the morphologic characteristics of the hibernating human myocardium and to correlate its with the cumulative score index (HOMA index is an important predictor of CHF patients as 6 and 12 months. The hemodynamic abnormalities predictors (low LVEF, high LVEDVI) are valuable only in relation to 6-month mortality prognosis. The predictive value of elevated plasma UA and level blood lymphocyte < 21% is the more important to 6-months mortality; according to follow-up duration, the predictive value of low BMI, HR > 75 beats p.m. and LA size > 49 mm, are increased.

Predictors of 6- and 12-month mortality

<table>
<thead>
<tr>
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<th>12 month OR</th>
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<td>3.59</td>
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* Only significant predictors are included (p < 0.05). UA - uric acid; BMI - body mass index; LVEDVI - left ventricular and diastolic volume index; HR - heart rate; SAP - systolic arterial pressure; LA - left atria size; LVEF - left ventricular ejection fraction.
P2157
Metabolic treatment elderly patients with congestive heart failure with preserved systolic function and non-severe aortic stenosis
OV Olena Soya1; OV Kuryatov1
1Dnipropetrovsk State Medical Academy, Dnipropetrovsk, Ukraine

Background: Calcium aortic stenosis (AS) is the most common valvular abnormality in the geriatric age group. Like the AS, the prevalence of congestive heart failure (CHF) with preserved systolic function increases with age. Meldonium is cardio-protective drug with anti-ischemic and stress-protective effects in treating various cardio-vascular diseases and other pathologies. The aim of this study was to assess effect of meldonium treatment on cardiovascular function and exercise capacity in elderly patients with non severe AS and CHF with preserved systolic function.

Methods: In study were included 112 patients (male 61, female 51, age 79.8±5.5) with non critical AS (mean gradient 31.1±5.5 mmHg) and with CHF of heart (HFr). CHF diagnosis was based on: dyspnea on mild exercise, NYHA class ≥ II, typical ECG changes and LV systolic dysfunction. All patients had left ventricular ejection fraction>45%. Patients were divided in two groups: in 1-st group – 58 patients got a standard combined CHF therapy, in 2-nd group – 54 patients got standard CHF therapy in combination with meldonium 1,0 g daily. Plasma level of insulin was measured before and after 4 months treatment with meldonium or placebo.

RESULTS: There were no differences in baseline characteristics including hemodynamic parameters between 2 groups. After 4 months the elderly patients with AS and meldonium treatment demonstrated improved CHF functional class (50.1% vs 27.3%, p < 0.013) and exercise capacity by 6 minute walk test (39.3% vs 24.7%, p < 0.001) compared with standard therapy group. Patients receiving placebo demonstrated increasing insulin level (263±31 pmol/l vs 381±49 pmol/l, p < 0.01). In contrast, in patients receiving meldonium, plasma level of insulin did not change.

Conclusion: Metabolic treatment with meldonium could have positive effect on cardiohemodynamic and exercise capacity in elderly patients with non severe aortic stenosis and CHF with preserved systolic function. Besides, meldonium prevents increasing plasma insulin level which could be significant negative prognostic marker.

P2158
Rheumatoid arthritis and congestive heart failure
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Introduction: It is widely accepted that Congestive Heart Failure (CHF) and Rheumatoid Arthritis (RA) are associated. There are studies that have examined the importance of RF and the anti – TNF treatment in the development of CHF in RA. Purpose: Our purpose was to examine Greek women with RA and CHF and determine whether RF(+) women were at greater risk of developing CHF than those who were RF(-) independently of the presence of other cardiovascular risk factors.

Methods: We studied two groups of women with RA. Group A included 22 women from 55 to 74 years old, non-smokers, suffering from hypertension and dyslipidemia, who were RF positive and anti-ccp positive, receiving DMARDs treatment per os. Group B included 21 women, with similar age (55-75 years old) and history of CV risks, who were anti-ccp(-) and RF seronegative and were receiving similar to group A DMARDs treatment. All of the women were submitted to CMR (cardiovascular magnetic resonance).

Results: The results have shown that 17 women from group A suffered from stage A to stage D CHF whereas only 5 group B women had CHF compatible CMR imaging. Having ruled out the possible role of anti TNF treatment in CHF development (some women had partly received anti-CD 20 and abatacept, adalimumab, anakinra and golimumab treatment when none of them received etanercept), the difference of the women who were RF positive and anti-ccp positive, receiving DMARDs treatment per os.

Conclusions: Our exploratory results suggested that rs 2274273 T allele and LGALS-3 mRNA expression could bear the risk for more severe post MI LVF and HF develop- ment. Further replication and validation in a larger group of patients is inevitable.

P2160
The relationship between blood pressure, heart rate and clinical status in patients with chronic heart failure with reduced left ventricular ejection fraction
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Introduction: The effects of increased heart rate (HR) and blood pressure (BP) on cardiovascular mortality have been thoroughly studied for many years. The impact of BP on clinical status and prognosis of patients with CHF still needs further inves-tigation.

Purpose: The aim of the study was to assess the relationship between BP as well as HR and clinical status including: major adverse cardiac events (MACES), left ventricular ejection fraction (LVEF), brain natriuretic peptide (BNP) and six-minute walk test (6MWT) distance in stable patients with CHF.

Methods: There were 80 patients: 73 (91%) men and 7 (9%) women (mean age: 59 ± 12 years) with stable CHF and mean NYHA class 2, 15 ± 0,57, with reduced LVEF recruited for the study. Coronary artery disease (CAD) was the main CHF cause. The majority of patients were nondiabetic (n = 58, 70%). At patients underwent follow-up examinations: medical history, physical examination, electrocardiography, laboratory tests including BNP, 12-lead electrocardiogram, echocardiogram, six-minute walk test (6MWT). We obtained: BP, systolic and diastolic (SBP, DBP) and HR as determined in 24-hours ECG and blood pressure monitoring (50% of patients) or telemetry monitoring and BP measurements 5 times a day (in the rest of the group). All patients were treated according to ESC guidelines. Most of them received β-blockers (n = 71, 89%). The median follow-up period was 6 months. MACES were defined as: death of all causes, cardiovascular death, hospitalization due to the heart failure exacerbation.

Results: There was sinus rhythm in the majority of patients (65%) while atrial fibrillation was found in 16 (21%) patients. The LVEF <35% (mean 23 ± 6%) was confirmed in all patients as well as elevated BNP level (742 ± 701 pg/ml). Median 6MWT distance was 351 ± 110 m. Median heart rate was 75 ± 13.41/min. Median BNP was 114 ± 14 nmol/l and a mean EF was 59.78 ± 9.65%. The percentage of patients with heart failure exacerbation was 13% at 3 months and 24% at 6-month follow-up. The mortality rate was 4% at 3 months and 6% at 6-month follow-up. We found positive correlation between SBP and LVEF (R=0.54, P = 0.0002), 6MWT distance (R = 0.33, P = 0.0565) and negative between SBP and BNP (R = -0.03, P = 0.068). We also revealed positive correlation between DBP and EF (R = 0.16, P = 0.0183). Although there was no relationship between HR and EF, BNP 6MWT, we confirmed negative correlation between HR and LVEF (R = -0.35, P = 0.008) in the subgroup of patients with atrial fibrillation. After 3-month but not 6-month follow up there was a significant correlation between DBP and all-cause mortality (R = 0.54) as well as CHF decompensation (P = 0.0004) in the whole group. We have not found any significant relationship between HR or SBP and MACES.

Conclusions: Blood pressure is strongly associated with clinical status of patients suffering from CHF. Moreover, DBP may be helpful in prediction of heart failure exacer-bations in stable patients with CHF with reduced ejection fraction in short-term observation.

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aspartate (AsT) and alanine transaminase (ALT), total bilirubin (TB), and albumin plasma concentration. After initial investigation all patients are divided on two: (with liver abnormalities, n28; 43,7±1 yrs) and II (without hepatitis, n41, 41,9 yrs) groups.

**Results:** Apparently, the prevalence of liver dysfunction characterized by increasing of TB and/or transaminases levels was 37,2% and at 6 (5,8%) from them had cirrhosis signs. The most typical markers of hepatic damage at our patients were hyperbilirubinaemia, registered at 25 (89%) pts of 1 gr. At the same time, increase of transaminase was less expressed (at 18 pts). It is noticed, that at I gr patients decreasing of plasma albumin (3,30±0,12)g/l vs 3,80±0,15g/l and total cholesterol (allocated as adverse predictor at CHF patients) levels was more expressed (123,95±7,49/ml vs 147,36±8,69/ml, both p0.05). Comparative analysis of diseases severity showed that differences of NYHA class was non significant, but I gr pts characterized by reduction of distance by 6 minute walking test on 16.3% (168.7±9.3m vs 202±10.2m accordingly, p0.04).

**Conclusion:** The 37.2% pts with various etiology CHF had signs of hepatic dysfunction, including cirrhosis. It is noticed, that the hyperbilirubinemia is frequent display of hepatopathy. Increasing of liver markers associated by hypalbuminemia, hypocholesterolemia and physical tolerance worsening.

**P2163**
Cardiac resynchronization therapy in heart failure patients
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**Background:** Patients with symptomatic heart failure and severe depression of left ventricle ejection fraction despite optimal medical treatment can benefit from cardiac resynchronization. However, the increase use of implantable cardiac electronic devices was associated with an increase in complications and mortality.

**Purpose:** Our goal was to determinate the rate and the predictors of complications in patients with cardiac resynchronization therapy (CRT) in a real-world study.

**Methods:** Patients who received CRT-D/P between January 2009 and December 2013 were included in the study. We identified all complications during the follow-up. Appropriate statistical tests were applied to identify the rate and the predictors of complications. We are particularly interested with the subgroup of patients with cardiac resynchronization therapy.

**Results:** 64 complications in 53 patients were noted over the period of the study, in fact 11.5% of patients receiving an implantable cardiac device (n=462) experienced with higher rates (9 cases, 34%) compared to other implanted patients (13%). Infectious complications were registered in 11.5% of patients with CRT versus 1.37 % in patients with non CRT devices (p=0.03). Independent risk factor of infections were heart failure (OR= 9) and diabetes (OR=4). Only one patient (3.8%) presented with left ventricle’s lead dislodgement. The same patient had coronary artery dissection and then failure of resynchronization. Neither pocket hematoma nor complication linked to route access was noted in CRT patients over the study period. Mortality linked to complications of cardiac stimulation reached 13.2% especially with infectious outcomes (p=0.04). However heart failure (p=0.25) and resynchronization therapy (p=0.35) were not directly associated to mortality due to complications.

**Conclusion:** Patients receiving cardiac resynchronization devices are subject to experience higher rates of complications compared to other types of implantable cardiac devices. Heart failure is an independent risk factor of complications. Comorbidities especially diabetes are an additional risk factor. Nevertheless, centers with low volume of implantation have particularly a high complication rate.

**P2164**
Myopathy and iron deficiency in chronic heart failure: dynamic 31P MR spectroscopy study of the skeletal muscle
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**Introduction:** The effect of sideropenia on myopathy due to chronic heart failure (CHF) is unclear.

**Purpose:** determine whether CHF leads to disruption of energetic metabolism of skeletal muscle, whether the abnormalities are affected by presence of sideropenia and whether these abnormalities disappear after correction by intravenous administration of ferric-carboxymaltose (FCM).

**Methods:** 25 healthy volunteers (49 ±15y, 28 ±4kg/m2, 70%) and 44 CHF patients (56 ±16y, BMI 27 ±4kg/m2, 75% men) underwent blood sampling and 31P MR spectroscopy of gastrocnemius muscle at rest and during exercise. In 13 sideropenic patients examination was repeated 1 month after administration of FCM.

**Results:** CHF was associated with reduction of high-energy phosphates content, acidosis and slower recovery of PCr after exercise, corresponding to CHF myopathy (table). The factors with highest impact on PCr-tau in CHF were: age, diabetes and male sex. Iron deficient HF patients had lower peak muscle strength, significant decrease of PCr during exercise and trend toward slower PCr recovery.

**Conclusion:** The administration of FCM led to a correction of sideropenia, improved functional capacity and muscle strength, but did not influence on energy metabolism in skeletal muscle, or redistribution of iron into skeletal muscle requires a longer period than 1 month.
P2165
Assessment of causes of increased myocardial fibrosis, left ventricular dysfunction and poor prognosis after valve replacement for acquired heart disease
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Background: Despite technically successful operations postoperative complications as heart failure, sudden death are still observed. Dynamic contrast-enhanced MRI with gadolinium-based contrast and 2D speckle tracking echocardiography (Echo) can be reliable tools for evaluating fibrosis, LV dysfunction and possible poor prognosis after valve replacement.

Aim: Assessment of reasons for increased or maintained myocardial fibrosis, left ventricular dysfunction and poor prognosis after valve replacement based on the dynamic contrast-enhanced MRI with gadolinium-based contrast and 2D speckle tracking echocardiography.

Methods: 144 (99 men, 45 women; age 47 ± 15) patients with aortic and mitral valve disease were included. In all cases 2D speckle tracking Echo was performed. 28 patients also underwent pre- and post-op MRI with gadolinium. Prognostic groups were considered - D-no complications, 1-arrhythmia, 2-heart failure, 3-death. MRI fibrosis was scored according to: A-none, B-moderate, C-severe. The global longitudinal, circumferential strain (LSt, CSt), strain rate (SR), rotation rate and torsion were obtained with Echo. Statistical analyses were done. Remodeling was considered as positive with reduced volume, increased ejection fraction, as negative with increased volume, decreased ejection fraction.

Results: The prognostic factors of high risk of heart failure: increased left ventricular systolic volumes Index before surgery (IVS - 45 ml/m²; AUC=0.84 ± 0.06), diminished basal septum motion (LSR 14 ± 0.1), decreased apex rotation ratio (37.2 ± 0.88 ± 0.1), diminished circular function of LV basal part (CStav= –14 %, AUC=0.8 ± 0.1).

Reverse remodeling was observed in 26% of pts. with moderate fibrosis. It was positive, but with persisted moderate-severe fibrosis in 62%, and negative with increased Cgosis in 12%. In persistent fibrosis LV LVEF fell from 45 ml/m² to 34 ± 15 (p=0.001). With fibrosis increasing residual LV volume was higher (43 ± 8), despite its reduction from the initial (p=0.001). LV LSt, CSt did not improve in persistent or increased fibrosis occurrence. Focal fibrosis was the most discernable at the junction of the septum with LV and RV free walls.

Conclusion: Initial irreversible stretching LV is the main cause of incomplete remodeling and the heart failure in the postoperative period. Pointed values, shown incomplete reverse remodeling, fibrosis and preservation of the heart failure after surgery were: ISV-45 ml/m², LVEDV -99.9 ± 9 ml/m², LST-La –26.1%. Initial ISV≥ 59 ± 9 ml/m² was the reason for the increase of fibrosis in the postoperative period. Initial LVEF ≥ 45.3 ml/m² was, 14.9 was the cause of persistent myocardial fibrosis. The valve-ventricular approach may be needed to counteract.

P2166
Predictors of left ventricular function recovery in patients followed in a heart failure clinic
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Background: Chronic Heart Failure (HF) remains a major worldwide problem with high prevalence and incidence. It is the end stage of many diseases. The recovery of left ventricular systolic function (LVSF) is important for the prognosis of these patients (pts), with relevance in the morbidity and mortality associated with HF.

Purpose: To evaluate the factors with impact on the recovery of LVSF (rLVSF) in pts with chronic HF and reduced ejection fraction (EF).

Methods: Retrospective study where including pts followed in a HF clinic (HFC) from a single center. The pts had reduced ejection fraction and were admitted in the HFC with a previous diagnosis of HF for at least 6 months. Pts with follow-up (FU) of less than 12 months were excluded. The rLVSF was measured by echocardiography and defined as an increase of ≥10% with respect to the initial value. The pts were divided into 2 groups: rLVSF (SI) and not rLVSF (G2). The groups were compared as to their clinical and echocardiographic characteristics and occurrence of hospitalization for HF (HFC), hospitalization for acute coronary syndrome, cardiovascular mortality and non-cardiovascular mortality. To analyze the relationship of the qualitative variables we used Fisher’s exact test, while the Student t test was used to analyze the influence of the quantitative variables. It also appealed to the Cox regression model for multivariate adjustment (EPIS 22.5).

Results: Included 290 pts, mean age 60.6 ± 13.3 years. 75.1% were male. 41% had ischemic etiology, 34.1% permanent AF and 63.8% severe depression of LVSF. The mean initial EF was 29.2 ± 10.8%. Mean FU time was 39 months ± 18.5 months. 86 pts (29.7%) presented rLVSF (EF Initial 25.3 ± 10.8% vs current EF 44.7 ± 12.5%). There were no significant differences in the composition of the two groups. In the univariate analysis, rLVSF was more common in patients with non-ischemic etiology (p = 0.057), lower sinus rhythm (p = 0.023), lower left ventricular end-diastolic diameter index (LVEDDI) at the end of the follow-up (50-44mm/m² vs 34.4mm/m², p<0.001), lower prevalence of chronic kidney disease (defined as glomerular filtration rate ≤ 60mL/min1.73m², < p=0.001), less HFP (p = 0.058), lower functional class (≤ 2, p = 0.004), higher percentage of patients receiving angiotensin converting enzyme inhibitors / angiotensin receptor blockers (ACEi/ARB, 94.2% vs 85.3%, p = 0.034) and less with diuretics (84.0% vs 76.5%, p = 0.024). When used logistic regression, the non-ischemic etiology (p = 0.011), LVEDDI (p < 0.001), HFP number (p = 0.047) and ACEi/ARB therapy (p = 0.035) were significantly associated with rLVSF.

Conclusion: In this study, the non-ischemic etiology, lower LVEDDI, less HFP and ACEi / ARB therapy were predictors of rLVSF.
P2170

Utilization of evidence based therapies in patients hospitalized for worsening heart failure

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Background: In real world setting, the rate of use of evidence based heart failure therapies (EBHFT) is lower than guidelines recommendations, suggesting the unmet need of further improving of medical education.

Aim: To evaluate the pattern of in-hospital use of EBHFT in patients hospitalized for worsening HF (WHF).

Methods: Romanian National Observational Study of In-Hospital Heart Failure (SONIC-RO) enrolled 1222 consecutive patients, over one month period, admitted with a primary diagnosis of WHF, from 41 hospitals in Romania, representative for the Romanian cardiological network. The rate of prescription and the doses of EBHFT (beta blockers [BB], ACE inhibitors/sartans and aldosterone antagonists [A/A]) were collected at admission and discharge. A multivariate logistic regression model was developed to identify baseline clinical variables predictive for the utilisation of EBHFT.

Results: The proportions of BB, ACEi/sartans and AA prescription on admission were 63%, 51%, and 43%, respectively; only 18% were prescribed all 3 medications. At discharge proportions were 74%, 57%, and 54%, respectively, and only 26% of patients had been prescribed all three classes. We identified the following variables that influence the rate of prescription for these medications – for BB use: age (HR 1.21, CI 1.14-1.33), admission in a community hospital rather than an academic one (HR 1.24, 95% CI 1.09-1.30), the presence of chronic obstructive pulmonary disease (HR = 1.32, 95% CI 1.14-1.53), and NYHA IV functional class (HR = 1.44, 95% CI 1.16-1.80); for ACEi/sartans use: age (HR = 1.32, 95% CI 1.05-1.64); NYHA IV functional class (HR = 1.24, 95% CI 1.09-1.30), chronic kidney disease (HR = 1.65, 95% CI 1.41-1.82), and systolic blood pressure < 100mmHg (HR = 2.21, 95% CI 1.94-2.53); and for AA use: chronic kidney disease (HR = 1.35, 95% CI 1.21-1.56), and systolic blood pressure < 100mmHg (HR = 1.52, 95% CI 1.34-1.73).

Conclusion: In present study, patients with higher cardiovascular risk at admission are less likely to receive optimal EBHFT. Distinct to clinical severity, non-academic clinical setting seems to influence in-hospital utilization of EBHFT, which should be considered for future educational programs.

P2169

Increasing the efficiency of treatment of patients with chronic heart failure through the changes of control systems of patients.

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Introduction: It was proved that treatment of chronic heart failure (CHF) is less effective on the ambulatory period; therefore, it is important to consider some methods to make ambulatory treatment more effective. Purpose: To compare the treatment efficiency of CHF patients with specialized center of CHF treatment and in real clinical practice.

Methods: Patients, after being discharged from hospital for acute decompensated heart failure (ADHF) were under observation in a specialized center of CHF treatment (group 1), n=244) in period of 8 months and patients (group 2, n=243) under observation in conditions of real clinical practice. Hemodynamic parameters, frequency of recommended treatment use and outcomes (total and cardiovascular death) were identified in both groups. In specialized center, the nurse made structured calls to patients from group 2 one time every month.

Results: Mean age of patients was 70.1±10.4 years in group 1 and 72.5±11.8 in group 2 (p=0.006). Quantity of patients according to NYHA classification was compared in both groups: 15.4% and 7.1% in first class, 30.2% and 39.3% in second, 41.6% and 46.4% in third, 12.8% and 7.2% in fourth for group 1 and group 2 respectively. Results, depending of ejection fraction (EF) were comparable: 68.6% and 68.6% of patients had conserved EF, 18.5% and 21.6% with mid-range EF, 12.3% and 9.8% with reduced EF in group 1 and 2 respectively. Hemodynamic parameters (systolic blood pressure, diastolic blood pressure, heart rate) were similar. After 8 months, administration frequency of Renin Angiotensin Aldosterone system blockers, Beta Blockers and Mineralocorticoid Receptor Antagonist in group 1 increased from 84.3% to 93.8% (p<0.001), from 78.6% to 87.4% (p<0.001) and from 63.1% to 70.3% (p<0.001) of patients respectively. In group 2, there was a decrease from 86.4% to 50.5% (p<0.001), from 79.6% to 54.9% (p<0.001), and from 64.5% to 24.1% (p<0.001). After 8 months, 70.5% of patients continue to use loop diuretics in group 1 (p<0.001), in group 2 only 38.5% (p<0.001). Total mortality during 8 months was 1.9% and 13.9% in group 1 and 2 respectively (HR=8.5 CI 95% 2.7-26.6, p<0.001). In group 1, causes of cardiovascular mortality were ADHF, sudden cardiac death and pulmonary embolism (PE). In group 2, ADHF was in 58.3% of cases, PE in 16.7%, stroke in 16.7% and myocardial infarction in 8.3% of cases.

Conclusion: during the period of observation, the recommended treatment was less used among patients under observation in conditions of real clinical practice comparing with patients under observation in specialized center of CHF. After ADHF patients are having bad prognosis, that's why, in Russian Federation, there is a big need in changing the strategy of treatment and observation of patients with CHF and developing of a specialized health care system.
this chronic disease remains a challenge in the area of prognosis stratification. In this context, renal function and B-natriuretic peptide (BNP) remain predictors of much interest. Purpose: To evaluate the role of renal function, through glomerular filtration rate (GFR) and BNP on the 10y ACS mortality of coronary patients with heart failure.

Methods: from May 2006 to March 2009, 1,050 consecutive patients who were hos- pitalized at a Cardiologic Clinic in Athens with ACS diagnosis were enrolled in the study. In 2016, the 10y follow-up (2006-2016) was performed in 745 participants. GFR was evaluated through the MDRD formula. Heart failure phenotype was defined according to baseline ejection fraction (EF): heart failure with reduced EF (i.e. <40%) (HFREF), preserved EF (≥40%) (HFpEF), and mid range EF (i.e. 40-49%) (HFmrEF). Results: 632 (84.6%) patients were alive at the 10y follow up. BNP levels were highlighted as an important predictor in long term performance of left ventricle for whom further investigation is highly demanded. In multivariate logistic regression analysis, GFR remained an independent predictor for the incidence of ACS death within the decade, after adjusting for potential confounders (OR=0.98 95%CI (0.97, 1.00), p<0.04). Additionally, since BNP levels were strongly associated with both the primary outcome and the GFR (p<0.001 from Spearman's correlation test), BNP was forced included in the multivariable model as a covariate with possible mediating effect. After adjusting for baseline BNP, GFR lost its significance whilst BNP levels (expressed per 2 fold increase) independently predicted ACS mortality (OR=1.39 95%CI (1.15, 1.67), p<0.001). What is more a significant interaction was observed between EF and BNP levels on the tested outcome (p for interaction < 0.001). In stratified analysis the aforementioned significant predictive value of BNP remained only in HFREF (OR=1.43 95%CI (1.01, 2.03), p=0.05) and in HFpEF (OR=1.80 95%CI (1.15, 2.82), p<0.01).

Conclusion: BNP values were highlighted as a significant independent predictor in long term prognosis of coronary patients with heart failure, namely those with better performance of left ventricle for whom further investigation is highly demanded.

P2172
Red cell distribution width change during hospitalisation and 1-year mortality in chronic heart failure
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Background: Red cell distribution width (RDW) is considered to be one of the novel predictors of adverse events in chronic heart failure (CHF) patients. However, the role and significance of RDW change during hospital stay has not been completely identified.

Purpose: To evaluate the influence of in-hospital RDW change on 1-year mortality in CHF patients.

Methods: Our study included 351 consecutive hospitalised CHF patients (46% male, mean age 72 ± 11 years old, mean left ventricular ejection fraction (LVEF) 53 ± 14%, 24% anemic). RDW measurements were obtained at least twice during hospitalisation: within 24 hours of admission and on discharge, respectively. The association between in-hospital RDW change and 1-year total mortality was tested with ROC-curve analysis and logistic regression, with further adjustment for possible confounders (routine clinical, laboratory and instrumental findings). If no cut-off value was established in the ROC-curve analysis, RDW change of > or < 1% was considered to be significant. Correlation was estimated with the use of Spearman’s rank correlation coefficient (rho).

Results: On admission 118 (34%) patients had NYHA class II heart failure, 115 (35%) – class III and 58 (16%) – class IV disease. Association between in-hospital RDW change and 1-year total mortality was not found to be significant both in ROC-curve and linear trend analysis (p=0.364). An increase in RDW was noted in 92 (26%) patients and conferred a higher risk of the negative outcome (odds ratio (OR) 2.07, 95% confidence interval (CI) 1.02-4.2, p=0.046) compared to 185 (53%) patients with insignificant RDW change. This increased risk lost statistical significance after adjustment for other risk predictors (OR 3.56, 95% CI 0.80-5.97, p=0.097), among which the measures of kidney function and echocardiographic parameters reflect left and right ventricular function were the most potent. No correlation was found between changes in RDW and hemoglobin (rho=0.039, p=0.206) or MCH (rho=0.029, p=0.690) values. However, weak positive association was present between changes in RDW and MCV readings during hospitalisation (rho=0.177, p≈0.015).

Conclusion: RDW increase during hospitalisation in CHF patients is a weak predictor of 1-year mortality in comparison to other risk factors.

P2173
Left ventricular dysfunction and cardiac outcomes one year after successful percutaneous coronary intervention in patients with acute ST elevation myocardial infarction
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Background: Preferred treatment for patients with ST-segment elevation acute myocardial infarction (STEMI) is primary percutaneous coronary intervention (PCI). However, some patients after successful PCI have suffered several attacks due to heart failure.

Purpose: We investigated predictors related to left ventricular (LV) dysfunction at follow-up echocardiography within one year and the association between LV dysfunction and one-year major adverse cardiac events (MACE) (composites of all cause of death, non-fatal myocardial infarction, and revascularization) in patients who underwent primary PCI successfully in diagnosis of STEMI.

Methods: A prospective cohort of 1738 consecutive patients who were successfully received primary PCI following a diagnosis of STEMI between January 2008 and March 2012, and underwent follow-up echocardiography from 30-days to one year was analyzed from Korea Working Group on Myocardial Infarction (KorMI) registry. Results: Among 1734, 243 (14%) patients had LV dysfunction (LV ejection fraction (EF) ≤40%) at follow-up echocardiography. In multivariable analysis, independent predictors of LV dysfunction at follow-up were LV dysfunction at index admission, renal insufficiency (creatinine ≥ 1.4mg/dL), peak creatine kinase (CK), and peak CKMB. Independent predictors for the deterioration of LVEF at follow-up (absolute 5% decrease) less than LVEF at index admission) were dyslipidemia, LVEF at index admission, peak CK, and peak troponin I, whereas independent predictors for the improvement of LVEF at follow-up (absolute 5% increase more than LVEF at index admission) were the male, no history of coronary artery disease, pre-TIMI flow, LVEF at index admission, peak CKMB, and peak troponin I. One-year major adverse cardiac events (MACEs) were significantly increased in patients with LV dysfunction at follow-up on Cox-regression analysis (Figure).

Conclusions: Persistent LV dysfunction after successful primary PCI was related with poor clinical outcomes at one-year clinical follow-up. We should evaluate post-infarction patients more meticulously for selection of the possibility of persistent LV dysfunction and to facilitate more appropriate treatment.

P2174
Heart failure with mid-range ejection fraction: clinical profile and mid-term outcome.
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Background: The ESC Heart Failure (HF) Guidelines of 2016 introduce the term HF with mid-range ejection fraction (HFmrEF) as a separate group with characteristics between HF with reduced and preserved ejection fraction. This is a population that probably has primarily mild systolic dysfunction, but with features of diastolic dysfunction. We conducted this study in order to know the the clinical characteristics and mid-term outcome of this population.

Methods: We studied all the patients with HFmrEF at follow-up in the HF Unit of our Hospital in the years 2010-2014, recording their clinical characteristics,
comorbidities and adverse events during follow-up (mortality, functional class wors-
ening, HF hospitalization, coronary acute syndrome and arrhythmias).

Results: Of the 114 patients (58 years, 41% female), 56 (50%) had ischemic epi-
tophy, 18 (15.8%) had diastolic dysfunction and 17 (14.9%) had valvular disease. In this series, 78 patients had left ventricular dysfunction, 81 (71.1%) had high blood pressure, 52 (45.6%) had diabetes, 63 (55.3%) had dyslipidemia, 25 (21.9%) had smoking habits, being the mean BMI 28.1 ± 4.8 kg/m². Analyzing the comor-
dobutamine infusion in 25 (21.9%) and 12 (10.2%) had protein malnutrition. In the mean Charlson Score was 7.5 ± 2.4. In the echocardiogram, 29 (25.4%) had dilated left ventricle, 34 (29.8%) left ventricular hypertrophy, 46 (39.8%) dilated left atrium and 22 (19.3%) had aortic stenosis.

Conclusions: The most frequent etiology in HFmrEF was ischemic heart disease. 2. There is a high prevalence of comorbidities in this population. 3. Echocardiogram showed signs of systolic and diastolic dysfunction. In our series this group had a high percentage of adverse events in the follow-up.

P2175
Precipitants of ADHF in era of disease management programs

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Background/Introduction: Disease Management Programs (DMP) have been shown to improve prognosis in heart failure with significant reduction in hospi-
talizations. Insight into how to further improve this intervention will be helped by understanding the precipitants of admission in patients enrolled on these programs. To date analysis of precipitants have been confined to general population. The aim of the study was to identify the precipitants of hospitalization in patients enrolled on a DMP a clinical audit of patients presenting for first time as Denovo diagnosed, who have not yet been enrolled on a DMP.

Methods: In an ongoing study we are prospectively enrolling patients admitted with ADHF to our unit. Patients are classified as being enrolled on a DMP or Denovo Heart Failure determined by history. Possible precipitants of decompensation are defined as follows; Infection, Arrhythmia (documented on ECG & clinically felt to be contributing) Ischemia/presence of suggestive symptoms & significant new ECG changes , with or without typical pattern of troponin release , Medication Alter-
ation (in dulation) , Medication Adherence (assessed using Morisky 8 tool). The objective exercise tolerance using the six minute walking test (6MWT).

Results: To date, 46 patients have been enrolled, 65.2% male, median age 75.3 years, 53 (59%) had ischemic etiology, 18 (20%) had diastolic dysfunction and 17 (19.6%) had valvular disease. In this series, 78 patients had left ventricular dysfunction, 81 (71.1%) had high blood pressure, 52 (45.6%) had diabetes, 63 (55.3%) had dyslipidemia, 25 (21.9%) had smoking habits, being the mean BMI 28.1 ± 4.8 kg/m². Analyzing the comor-
dobutamine infusion in 25 (21.9%) and 12 (10.2%) had protein malnutrition. In the mean Charlson Score was 7.5 ± 2.4. In the echocardiogram, 29 (25.4%) had dilated left ventricle, 34 (29.8%) left ventricular hypertrophy, 46 (39.8%) dilated left atrium and 22 (19.3%) had aortic stenosis.

Conclusions: The most frequent etiology in HFmrEF was ischemic heart disease. 2. There is a high prevalence of comorbidities in this population. 3. Echocardiogram showed signs of systolic and diastolic dysfunction. In our series this group had a high percentage of adverse events in the follow-up.

P2176
Sleep disordered breathing (SDB) in heart failure with preserved ejection fraction (HFpEF) the tip of the iceberg

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Background: The prevalence of sleep disordered breathing (SDB) in heart failure is high and is related to a poor prognosis. Higher prevalence of hypertension, arrhythmias, especially atrial fibrillation, coronary artery disease and worse diastolic left ventricular function. However, there is very little known about the prevalence and effects of SDB in heart failure with preserved ejection fraction (HFpEF).

Methods: This study aims to investigate the prevalence of SDB in the HFpEF population and the influence on the objective exercise tolerance.

Results: From January 2015 to December 2016, 115 patients were included in the HFpEF cohort of our dedicated HFpEF out-patient clinic. SDB was screened using an ApneaLink tool. 9 patients were already diagnosed with SDB. 40 patient underwent an ApneaLink test without polysomnography (PSG), 46 patients got both, ApneaLink test and PSG and 11 patients got directly a PSG. We classified the severity of the SDB using the Apneu-Hypopnee Index (AHI). No SDB if AHI < 5 per hour, mild SDB if AHI ≥ 5, but < 15 per hour, moderate SDB if AHI ≥ 15, but < 30 per hour and severe SDB if AHI ≥ 30 per hour. We preferentially used the AHI results of the PSG, but if it was not conducted we used the results of the ApneaLink test. We compared the baseline characteristics of a total of 94 patients: 53 without or with a mild SDB versus 41 patients with a moderate or severe SDB. We measured the objective exercise tolerance using the six minute walking test (6MWT).

Results: We observe that SDB patients are more frequently men (46.3% vs 20.8% p=0.008) and have a higher body mass index (BMI) (31 vs. 28.6 p=0.01). There are not any significant differences in the rest of co-morbidities, echocardiographic characteristics of exercise capacity.

This is the first study using ApneaLink Plus in a HFpEF population to determine the prevalence of SDB. We measured a high prevalence SDB (65.2%) in a general outpatient HFpEF population in a Dutch academic hospital. Also, this is one of the few studies investigating the influence of moderate to severe SDB to on objective exercise tolerance in HFpEF patients. SDB is highly prevalent in a HFpEF population, but so far SDB does not seem to affect objective exercise tolerance.

P2177
Management of patients with chronic heart failure and mid-range left ventricular ejection fraction

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Aim: To evaluate the effect of drug therapy including ivabradine and structured education on rates of hospitalization due to chronic heart failure (CHF) in patients with mid-range left ventricular ejection fraction (LVEF).

Methods: The study population of 93 patients with CHF I-IV NYHA and LVEF 40-49% was divided into group 1 – standard drug therapy (19 patients) and group 2 – drug therapy including ivabradine (74 patients). The intervention also included structured education of the patients. Learning capability (LC) was rated on a 4-point scale (1=poor to 4=excellent). LC and need for hospitalization due to CHF (expressed per 10 people) were investigated over 12 months.

Results: The cluster analysis specified 3 categories of patients with different LC: Category I – LC lower than 3 points at the hospital and outpatient stages of education (13 patients), Category II – LC 3-4 points after structured education (22 patients), Category III – LC 3-4 points at the hospital and outpatient stages of education (58 patients). The average number of hospitalizations due to CHF was lower in group 2 than in group 1 (0.8 and 9.0, respectively, P=0.028).

Conclusions: The dynamic education of CHF patients in combination with drug therapy including ivabradine has a positive influence on the course of the disease, as evidenced by a significant decrease in the number of hospital readmissions due to CHF within 12 months.

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P2178
Initial experience from a novel service for the initiation and uptitration of sacubitril/valsartan
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Background: The current ESC guidelines recommend that sacubitril/valsartan (SV) is considered for patients with ongoing symptomatic heart failure (HF), and an ejection fraction persistently ≤ 35% despite first line medical therapy. In England & Wales, SV was recently approved for use by the National Institute for Health and Clinical Excellence (NICE) after a health technology appraisal (TA388).

Purpose: We developed a novel trainee-led service to deliver SV therapy in the setting of limited resources and large numbers of potentially eligible patients.

Methods: Suitable candidates were identified by heart failure consultant cardiologists. Subsequent SV optimisation clinics were delivered by a cardiology registrar under remote supervision. Patients were optimised as per recommendations every third to fourth week. Mean (SD) baseline ACEi/ARB dose was equivalent to 16.7 ± 6.5 mg enalapril daily. Over 85/86 (98.8%) prescribers of SV were compliant with ESC and NICE guidelines. 11 patients (12.8%) stopped the medication due to adverse effects (PARADIGM-HF 17.8%), whilst another 5 patients (5.8%) were down titrated to a tolerable lower dose.

Results: 86 patients (mean age 63.1 ± 11.1 years) were initiated on SV. Mean LVEF 27.8 ± 6.5%; mean baseline eGFR 66 ± 22 ml/min/1.73m². Prior to initiation of SV, mean baseline ACEi/ARB dose was equivalent to 16.7 ± 6.5 mg enalapril daily. Over 85/86 (98.8%) prescriptions of SV were compliant with ESC and NICE guidelines. 11 patients (12.8%) stopped the medication due to adverse effects (PARADIGM-HF 17.8%), whilst another 5 patients (5.8%) were down titrated to a tolerable lower dose. 15.1% of all patients experienced symptomatic hypotension (PARADIGM-HF 14.0%). No episodes of angioedema, nor significant deterioration in renal function (>50% reduction in eGFR) were observed. Only 2 (2.3%) patients were hospitalised with decompensated heart failure symptoms, whilst 4 (4.6%) patients were admitted with syncope resulting from orthostatic hypotension.

A total of 46 patients were discharged to primary care, with a median follow-up time of 42 days (IQR 25) from commencement to stable discharge dose — each requiring 1 initiation consultation and a mean of 2.3 ± 1.1 follow-up consultations. The majority of patients (53; 71.7%) were discharged at the highest dose - 97/105 mg BD. 32 (69.6%) of those discharged reported a subjective improvement in symptoms and quality of life.

Conclusions: The data support the creation of a novel trainee-led (with consultant supervision) clinical service to deliver this new added component of HF services. Cautious real-world application of the guidelines leads to many patients being safely established on high doses of SV with similar tolerability to that seen in PARADIGM-HF. However, the lower mean age within this particular population, who were carefully selected, may indicate that such findings are not representative of the entire heart failure population.

P2179
Does allopurinol have any benefit in heart failure patients without hyperuricemia?
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Funding Acknowledgements: The study was supported financially by the Research Deputy of Rajaie Cardiovascular Medical and Research Center.

Introduction: Heart failure (HF) is a devastating syndrome leading to hemodynamic abnormality and neuroendocrine activation which affects multiple organs. It has been shown that allopurinol, a xanthine oxidase inhibitor, may improve vascular endothelial and myocardial dysfunction. However, data are still lacking regarding the precise effects of allopurinol on HF patients without hyperuricemia.

Purpose: To assess the feasibility of conducting a randomized controlled trial (RCT) testing cost-effectiveness of a palliative cardiology clinic.

Methods: A feasibility study with baseline and 4-month measures from two unmatched patient groups from: G1) cardiology-run palliative assessment and management service, G2) HF liaison service. At enrolment, G1 recruits had been seen at least once in the service. Eligible patients had HF (LVEF ≤ 35%) and persistent symptoms. Study measures included: symptoms (Edmonton Symptom Assessment Score [ESAS]), HRQoL (KCCQ12; EQ-5D-5L), performance, understanding of disease, anticipatory care planning (ACP), health service costs and survival. Feasibility outcomes; recruitment, retention, data quality, variability/sample size estimation.

Results: 77 (G1=34; G2=43; enrolled over 8 months; 53% men; mean age 77 [33 to 103]). Average G1 clinic prior attendance was 8 months. At baseline: fewer in G1

Patient satisfaction according to the result of educational program
had LVEF (90% vs 97%) than G2; G1 had worse ESAS (43.5 vs 35.2) & KCCQ (35.4 vs 33.9) scores; fewer admissions/past 6 months (32.6% vs 47.1%); G1 understood their care better (p = 0.0036); more had ACP (p = 0.001). All were on optimal cardiac treatment. G2 had a higher screen/consent ratio (1:2.8 vs 1:1.7) and more 4 month attrition than G1 (29% vs 25%). Data quality was good. Estimated sample size for a future trial: 41 to detect a 1 point clinically important change in ESAS shortness of breath (80% power, 0.05 alpha).

At 4 months ESAS and KCCQ improved in G1 and G2 (change from baseline) but by more in G2, reaching statistical significance for ESAS scores, G1: -1.5 (14.8) vs G2: -5.6 (16.8, p = 0.046), although between group differences were not statistically significant; set in a repeated measures model.

Documentation of ACP and understanding of care remained better in G1 (p < 0.001). There was no difference in survival between the two groups. G1 average NHS costs were lower (£785 cost saving/patient) with fewer nights in hospital, fewer GP and out-patient contacts and an average reduction in QALYs of 0.01235. Cost savings are likely to be underestimated given the duration of Q1 clinic attendance at baseline, reflected in baseline differences in admission. The uncertainty around the findings is too great to draw definitive conclusions and must be seen as exploratory.

Conclusions: Although the study was conducted in advanced HF patients, to test the cost-effectiveness of a cardiology-driven palliative care assessment and management service using patient-report data as a primary outcome is feasible in terms of recruitment and data quality. An adequately powered trial is warranted.

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Improves functional capacities. The aim of this study was to find predictive factors of improvement of physical ability in HF-REF patients after completion of an exercise training program.

Methods: Functional, clinical, biological and echocardiographic data were retrospectively analyzed in 55 HF-REF patients who underwent an exercise testing.

Results: Patients were 53.3 ± 12.1 years old with a mean ejection fraction of 34 ± 10% and an average of 18.7 sessions over a 4 month period was performed. Mean pre and post training MET were retrospectively 4.9 ± 1.8 and 6.1 ± 2.3 (p < 0.001). At the end of the training period, 22 patients displayed an improved exercise testing. Exercise testing improvement was associated with the absence of arterial hypertension (67% vs 23% p = 0.04), and a tendency was seen with lower furosemide daily intake (25.7mg vs 84.3mg p = 0.05), and lower Heart Failure Risk of Death at 1-year score (7.02% vs 10.22%). Pre-training exercise capacity was not associated with post-training improvement (4.6 ± 1.5 MET vs 5.2 ± 1.8 MET p = 0.17).

Conclusions: HF-REF patients without previous arterial hypertension had more chance to improve physical capacities after exercise training program. A lower furosemide daily dosage, and a lower Heart Failure Risk of Death at one-year score tend to be associated with improvement of physical abilities, so the sooner the better.
chronic HF with reduced ejection fraction (HFrEF) managed in the primary care setting across Europe.

Purpose: The primary objective of PREFER is to assess whether biomarker-guided (>600 pg/mL N-terminal pro B-type natriuretic peptide (NT-proBNP)) referral of clinically stable HFrEF patients from PCP to a cardiologist improves treatment, as defined by increased adherence to ESC HF management guidelines. Secondary objectives include the assessment of baseline characteristics (demographic, clinical and treatment, NT-proBNP levels, and health-related QoL) of HFrEF patients managed by PCPs across Europe; the impact of patient baseline characteristics on prescribed treatment; the effect of treatment optimisation on NT-proBNP levels; and the proportion of HFrEF patients considered to be clinically stable, defined as requiring no change in HF treatment for >3 months prior to baseline visit.

Methods: PREFER will enrol consecutive HFrEF patients ≥18 years with left ventricular ejection fraction ≤40% attended in the PCP setting. Main exclusion criteria are primary management by a cardiologist; co-morbidities including severe renal insufficiency (estimated glomerular filtration rate [eGFR] < 25 mL/min/1.73 m² since severely decreased eGFR is known to increase NT-proBNP; thus avoiding this specific confounder), cerebral trauma or cancer; and major surgery, cerebrovascular incident or acute exacerbation of chronic obstructive pulmonary disease within the previous three months. The study comprises three visits over a maximum period of 10 months with patient and disease characteristics and NT-proBNP concentrations documented at Visit 1. Patients assessed as clinically stable by the PCP with NT-proBNP ≥600 pg/mL will be referred to a cardiologist. Treatment changes, health status, and vital signs will be recorded over subsequent visits; QoL will be assessed by means of EuroQol ED-10D and Kansas City Cardiomyopathy Questionnaire (KCCQ) and NT-proBNP will also be assessed at Visit 3.

Conclusion: To conclude, we report the rationale and the design of the PREFER study. Recruitment will begin in June 2016. It is expected that the study will recruit approximately 4,000 patients from a total of 20 European countries.

P2185
Reliability of peripheral arterial tonometry for assessment of endothelial function in patients with heart failure with preserved and reduced ejection fraction, diabetic nephropathy and arterial hyper

F Welschock; M Fitzsch; S Beckmann; S Littmeier; J Wagner; D Dawid

Aims: Endothelial dysfunction plays a major role in cardiovascular (CV) diseases and pulse amplitude tonometry (PAT) offers a non-invasive way to assess endothelial dysfunction. However, data about the reliability of PAT in CV patient populations are scarce. Thus, we evaluated the test-retest reliability of PAT using the natural logarithmic transformed reactive hyperaemia index (LrRHI).

Methods and Results: Our cohort (figure 1) consisted of 92 patients (mean age: 65 ± 9.7 years, 32 % female), who were divided into four groups: those with heart failure with preserved ejection fraction (HFpEF) (n = 23), heart failure with reduced ejection (HFrEF) (n = 24), diabetic nephropathy (n = 20), and arterial hypertension (n = 23). All patients underwent two separate PAT measurements at a median interval of 7 days (range: 4-14 days). LrRHI derived by PAT showed good reliability in subjects with diabetic nephropathy (Intra-class correlation (ICC) = 0.864) and satisfactory reliability in patients with both HFpEF (ICC = 0.557) and HFrEF (ICC = 0.586). However, in patients with arterial hypertension, reliability was poor (ICC = 0.125) (figure 4).

Conclusion: We demonstrated that PAT is a reliable technique to assess endothelial dysfunction in adults with HFpEF, HFrEF or diabetic nephropathy. In subjects with arterial hypertension, we did not find high reliability, possibly related to the greater daytime and heart rate variances in this group of patients.

P2186
An algorithm to screen for left ventricular systolic dysfunction in the elderly, based on specific ECG-changes, NT-proBNP and handheld echocardiography

LL Olesen

Purpose: To develop a reliable objective method to screen for LVSD in high-risk and growing geriatric population, in cooperation between the primary and the secondary health care system, to improve diagnosis and treatment of LVSD.

To extract an algorithm to screen for LVSD from previously published studies about this topic.

Methods and Results: A study performed to find a way to screen for LVSD, included 260 elderly (80 years of age (75-92) from the community and from the local heart failure clinic. In everyone a handheld (HE) and a standard echocardiography (SE) were performed. Even though HE has limited options, HE was comparable to SE (gold standard) in diagnosing LVSD.

Sixty had LVSD and 200 did not have LVSD, and in a case-control study, LVSD was correlated with specific ECG-changes with sensitivity > 90 % and specificity > 80 %. These ECG-changes, atrial fibrillation (AFIB), left bundle branch block (LBBB) and any mode of pacing, were all associated with elevated NT-proBNP. In addition, LVSD was correlated with Q-waves combined with elevated NT-proBNP.

On this background, was evolved the illustrated algorithm to screen for LVSD.

Conclusions: LVSD seems to be under-diagnosed and under-treated in the elderly 75+ with serious consequences not only for the patients, but also for society and the health care systems.

Screening for LVSD in the growing geriatric population should have high priority, because correct diagnosis is the cornerstone of effective treatment, which can reduce symptoms, morbidity and mortality and the overall societal burden of this serious disorder.

The present study suggests a new LVSD-screening-algorithm. This algorithm recommends that, when LVSD is under suspicion, due to AFIB, LBBB or pacing, or Q-waves combined with elevated NT-proBNP, a handheld echocardiography should be performed. In case of LVSD, the local heart failure clinic should treat the patient and find the cause of LVSD, including a standard echocardiography.

Further studies are needed to validate this algorithm.

P2187
Association of serum ADAM-10 with cognitive function in patients with stable chronic heart failure

S M Sonja Maria Wedegaertner; S Selejan; J Karbach; M Boehm; I Kindermann

Background/Purpose: Patients with stable heart failure show cognitive impairments associated with adverse events like higher mortality rates, worse quality of life, poorer drug adherence, and increased hospitalization rates. Possible pathophysiological causes are cerebral hypo-perfusion and multiple cardiogenic emboli, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival. However, however the underlying mechanisms are still not fully understood. ADAM-10 (A Disintegrin and Metalloproteinase-10) prevents the generation of neurotoxic amyloid β (Aβ) and is important for the maintenance of neural cell survival.
to the cognitive functioning in patients with chronic heart failure.

**Methods:** In a cross-sectional study patients with stable chronic heart failure, n=13, mean age 66.77 years, 15.4 % females, 54. % ischemic cardiomyopathy, left ventricular ejection fraction ≤ 45 %, NYHA class III-IV, serum levels of ADAM-10 were assessed by Western blot and densitometric analysis and compared to values in age-matched controls (n = 13). Cognitive abilities (attention, processing speed, executive control, working memory, and intelligence) were assessed in heart failure patients using validated psychological instruments (Frankfurt Attention In-ventory [FAIR], Digit Symbol Substitution Test, Stroop Test, Digit Span, Corsi Block Tapping Task, Matrix Reasoning [Wechsler Adult Intelligence Scale]).

**Results:** Serum ADAM-10 activity was decreased in patients with chronic heart failure as compared to healthy controls (-4.4 % decrease). Additionally, ADAM-10 pro- tein levels showed a negative correlation (p = 0.03; r = -0.6) with cognitive abilities like attention as assessed by the FAIR in patients with chronic heart failure.

**Conclusion:** A reduction of ADAM-10 activity might promote neurotrophic processes in patients with chronic heart failure resulting in further cognitive deterioration in these patients.

**P2188**

**Assessment of syndecan-4 expression in the hearts of mice and human subjects with chronic chagas cardiomyopathy**

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**Background:** The hallmark of chronic Chagas cardiomyopathy (CCC) is the pres- ence of a multifocal inflammatory reaction, which leads to myocardial fibrosis, often followed by ventricular dysfunction and arrhythmias. The expression of syndecan-4, a transmembrane protein, is increased in the hearts of mice chronically infected with Trypanosoma cruzi, suggesting a role of this protein in the pathogenesis of CCC.

**Purpose:** Here we aimed to evaluate the pattern of expression of syndecan-4 in heart tissue of mice and subjects with Chagas cardiomyopathy and to correlate with the degree of inflammation and fibrosis.

**Methods:** First we evaluated the expression of syndecan-4 in the hearts of mice at different time points after infection. C57BL/6 mice (n=5 per group) were infected by intraperitoneal route with Colombian strain T. cruzi and the heart tissue was eval- uated by immunochemistry using controls. We also compared the expression of syndecan-4 in sixty samples of explanted human hearts of subjects with CCC, idiopathic dilated cardiomyopathy (IDCM) and ischemic cardiomyopathy (ICM). Sam- ples were analyzed by confocal microscopy to determine the expression pattern of syndecan-4. Inflammation and fibrosis were evaluated by morphometric analysis.

**Results:** Syndecan-4 expression was increased after the acute infection and was sustained during the chronic phase, and did not correlate with the intensity of inflam- mation or fibrosis. Confocal microscopy analysis showed syndecan-4 expression mainly by vascular smooth muscle cells. Confocal microscopy analysis of fragments of explanted human hearts showed a similar pattern of syndecan-4 expression. No correlation between syndecan-4 expression and inflammation or fibrosis was found in the hearts from subjects with CCC. We also compared the expression of syndecan-4 of subjects with CCC, idiopathic dilated cardiomyopathy (IDCM) and ischemic cardiomyopathy (ICM). No differences in the number of syndecan-4 positive vessels/mm2 were found comparing the three subject groups (P=0.48), whereas a statistically significant difference in inflammation was seen (P=0.035). Additionally, no correlation between syndecan-4 and fibrosis or inflammatory cells was found.

**Conclusion:** We conclude that there is no evidence of correlation between either the degree of myocardial fibrosis or the number of inflammatory cells and syndecan-4 expression. Additional studies are required to determine its role in Chagas disease.

**P2189**

**Analysis of mirna alterations in subjects with chronic chagas disease cardiomyopathy**

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**Background:** Chagas disease is an anthropozoonosis caused by the flagellate pro- tozoan Trypanosoma cruzi. It is estimated to be one of the rick causes of death due to heart failure in Latin America. To date, there is no effective treatment for chronic Chagas disease. The biological role of microRNAs in the mammalian cardio- vascular system has become a rapidly evolving field of research. Several studies in humans and animal models have shown that microRNAs are differentially expressed in heart failure and play a critical role in the pathogenesis of the disease.

**Purpose:** The objective was to evaluate the expression of different microRNAs in Chagas disease subjects and to investigate possible associations with clinical eval- uation.

**Methods:** This study investigated the expression of 18 microRNAs in serum obtained from eight Chagas disease subjects, selected from a database of the out-patient clinics at Hospital (Brazil). As controls, four healthy subjects, with negative serology for Chagas disease, were selected. The Pick-A-Mix Custom microRNA qPCR Panels (Denmarks) was used. MicroRNAs were selected based on the clinical profile of Chagas disease cardiopathy, characterized by inflammation and fibrosis. The T7000 Fast Real-Time PCR (Thermo Fisher) was used under standard thermal cycling conditions. Data was analysed using threshold cycle (Ct) method and STATA statistical software.

**Results:** Of the analyzed microRNAs, 28 presented statistical significance (p < 0.05) in relation to healthy individuals. Of these, 22 miRNAs were down-regulated and 6 of them amplified only in the control group. We performed analysis of corre- lations between the miRNAs and clinical and imaging parameters, such as stan- dard two-dimensional and strain by speckle tracking echocardiography, myocardial fibrosis by nuclear magnetic resonance, NT-proBNP and gaeicolin levels and Russi score. Analysis miR-28 and miR-29c did not show a negative association with longi- tudinal global strain only for miR-29c (r = -0.7553, p = 0.05). In the miR-30 family, miR-30d showed a tendency of a negative association with fibrosis (r = -0.7115, p < 0.07), whereas miR-30c had a negative association with longitudinal global strain (r = -0.8308, p < 0.05). We did not find any correlations between miRNAs the other clinical and imaging parameters.

**Conclusion:** Preliminary data suggest the correlation of miR-29c and miR-30c with longitudinal global strain measurement in Chagas disease. The investigation of the expression from these miRNAs in a larger group of chronic chagasic subjects, as well as in subjects with the indeterminate form is currently being performed in order to expand and validate the results.

**P2190**

**Sex-related differences in the systolic function in the setting of acute coronary syndrome**

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Sex-related characteristics of acute coronary disease may contribute to the con- trast in heart failure incidence between men and women. We examined the relation of severity of coronary atherosclerosis and inflammatory response to sex-related differ- ences in the myocardial contractile function during acute coronary syndrome (ACS) and after six-month follow-up. Three hundred and twenty one patients (48% women) with ACS were included. They had their acute and chronic phase left ventricular ejec- tion fractions (EF1; EF2), end-systolic and end-diastolic indexed to body surface area volumes (ESV1; EDV1; ESV2; EDV2) assessed with 2D-echocardiography. Echocardiography by the sixth month - available in 147 (68.8%). Other methods used: immunoturbidimetry - for high-sensitive C-reactive protein, hsCRP; coro- nary angiography with SYNTAX score calculation - performed in 282 (97.6%). Men had worse systolic function in the acute phase (EF1: 55.3 ± 10.5% vs 58.8 ± 10.9%, p = 0.001 for EF1; 29.6 ± 14.9 mm vs 24.5 ± 11.7 mm, p < 0.0001 for EDV1; 65.9 ± 19.1 ml vs 60.8 ± 14.7 ml, p = 0.013 for EDV1) and at the sixth month (33.8 ± 18.8 ml vs 27.1 ± 13.3 ml, p < 0.0001 for ESV2). Inflammatory markers correlated positively with all enzymes of myocardial necrosis. Higher SYNTAX scores of men had a closer association with the myocardial necrosis severity and the contractile function deter- mination in acute and chronic phase compared to women. Higher WBC were signif- icantly related to lower EF regardless of sex and increased hsCRP levels - to worse EF and ESV at the time of ACS and during follow-up only among men (table 1). The severity of coronary atherosclerosis and of the acute inflammatory response contribute in lesser degree among female than among male patients to the systolic function decline after ACS.

**P2191**

**A study of coronary flow response to nitroglycerin in patients with slow coronary flow syndrome and other types of non-obstructive coronary disease having diastolic dysfunction**

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Background: Nitroglycerin (NTG) induces extremely slow coronary flow and angina in patients with microvascular dysfunction and normal coronary angiograms. The coronary slow flow syndrome (CSFS) is an angiographic finding characterized by delayed distal vessel opacification in the absence of significant epicardial coronary and myocardial disease.

Purpose: The object of our study was assessment of the response of coronary blood flow to intracoronary injection of NTG in patients with non-obstructive coronary atherosclerosis (including CSFS) with diastolic dysfunction.

Methods: The study included 143 patients: 66 - with CSFS and other 77 – with non-obstructive coronary disease, NCAID (coronary plaques causing <50% stenoses). The following myocardial perfusion indices defined during selective coronary angiography, SCA (at baseline and after intracoronary administration of 100-200 μg of NTG) were employed: corrected TIMI frame count (cTFC) – assessed in 140 (97.9%) patients; propagation of contrast medium in coronary artery in systole (CPs) vs 22.6 μm (n = 12), propagation of contrast medium in systole in patients with microvessel dysfunction and normal coronary angiograms. The coronary flow in SCFS was impaired compared to other patients with NCAID (cTFC 37.7 ± 11.9 vs 28.2 ± 13.6 frames, p < 0.0001; a trend for CPs 18.4 ± 9.4 vs 22.6 ± 12.3, p = 0.077). Additional analysis demonstrated impairment of coronary flow after NTG (considerable for CPs: a trend for CPs) only in the group with non-obstructive coronary disease (including CSFS) having diastolic dysfunction (Table 1).

Conclusion: NTG reduces myocardial blood supply in non-obstructive coronary disease with diastolic dysfunction. It should not be given for angina relief to patients without proven on angiography significant coronary stenoses.

<table>
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<tr>
<th>SCFS/NCAID</th>
<th>No diastolic dysfunction</th>
<th>With diastolic dysfunction</th>
<th>P value</th>
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<tr>
<td>cTFC, frames (n = 58/18)</td>
<td>31.1±14.9</td>
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<td>CPs, mm (n = 52/15)</td>
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<td>With diastolic dysfunction</td>
<td>P value</td>
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<tr>
<td>cTFC, frames (n = 59/18)</td>
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<td>30.7±9.0</td>
<td>0.765</td>
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<td>CPs, mm (n = 52/15)</td>
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</table>

ATRIAL FIBRILLATION

P2190

The adequacy of antithrombotic therapy in patients with atrial fibrillation in Uzbekistan

N U Zakirov; R D Kurbanov; T Z Tahir Ganilov; D V Yosov
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Background: Epidemiological studies on atrial fibrillation (AF) and prevention of thromboembolism have not been conducted in Uzbekistan (Central Asia).

Objective: To assess the pre-hospital anticoagulant therapy (ATT) in patients with AF, according to the ESC recommendations.

Material and Methods: We retrospectively analyzed the medical data of patients, who were discharged from specialized center of cardiology between 01.10.15 and 30.11.15. The thromboembolic events and bleeding risks were assessed by CHADS2/VAAS and HAS-BLED scores, respectively.

Results: Among 1298 patients, AF was detected in 161 (12.4%, mean age 65.3 ± 8.7 years), of these 75 (44.6%) men. In 129 (80.1%) patients were identified non-valvular and in 32 (19.9%) valvular AF. Paroxysmal AF was detected in 45 (28%), persistent in 19 (11.8%) and permanent in 97 (60.2%) patients. Hypertension 1-3 degree was detected in 67.1% of patients (n = 108), heart failure 2-4th FC by NYHA in 69.6% (n = 112), diabetes in 14.9% (n = 24). History of thromboembolism or TIA were present in 9.3% (n = 15) and peripheral vascular disease identified by ultrasonography of artery (major and peripheral vessels) in 54.6 % (n = 88). At the time of admission HAS-BLED score > 3 were identified in 13.7 % (n = 22) of patients and the mean HAS-BLED score was 1.7 ± 1.2 and CHADS2/VAAS score was 4.1 ± 1.5. At pre-hospital period, ATT was indicated to 175 (97.5%) patients, (125 patients according to CHADS2/VAAS score). It was found that 28% (n = 45) of patients did not take any ATT. There weren’t any patients treated with new oral anticoagulants (NOACs). Only 31.7% (n = 51) of patients received warfarin. Compliance of anticoagulant therapy in patients with valvular AF were superior to non-valvular AF patients (50% vs 21.7%, respectively, p = 0.037). Only 2.5% (n = 4) of patients received aspirin and clopidogrel in combination. 37.9% (n = 61) of patients received antithrombotic agents as a monotherapy. Among patients receiving warfarin INR control from 2.0 to 3.0 revealed only in 7 (13.7%), at the same time 7 (13.7%) patients had an INR > 3 at the time of admission.

Conclusion: Despite, high risk of thromboembolic events and low bleeding risk, 28% of patients with AF did not take any ATT at the time of admission. There weren’t any patients treated with NOACs. Only 31.7% of patients requiring anticoagulation, receive warfarin regularly and compliance to anticoagulant therapy was significantly superior in patients with valvular AF. Totally, 4.4% of patients who had indicated ATT, receive warfarin in selected dose (INR 2.0-3.0) for optimal prevention of thromboembolic events according to ESC recommendations.

P2193

Predictive markers of atrial remodeling and role of PA-TDI duration and NT-proBNP in the assessment of atrial fibrillation recurrences

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Introduction: Total atrial activation time has been identified as an independent predictor of new-onset atrial fibrillation (AF). Echocardiographic assessment of PA-TDI duration provides an estimation of total atrial conduction time. Recently total atrial conduction time (Total atrial conduction time measured by tissue doppler PA-TDI duration) has been shown to be a predictive marker of atrial remodelling. Pre-procedural assessment of the extent of atrial remodelling could be used to identify patients with a high risk of AF recurrence. Purpose of the present study was to identify and define new predictors of AF recurrence: PA-TDI duration, also left atrial (LA) volumes, LA function in patients after radiofrequency catheter ablation and with heart failure and elevated level of Natriuretic peptide NT-proBNP who had undergone ICD implantation.

Methods: We assessed n=80 patients, among them n=65 patients with atrial fibrillation-AF paroxysmal and persistent forms of AF without structural changes and normal NT-proBNP in pre- and post-operative periods of RFCA and electrical and pharmacological cardioversion and n=15 patients with AF with structural

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heart disease and elevated level of NT-proBNP with mild to severe heart failure symptoms scheduled for ICD implantation. The PA-TDI duration was assessed by measuring the time interval between the onset of the P-wave in lead II of the surface ECG and the peak A-wave on the tissue Doppler tracing. A long PA-TDI duration corresponded to a long total atrial conduction time. In all patients we performed a 24-hr Holter monitoring. Results: An increased total atrial conduction time (PA-TDI >119 ms, mean PA-TDI 139±189) was associated with poor outcome and complications such as symptoms of heart failure P<0.01 and recurrences after RFCA p<0.001 and recurrences after cardioversion - in all subgroups - in patients with atrial fibrillation with or without structural heart changes. Increased PA-TDI duration also correlated with NT-proBNP level in patients with heart failure symptoms. It was found correlation between LA size and PA-TDI duration p<0.001, but in 35% of the patient without LA enlargement and prolonged PA-TDI duration we also found AF Recurrences.

Conclusions: An increased PA-TDI duration can be independently associated with AF recurrence in heart failure patients with history of AF who had undergone ICD implantation and this parameter correlates with elevated NT-proBNP.

P2194

Long term outcome of pulmonary vein isolation for atrial fibrillation in patients with mitral valve disease.
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Pulmonary vein isolation (PVI) is one of the effective option of atrial fibrillation (AF) treatment. The effectiveness of PVI for AF patient with left ventricular dysfunction was reported, but mid to long term outcome is still unidentified. The purpose of this study is to evaluate the mid to long term effectiveness of PVI for AF patient with left ventricular dysfunction.

Methods: Total 628 sessions of PVI for 609 cases were performed in our institute since 2003 to 2016, left ventricular dysfunction, which was defined as left ventricular ejection fraction (LVEF) under 50%, was complicated within 96 cases. We retrospectively analyzed the patient’s characteristics and outcomes in those cases. Results: The average observation period after PVI was 32.7±25.0 months, longest term in 93 months. The maintenance rate of sinus rhythm was 93.7% (87 cases), 36.8% of those (32 cases) was still under rhythm control treatment. Left atrium diameter (LAD) and left ventricle systolic volume (LVSV) at least three years after PVI reduced significantly in comparison with pre-procedure (LAD 43.9±7.7 to 40.8±6.3mm; p=0.01, LVSV 66.8±34.0 to 51.7±27.3ml; p=0.001), and UVI was significantly improved,0.08±0.5 to 0.13±0.5;p<0.0001). Conclusions: The PVI for AF patient with left ventricular dysfunction contributes to left atrial and left ventricle remodeling, and outcomes are excellent.

P2195

Relation between ventricular-arterial coupling parameters, left atrial remodeling and recurrences of atrial fibrillation in hypertensive patients with preserved left ventricular systolic function
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Background: Deterioration of the left ventricular-arterial coupling (VAC) may play a key role in the development of diastolic dysfunction and therefore structural and functional changes of the left atrium (LA). But the data concerning the relationship between VAC parameters and atrial fibrillation (AF) is scarce.

Purpose: To evaluate the relation between VAC parameters, structural and functional changes of the LA and their predictive value for AF recurrence in hypertensive patients with paroxysmal or persistent AF and preserved left ventricular systolic function.

Methods: The study included sixty hypertensive patients (45% male, median age 65 (61; 72) years) with recurrent non-valvar AF and preserved left ventricular systolic function. A group of 30 patients received 200 mg of amiodarone + 50 mg of metoprolol daily, while another group, also consisting of 30 patients, received 160 mg of metolazone daily. All the patients underwent conventional and speckle tracking echocardiography. Global peak LA longitudinal strain (PALS) and strain rate (PALSsR) in the reservoir (R) and contractile (C) phases were assessed using 6 segments in the 4-chamber and 2-chamber views. To estimate VAC Ea, Ees, Ea/Ees and also systemic vascular resistance index and total arterial compliance (TAC) were calculated. Follow-up period was 3 months.

Results: Significant relation between EaL and LA size (p=0.38, p=0.003), LA end diastolic volume (p=0.33, p=0.009) and PALSsR (-0.31, p=0.02) were found. Other VAC parameters were not associated with changes of the LA. 35 (58%) patients maintained sinus rhythm (group 1) throughout the follow-up period, whereas 25 (42%) patients (group 2) experienced at least one AF recurrence. Despite having comparable LA volume index, the patients of group 1 had significantly higher PALsSr (15.7±24.9 vs -24.8±42.7, p<0.001), PALsRc (-2.4±1.6, p=0.001), TAC (1.26±1.08, p=0.049), whereas Ees corrected by left ventricular mass was higher in group 2 (619 vs 803, p=0.004). Stepwise multiple regression analysis showed a significant association between PALsSr and the efficacy of antiarrhythmic therapy (p=0.38, p=0.04).

Conclusion: Despite the fact that TAC and Ees corrected by left ventricular mass in AF patients were significantly different between the two groups, they had no predictive value in AF recurrence. PALsSr was the only independent parameter associated with AF recurrence.

P2196

Russian observational survey of heart failure patients with atrial fibrillation (RIF-CRP): clinical characteristic of patients.
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Background: Atrial fibrillation and heart failure frequently coexist. Both conditions are risk factors for stroke, systemic embolism, and worse outcomes. Data on clinical characteristic and compliance with clinical guidelines for heart failure patients with atrial fibrillation in Russian Federation is limited.

Methods: We conducted a registry of consecutive in- and outpatient patients with heart failure and atrial fibrillation from 38 medical centers in different regions of the Russian Federation. All patients had ECG-documented diagnosis of atrial fibrillation and heart failure. Patients with preserved ejection fraction (40%) were eligible for study if they had level of BNP or NT-proBNP larger then100 pg/ml or 300 pg/ml, respectively.

Results: A total of 1003 patients (57% men, mean age 67 years) with heart failure and atrial fibrillation were included in this study between February and December, 2015. Ejection fraction more than 40% was present in 54.8% of patients. In our registry 46% of patients had NYHA Class II, 45.7% had NYHA Class III and 8.9% - NYHA Class IV. The commonest associated comorbidities were coronary heart disease (68.9%), hypertension (85%), diabetes mellitus type 2 (26%), previous stroke or TIA (23%) and chronic kidney disease (12.9%). Of the whole cohort, 56.8% of patients had permanent atrial fibrillation, 27 and 9.4% had paroxysmal and persistent atrial fibrillation, respectively. Of the whole cohort, the mean CHA2DS2-VASc score was 4.2 ± 1.74 and the mean HAS-BLED was 1.68 ± 1.12. High risk of thromboembolism (CHA2DS2-VASc score ≥ 2) had 77.6% of patients. Oral anticoagulants were used in 81% of patients with CHA2DS2-VASc ≥ 1, 69% patients with CHA2DS2-VASc ≥ 2 and only 58% in CHA2DS2-VASc score ≥ 3.

Conclusions: Based on current guidelines, oral anticoagulation is recommended for the vast majority of patients with heart failure and atrial fibrillation. Compliance with the treatment guidelines for patients with higher stroke risk scores remains suboptimal.

P2197

Management of atrial fibrillation in heart failure
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Background: There are no specific recommendations for the management of patients with heart failure (HF) and atrial fibrillation (AF), not knowing if the management of these patients is similar to that done in patients without HF diagnosis.

Purpose: Describe the characteristics and management of AF in patients with or without HF.

Methods: Observational and prospective study on patients with AF, analyzing differences in the diagnostic and therapeutic approach among patients with or without HF. Sociodemographic, clinical, analytical and echocardiographic variables were collected, and a comparative analysis of the same was performed between both groups.

Results: A total of 915 patients were analyzed, 144 with HF (15.7%) and 771 without HF (84.3%). No differences between groups were conceded in age, sex, CHADSVASC, HAS-BLED, renal function, hemoglobin, hypertension or previous bleeding events. The percentage of diabetic patients was higher in the group of patients with HF (39.6% vs 21.9%, p<0.001), with these patients having a larger left atrium size [left atrial area in apical four chamber view: 30.9 vs 26.9 cm2, p=0.049]. The rhythm control was used less frequently in patients with HF (22.2% vs 12.6%, p<0.001), Beta-blockers (78.3% vs 58.3%, p<0.001) and digoxin (23.4% vs 12.7%, p=0.002) were more frequently used in patients with AF, with less use of antiarrhythmic drugs in this group (5.7% vs 13.4%, p=0.004). When antiarrhythmic drugs were employed, amiodarone was used in 100% of patients with HF. The most frequent antiarrhythmic drug in AF without HF was flecainide (46%) followed by...
by dronedarone (26%) and amiodarone (25%). No differences between anticoagulated patients (90.6% vs 91.7%, p = 0.387) or type of anticoagulation prescribed (AVK: 65.7 vs 67%; NOAC: 34% vs 33%, p = 0.792) were observed.

Conclusions: Patients with AF and HF are more frequently diabetic and have a larger atrial size. In them the rhythm control strategy is used less frequently, being

HYPERTROPHIC CARDIOMYOPATHY

P2198
Predictors of ICD-related adverse events in patients with hypertrophic cardiomyopathy
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Background: Hypertrophic cardiomyopathy (HCM) is the most common cause of sudden cardiac death in young patients. Implantable cardioverter-defibrillator (ICD) therapy may be considered in HCM patients at high risk of ventricular arrhythmia. Aims: To determine predictive factors of transvenous ICD-related adverse events in HCM patients.

Methods: All patients with HCM referred for ICD implantation in two French tertiary centres between May 1992 and August 2016 were retrospectively included. Clinical, electrocardiographic and echocardiographic data were obtained from electronic medical records. ICD-related adverse event was defined as the combination of inappropriate shock and/or other complication related to the device (infection, access-, generator- or lead-related complication).

Results: A total of 177 patients were included. Median follow-up was 45.6 months. One hundred and fifty-six patients received a transvenous-ICD (TV-ICD) and 21 a subcutaneous-ICD. Among the whole cohort, 46 patients (26%) experienced at least one appropriate therapy. Among TV-ICD group, inappropriate shocks occurred in 27 patients (17%) and 41 patients (26%) experienced a total of 51 complications including 14 lead fractures and 7 infections. In multivariable analysis, history of atrial flutter (HR=12.5 [2.3-67.2], p = 0.003), unexplained syncope (HR=5.5 [2.0-15.4], p =0.001) and young age (HR=0.856 [0.935-0.983], p = 0.001) were associated with TV-ICD-related adverse event. Among S-ICD group, inappropriate shocks occurred in 2 patients (8%) during a follow-up of 12.0 months. After adjusting for year-implantation, no difference was found between TV-ICD and subcutaneous-ICD in terms of device-related adverse events.

Conclusion: We identified three simple and readily available variables that are associated with TV-ICD-related adverse events in HCM patients at high risk of SCD. Considering the model performance in this population, it should be validated in a larger cohort.

P2199
Impact of hypertrophy in left ventricular ejection fraction and myocardial strain: application of three-dimensional wall-motion tracking technology in hypertrophic cardiomyopathy
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Introduction: Hypertrophic cardiomyopathy (HCM) is a genetic disease with an autosomal dominant pattern of transmission. It is histologically characterized by cardiomyocytes hypertrophy, fibre disarray and interstitial fibrosis. These microscopic abnormalities translate into functional abnormalities, not always recognized by conventional cardiac imaging assessment. Thus, quantitative assessment of myocardial dysfunction caused by hypertrophy and heterogeneous fibrosis in HCM remains a challenge.

Purpose: Using three-dimensional wall-motion tracking (3DWMT) echocardiographic technique, we aimed to characterize the left ventricle (LV) global mechanics in a HCM group of patients, and to compare morphological and strain parameters with a group of healthy controls.

Methods: Thirty five (35) HCM patients (HCM group) and 27 healthy controls (control group) underwent standard bi-dimensional (2D) echocardiography, followed by 3DWMT evaluation. Using Toshiba Artida echocardiography equipment (Toshiba Medical System), global strain values were obtained for each component (global longitudinal strain (GLS), global circumferential strain (GCS), global radial strain (GRS), area tracking (AT)), as well as, twist and torsion angle, and LV ejection fraction (VEF).

Results: We found no age (61.5±10.3 vs 57.5±7.2 years, p = 0.097), gender (g = 0.384) or VEF (63±9 vs 65±13%, p = 0.437) differences among HCM and control groups. Regarding strain parameters, we found a statistically significant decrease in GLS (-10.6±3.1 vs -16.5±4.3%, p < 0.001) and GCS (-24.4±8.1 vs -28.6±7.3%, p = 0.033) in HCM group. A non-significant trend to lower GRS values was also observed in this group (27.9±11.2 vs 31.5±1.7%, p = 0.275). Furthermore, a significant decrease was observed in AT values (-32.9±9.1 vs -39.8±9.8%, p = 0.007). No differences were verified in twist angles values (6.7±2.9 vs 5.5±2.7°, p = 0.888), nor torsional angle (1.8±0.6 vs 1.6±0.9°, p = 0.399).

Conclusion(s): HCM patients with and preserved LV EFEI exhibit abnormal myocardial...
In clinical practice, most patients with hypertrophic cardiomyopathy (HCM) have an increased levels of brain natriuretic peptide (BNP) despite of preserved global systolic function of the left ventricle (LV). The relationship of BNP level and clinical-instrumental parameters in patients with HCM is of great interest of investigators.

Purpose: To assess BNP level and its relationship with clinical status and instrumental parameters in HCM patients.

Materials and methods: 59 patients with HCM were examined (13 men [33%], average age 58.8 ± 15.5 years). All patients were treated with bisoprolol (8.5 ± 1.8 mg). In 15 patients [27.3%] obstructive form of the disease was identified. All patients underwent echocardiography with high-frequency Doppler and tissue Doppler imaging (TDI) and brain natriuretic peptide (BNP) estimation.

Results: 52 HCM patients (94.5%) had an elevated BNP level with average mean 15.56 ± 9.83 pg/ml. There was a significant correlation between BNP level and functional class (FC) of chronic heart failure (CHF) by NYHA (r=0.37, p<0.01), left ventricular intraventricular septum (LVIS) (r=0.40, p=0.02), mitral regurgitation (r=0.50, p=0.006), tricuspid annulus lateral s’ (r=-0.79, p<0.002), and basal lateral RV wall s’ (r=-0.84, p=0.000), medium lateral RV wall s’ (r=-0.73, p=0.02).

CONCLUSIONS. BNP levels was elevated in 94.5% HCM patients. Increased BNP level was associated with higher functional class of CHF by NYHA, myocardial hypertrophy, increased left atrium size, left ventricle diastolic dysfunction and RV longitudinal systolic dysfunction.

P2002
Myosin heavy chain and MAP-kinease activating death domain-containing gene polymorphisms in adults with hypertrophic cardiomyopathy

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Background and Purpose: Hypertrophic cardiomyopathy is the most common inherited cardiac disorder. Phenotypic manifestation of the disease, especially in the adult and elderly group, depends on many environmental and genetic factors, including co-expression of BNP and NT-proBNP. The aim of this study was to evaluate the genotype and allele distribution in rs2290149, rs10838692, rs753992 of MADD gene and rs2069542 of the MYH7 gene in adults with hypertrophic cardiomyopathy (HCM).

Methods: The study group included 154 patients with HCM at the age 45 - 91 years (57.69 ± 11.19 years, men - 48% women - 52%). The diagnosis of HCM was established according to the guideline of the European Society of cardiology on the diagnosis and treatment of HCM, 2014. The control group included 257 healthy donors (82.5% vs. 77%, r=0.055). The allele frequency also differs for rs2290149 (r=0.008, p=0.01), tricuspid annulus lateral s’ (r=-0.79, p<0.002), and basal lateral RV wall s’ (r=-0.84, p=0.000), medium lateral RV wall s’ (r=-0.73, p=0.02).

Results: We observed a significant increase in frequency of TT genotype of rs10838692 of the MADD gene in patients with HCM compared to healthy group (55.2% vs. 45.3%, p= 0.05). A trend although not reaching a statistical significance was detected towards the predominance of the TT genotype in rs2290149 of the MADD gene in patients with HCM compared to healthy donors (82.5% vs. 77%, p=0.055). The allele frequency also differs for rs2290149 (TT = 89.9%, 10.1% in control group, p = 0.007) and for rs10838692 (TT = 72.4%, 37.6% in control, p = 0.009). We did not detect any difference in genotype and allele distribution for rs753992, rs753992 of MADD gene and for rs2069542 of the MYH7 gene.

Conclusion: In older adults with HCM the T allele of SNP rs2290149 and SNP rs10838692 and TT genotype of rs10838692 of the MADD gene are prevailing compared to healthy individuals, while polymorphic variants rs7124958, rs753992 of the MADD gene and rs2069542 of the MYH7 gene had no association with HCM.

P2003
The role of soluble ST2 and galectin-3 in hypertrophic cardiomyopathy assessed by cardiac magnetic resonance

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Background: Soluble ST2 (sST2) and galectin-3 (Gal-3) are useful biomarkers for prognosis of heart failure. Both of them are involved in cardiac fibrosis and remodeling. Myocardial fibrosis identified on cardiac magnetic resonance (CMR) imaging is present in approximately 70% of patients with hypertrophic cardiomyopathy (HCM) and may play an important role in predicting sudden cardiac death in this population.

Purpose: The aim of this study was to evaluate sST2 and Gal-3 as potential biomarkers in HCM.

Methods: Serum sST2 and serum Gal-3 concentrations were measured in 60 patients with HCM and 20 healthy controls with normal physical examination. The patients with HCM underwent 12-lead electrocardiography (ECG), two-dimensional (2D) echocardiography, 48-hour Holter ECG monitoring, NT-proBNP and high-sensitivity Troponin T measurements. Additionally, CMR exam was performed in this group to calculate left ventricular (LV) mass, LV mass indexed for the body surface area (LVMi), ejection fraction (LVEF), and maximal wall thickness (MWT). The control group underwent 12-lead ECG, 2D echocardiography and NT-proBNP measurements to exclude asymptomatic heart disease.

Results: Concentrations of sST2 and galectin-3 were significantly higher in patients with HCM than in control group [5.0 [3.8 - 18.9] vs. 12.9 [9.4 - 14.8] p=0.04 and 8.4 [6.8 - 10.0] vs. 6.1 [5.5 - 7.6] p=0.003, respectively]. We observed positive correlations between sST2 levels and CMR-derived parameters: LV mass (r=-0.296, p=0.003), LVMi (r=-0.290, p=0.028) and MWT (r=-0.334, p=0.015). Gal-3 levels were associated only with hs-cTnT concentrations (r=0.257, p=0.046). We confirmed positive correlations between NT-proBNP levels and LV mass (r=0.328, p=0.0038), LVMi (r=0.458, p=0.0002) and MWT (r=0.438, p=0.0004). There were also positive correlations between hs-cTnT levels and LV mass (r=0.598, p<0.00001), LVMi (r=0.518, p<0.00001), MWT (r=0.337, p=0.008), and negative correlation between hs-cTnT levels and LVEF (r=-0.355, p=0.006). Patients with non-sustained ventricular tachycardia (nsVT) had higher levels of sST2 [19.0 [9.6 - 22.6] vs. 13.7 [9.2 - 17.4] p=0.027] and hs-cTnT [24.2 [16.2 - 31.3] vs. 11.0 [7.4 - 22.9] p=0.038].

Conclusions: Our study confirmed that NT-proBNP and hs-cTnT are valuable biomarkers in HCM. Gal-3 levels were higher in patients with HCM than in control group, but there were no correlations between Gal-3 levels and CMR-derived LV dimensions. We demonstrated a significant correlations between serum sST2 levels and LV mass, LVMi and MWT assessed by CMR in HCM patients. Levels of sST2 were also higher in patients with nsVT. These findings suggest that sST2 may have a potential as a biomarker for better risk stratification in HCM.

Figure 1. Correlations between sST2 levels (mg/ml) and CMR-derived parameters: (A) MWT (mm), (B) LVMi (g/m²), and (C) LV mass (g) in HCM patients. Levels of sST2 in patients with nsVT (D).
Background: Arterial stiffness is known marker of poor cardiovascular prognosis. Associations of valve calcification and arterial stiffness in patients with end-stage renal disease (ESRD) are not well studied. The aim of the study was to assess the incidence of valve calcification in patients with and its associations with clinical parameters and markers of arterial stiffness.

Methods: In 68 adults with end-stage renal disease on maintenance hemodialysis for >3 months (45.6% males, median age 58.3 ± 7.7 years, dialysis duration 62.7 ± 67.7 months, body mass index 26.8 ± 5.3 kg/m², arterial hypertension 94.6%, stable angina 34.6%, heart failure 28.1%, diabetes mellitus 21.2%, glomerulonephritis 35.2%, pyelonephritis 25.0%, multivisceral dysplastic kidney 13.5%, euthyroidism 10%) echocardiography and applanation tonometry were performed. Calcification in mitral, aortic or both valves and parameters of arterial stiffness and central pulse wave were assessed. Mann-Whitney test was performed. P < 0.05 was considered significant.

Results: Calcification of the aortic, mitral and both valves were revealed in 46 (67.6%), 34 (50%) and 38 (51.4%) of patients respectively. 20 (29.4%) patients had no signs of calcification of valves. Patients with vs without calcification of aortic valve were older (65.1 ± 9.5 vs 41.4 ± 11.9 years, p < 0.001), had higher diastolic blood pressure (51.8 ± 20.2 vs 71.3 ± 17.5 months, p < 0.001), left atrium volume (LAV) (44.4 ± 20.7 vs 42.5 ± 20.5 ml, p < 0.05), area aortic valve (AVAV) (44.2 ± 24.8 vs 40.2 ± 14.3 ml, p < 0.05), lower stroke volume (SV) (71.9 ± 10.2 vs 78.4 ± 13.6 ml, p < 0.05). Patients with vs without calcification of mitral valve had lower peripheral diastolic blood pressure (DBP) (76.7 ± 17 vs 84.2 ± 14 mmHg, p < 0.05), central DBP (75.8 ± 11 vs 82 ± 11 mmHg, p < 0.05), lower reflected wave transit time (RWT) (131.1 ± 17 vs 137.5 ± 15 ms, p < 0.05). Patients with vs without calcification of mitral valve were older (67.8 ± 8.2 vs 47.9 ± 13.5 years, p < 0.001), had higher diastolic blood pressure (51.8 ± 34.11 vs 76.4 ± 15.7 months, p < 0.001), LAV (45.43 ± 46.3 vs 42.52 ± 40.64 ml, p < 0.05), systolic pulmonary artery pressure (SPAP) (23.27 ± 7 vs 29.7 ± 30.0 mmHg, p < 0.001), lower stroke volume (71.8 ± 10.3 vs 78.4 ± 13.6 ml, p < 0.05). Patients with vs without calcification of mitral valve had lower heart rate (62 ± 13 vs 45 ± 16 mmHg, p < 0.05), lower RWT (13.3 ± 120 vs 135 ± 124.12 ms, p < 0.05).

Conclusion: High prevalence of valve calcification (71%) was revealed in patients with ESRD on maintenance hemodialysis. Patients with vs without valve calcification were older, had higher duration of dialysis and more pronounced arterial stiffness.

P2205
control of uric acid in the blood - A new lever quality of life of patients with rheumatoid arthritis and chronic heart failure
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Increased uric acid levels in patients with chronic heart failure and in patients with rheumatoid arthritis - the spread in the clinic. The impact on quality of life of hyperuricemia in patients with chronic heart failure, as well as ways of correction of elevated levels of uric acid in patients by different ways until plasmapheresis and prednisone - study topic. Today, however, it is not clear whether there is a relationship between the level of hyperuricemia in patients with rheumatoid arthritis and chronic heart failure with quality of life. Purpose of the study. To study the effect of hyperuricemia on the quality of life of patients with rheumatoid arthritis and chronic heart failure.

Materials and methods: We examined the patients (n = 79), including 46 women and 33 men, average age - 55.6 ± 7.2 years, with verified diagnosis of rheumatoid arthritis by ACR criteria (1987). Chronic heart failure and its functional class (for NYHA) exhibited on the basis of complex clinical and laboratory, instrumental methods that included physical examination of the patient, with the six-minute walking test, echocardiogram, pro-BNP. 77% of patients had hypertension, 23% angina pectoris, 15% had a combination of these diseases. All of the patients at the time of inclusion in the study were 1st functional class of angina and well-controlled blood pressure. Quality of life was assessed by the SF-36 questionnaire.

Results: Found correlation communication between the strength of the level of uric acid in the group of men surveyed and functional class chronic heart failure (p = 0.05). In the subgroup of women this correlation goes missing (p = 0.12). In addition, if not statistically different functional class of heart failure, patients with higher levels of uric acid had statistically lessens indicators by questionnaire SF-36, such as the role functioning (p = 0.008), role physical functioning (p = 0.005), physical pain (p = 0.003), social functioning (p = 0.002). Also found a correlation of medium strength, positive between uric acid levels and an indicator on the questionnaire SF-36 mental health.

Conclusion: The results show the effect of hyperuricemia on the functional class of chronic heart failure in men with rheumatoid arthritis. Also, the findings suggest a direct effect of hyperuricemia on the quality of life parameters in patients with rheumatoid arthritis and chronic heart failure and reverse its impact on the mental quality of life parameters.
Methods: This is an observational prospective study that enrolled 102 patients with the following inclusion criteria: a) advanced HF (stage C-D as per the ACC/AHA classification); b) at least one previous decompensating episode, c) non-clinical signs of active infection. In all of them, we performed a lactulose breath test collecting breath samples at baseline and every 20 minutes for 2 hours. Negative biornodal regression method was used to determine the association between the area under the receiving operator curve of H2 and CH4 (AUC-H2 and AUC-CH4, respectively) and the risk of recurrent hospitalizations. Estimates of risk were reported as incidence rate ratios (IRR).

Results: Median (interquartile range) of AUC-H2 and AUC-CH4 were 1290 (520-2430) and 985 (450-2120), respectively. SIBO prevalence was up to 65.69% of the sample. At a median (interquartile range) follow up of 203 (80-369) days, 100 all-cause readmissions in 49 patients and 51 AHF-readmissions in 26 patients were recorded. In multivariable setting, AUC-H2 was significant, positive and linearly associated with an increased risk of recurrent all-cause (IRR=1.14; CI 95%:1.03-1.27; p = 0.014) and AHF-hospitalizations (IRR=1.27; CI 95%:1.06-1.52; p = 0.01) as is shown in figure 1a and 1b.

Conclusions: In this preliminary study, exhaled H2 and CH4 after a lactulose breath test were independently associated with higher risk of recurrent admissions in patients with HF.

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P2211
Anaemia is associated with development of acute heart failure in patients with acute coronary syndrome: propensity-score matched study

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Introduction: Anaemia is a prevalent comorbidity in patients with heart failure (HF), associated with worse prognosis as highlighted by 2016 ESC guidelines of HF, which reinforced the importance of its treatment to improve HF patients’ outcomes. However, the role of anaemia in the development of acute HF in patients with acute coronary syndrome (ACS) is not well characterized.

Purpose: Authors pretend to evaluate if anaemia at admission for ACS is associated with in-hospital development of acute HF.

Methods: Observational retrospective study, with a sample of 594 consecutive patients admitted for ACS. Patients were divided in two groups: with anaemia, defined as haemoglobin at admission less than 12 g/dL, and without anaemia. Propensity-score was calculated to each patients taking into account age, sex, previous history of smoking, arterial hypertension, diabetes mellitus, hyperlipidaemia, myocardial infarction, percutaneous coronary intervention, coronary artery bypass graft, heart failure, significant valvular disease, stroke, peripheral arterial disease, cancer, chronic obstructive pulmonary disease, dementia, family history of coronary artery disease, type of acute coronary syndrome justifying admission, severity of coronary artery disease, degree of revascularization and value of creatinine at admission. Each patient with anaemia was matched with a patient without anaemia with similar propensity-score. Outcome of acute HF was defined as evolution in Killip-Kimball classes 3 (acute pulmonary oedema) and 4 (cardiogenic shock) during hospitalization. The association of anaemia with acute HF was assessed in the matched-pairs with logistic regression and p < 0.05 was considered statistically significant.

Results: From the study sample of 594 patients, 120 (20.2%) patients had anaemia at admission. Matching each patient with anaemia with a patient without anaemia with similar propensity-score resulted in 120 matched-pairs of patients and a study sample of 202 patients, due to multiple matching of controls. Matched-pairs on propensity-score were similar in every variable used in the construction of the propensity-score, proving the correct pseudo-randomization. Anaemia at admission was associated with the development of in-hospital acute HF with an odds ratio (OR) of 1.11 (95% CI 1.04 – 1.19, p < 0.05) was associated with the development of in-hospital acute HF with an odds ratio (OR) of 1.11 (95% CI 1.04 – 1.19, p < 0.05). The analytical parameters were (baseline-3 months post): Hemoglobin (Hb) 12.2 ± 1.6 vs. 12.8 ± 1.6 (ns); Hct 40.9 ± 3.9 vs. 43.2 ± 3.95 (ns); NT-proBNP 4845.9 ± 9391.0 vs. 3627.2 ± 4301.1 (p < 0.05).

P2212
Do we properly treat iron deficiency with intravenous ferric carboxymaltose in clinical practice?

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Introduction: Iron deficiency, with or without anaemia, is a common finding in patients with heart failure (HF), and its inappropriate correction with ferric carboxymaltose has been shown to improve the functional status and quality of life of the patients, according to FAIR-HF and CONFIRM-HF trials. However, there is less data about its effectiveness in clinical practice and the analytical follow-up of these patients.

Methods: We considered the patients in chronic follow-up in the HF Unit of our center in whom iron deficiency was detected in a routine analysis, according to 2016 ESC-HF clinical practice guidelines criteria. The analytical and clinical characteristics of the patients were collected. Intravenous ferric carboxymaltose was administered, adjusting the dose according to patient weight and analytical parameters (500 or 1000 mg in a single dose, 15 minutes time infusion in daily hospital of the HF Unit). Then, clinical and analytical reevaluation was performed at 3 months after infusion.

Results: Ferric carboxymaltose was infused in 122 patients, and 80 (66.2%) men completed the follow-up with control at 3 months. Only one patient presented an adverse effect consisting in local allergic reaction. The mean age was 86 ± 8.4 years old. 74.6% of the patients was in NYHA I, 70.4% in NYHA II and 22.2% in NYHA III. The cause of his heart disease was: ischemic 42.3%, valvular 55.6%, hypertensive 5% and other ones 27.1%. The mean left ventricular ejection fraction was 45.2 ± 17.3 %. The analytical parameters were (baseline-3 months post): Hemoglobin (Hb) 12.2 ± 1.6 vs. 12.8 ± 1.6 (ns); Hct 40.9 ± 3.9 vs. 43.2 ± 3.95 (ns); NT-proBNP 4845.9 ± 9391.0 vs. 3627.2 ± 4301.1 (p < 0.05).

Conclusion: According to our results, the intravenous administration of ferric carboxymaltose in patients with iron deficiency and heart failure is safe and improves the analytical parameters of the ferric profile even 3 months after infusion. The impact on hemoglobin is lower, due to the multifactorial origin of anemia. In addition, there was a significant decrease in cardiac biomarkers.

P2213
Comparison of diagnostic criteria for iron deficiency in heart failure

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Background: Iron status assessment in routine clinical care of heart failure (HF) patients is mainly based on circulating levels of ferritin and transferrin saturation (TSAT), with ferritin < 100 µg/L being diagnostic for absolute ID and ferritin 100 – 199 µg/L with TSAT < 20% meaning functional ID. Recently, hepcidin < 14.5 ng/mL and/or soluble transferrin receptor (sTfR) ≥ 1.59 mg/L were proposed to diagnose ID.

Purpose: We compared the diagnostic performance and concordance between ferritin/TSAT and hepcidin/sTfR for ID diagnosis in acutely decompensated and stabilized HF.

Methods: Data derive from a single center study, investigating the evolution of biomarkers upon presentation with ADHF and 30 days of follow-up (FU).

Results: Ferritin/TSAT levels at admission and 30 days of FU were available for 47 patients. At admission, twenty-seven patients fulfilled criteria for absolute ID (57%) and twelve patients for functional ID (25%). At 30 days of FU, 5 patients (11%) and 27 patients (57%) had absolute and functional ID respectively. Circulating levels of hepcidin and sTfR were available for 41 patients at admission. Thirty-four patients (83%) were ID. Twenty-seven patients (66%) were identified as ID by ferritin/TSAT and hepcidin/sTfR. Seven patients (17%) were considered ID based on hepcidin/sTfR yet not based on ferritin/TSAT. Six patients (15%) were considered ID based on ferritin/TSAT but not based on hepcidin/sTfR. There was no significant difference in the sensitivity of ferritin/TSAT and hepcidin/sTfR to detect ID at admission; yet there was only a weak association between both tests (p = 0.78, phi coefficient 0.04). Levels of hepcidin and sTfR were available for 46 patients after 30 days of FU, 36 patients were ID (78%) and 10 (22%) were non-ID. When comparing hepcidin/sTfR and ferritin/TSAT to diagnose ID at 30 days of FU, 63% of patients was similarly identified as either ID or non-ID in both assays, 24% was ID using ferritin/TSAT yet not using hepcidin/TSAT; 13% was ID using ferritin/TSAT yet not using hepcidin/sTfR. These differences did not reach statistical significance (p = 0.2253; phi coefficient 0.18). Comparing the detection rate of ID using either hepcidin/sTfR at admission and ferritin/TSAT at 30 days of FU, 24 patients (59%) were identified as ID in both assays. Three patients (7%) who were considered false negatives and 10 patients (24%) were considered false positives using hepcidin/sTfR during ADHF if compared with ferritin/TSAT at 30 days of FU. The difference in ID detection using ferritin/TSAT at 30 days of FU and hepcidin/sTfR at admission was borderline significant (p = 0.05), with a moderate measure of association (phi coefficient 0.33).

Conclusion: There is only a moderate correlation at most between ferritin/TSAT and hepcidin/sTfR to assess ID, urging for additional research to adequately detect ID using circulating biomarkers.

P2214
Prevalence of iron deficiency in acute decompensated and stabilized chronic heart failure

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Background: In clinical studies, the reported prevalence of iron deficiency (ID) varies remarkably. Estimates range between 30-50% in patients with stable chronic heart failure (CHF), whereas 60-80% of patients are reported to be ID in acute decompensated HF (ADHF). We hypothesised that the timing of its assessment influences the reported prevalence of ID.

Purpose: We aimed to depict the spontaneous evolution of biochemical parameters of iron metabolism following presentation with ADHF and ensuing treatment; secondly, we wanted to unravel the pathophysiological processes explaining changing iron status.

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Methods: Data derive from a prospective, observational, single center study, investigating the evolution of biomarkers upon presentation with ADHF and 30 days of follow-up (FU). ID was defined as ferritin < 100 μg/L or ferritin 100–299 μg/L with transferrin saturation < 20%.

Results: We included 47 patients in the final analysis with a mean age of 70.4 years (IQR 67.1–73.6). Median ferritin of 93 μg/L (IQR 76–107 μg/L) and median brain natriuretic peptide (BNP) of 1044 pg/mL (IQR 652–1676 pg/mL) at baseline. At 30 days of follow-up, ferritin levels significantly increased (median: 159 μg/L, IQR 134–190 μg/L; p < 0.0001), BNP significantly decreased (median: 261 pg/mL, IQR 176–482 pg/mL; p < 0.0001), whereas 57%, 26% and 17% of patients had absolute, functional and no evidence of ID respectively at admission; these respective percentages changed to 11%, 57% and 32% at 30 days of FU (p=0.0001). There was only a moderate association between ID status at baseline and 30 days of FU using ferritin/TSAT (phi-coefficient 0.26). Changing ferritin levels between 0 and 30 days correlated with changing levels of mid-regional pro-adrenomedullin, BNP, procalcitonin, interleukin 6, CRP, growth differentiation factor 15, galectin-3, fibrinogen, gen nor myeloperoxidase. Our results implicate systemic inflammation, not dilution, as one causative factor of increased ID prevalence in ADHF compared to CHF.

Conclusion: During ADHF, ID diagnosis based on ferritin levels and transferrin saturation is unreliable: indices of iron metabolism vary and only reach a steady state several weeks after remission of ADHF. Systemic inflammation, not dilution, may be one of the causative factors of altered iron status between admission and steady state. These results suggest that ID diagnosis and correction should only be undertaken at distance of an ADHF episode.

PP215 Assessment and treatment of iron deficiency in patients hospitalised for heart failure
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Introduction: Iron deficiency (ID) is common in patients with heart failure (HF). Despite current guidelines and existing evidence stating the importance of ID as a co-morbidity in patients with chronic HF, ID has continued to remain under-diagnosed and under-treated by physicians in clinical practice, including in patients hospitalised for decompensation.

Purpose: To investigate whether hospitalised patients with HF were screened routinely for ID within 12 months of their admission, and whether they were managed according to the latest recommendations.

Methods: This retrospective observational study included 154 patients who were admitted over a 6-month period with a primary diagnosis of decompensated HF. Anaemia was defined as haemoglobin < 13g/dL for men and <12g/dL for women. ID was defined as either serum ferritin < 100μg/mL or serum ferritin 100-299μg/mL and transferrin saturation <20%.

Results: Out of the 154 included patients, 68 patients had an ejection fraction (EF) of <50%, while 60 patients had heart failure with preserved ejection fraction (HFpEF). The other 26 patients’ EF was unknown. Slightly more than half (82; 53.25%) of all patients had had a recent iron study. Of the 82 patients who had iron studies performed, 60 (38.96%) had ID. However, only 22 (36.67%) received iron replacement therapy. 100 patients (64.54%) were found to be anaemic, with only 66 of them being investigated for ID. Of the 66 patients (78.79%) were later found to be iron-deficient but only 20 (38.46%) of them were treated. In patients with no evidence of anaemia, iron parameters were only assessed in 15 (27.78%) of them.

Conclusion: Although the prevalence of ID in our study was consistent with that of other studies, many patients did not have an assessment of their iron status. Due to its clinical impact, it is important to reinforce awareness in treating physicians are necessary.
Background: In registries on acute heart failure (HF), anemia (An) and iron deficiency (Df) are common, particularly in patients hospitalized with severe HF, women, elderly and with renal impairment. An and Df showed in some studies a negative independent prognostic value. Aim of the present study was to analyze the frequency and prognostic relevance of An and Df in patients admitted in 2009-2014 for acute HF in the area of our city in Northern Italy.

Methods: Data were retrieved from the Cardiovascular Observatory of our city. Different databases were linked: hospital records with discharge diagnosis, cardiological chart, laboratory tests, registry of death. HF diagnosis included ICD-9th codes for heart failure (428.x) and hypertensive heart failure (402.01, 402.11 and 402.91) according to National Outcome Evaluation Program (PNE). Patients were included in the analyses if hemoglobin (Hb), ferritin and TSA were available. An was defined as Hb < 12 g/dl in females and < 13 g/dl in males; ID as ferritin < 100 µg/L or ferritin 100-300 µg/L and TSA < 20%. "Worsening" HF (WHF) was classified in presence of at least one HF hospitalization in the 5 years preceding the index admission.

Results: Out of 7466 hospital admissions, 3046 (40.8%) were available for evaluation. An and Df were present in 49.8% of cases. Only ID in 6.2%, only An in 10.3%, No An or No ID in 33.7%. Patients with An and Df vs No An and No ID showed an older age (82.5 ± 7.9 vs < p < 0.001), more frequent female gender (61.9% vs 40.5%, < p < 0.001), worsening HF (47.1% vs 34.7%, < p < 0.001), Charlson index ≥ 3 (76.4% vs 62.1%, < p < 0.001), H-FABP (1.2% vs 47.4%, < p < 0.001) and CKD-EPI < 60 ml/min (77% vs 66.3%, < p < 0.001). Follow-up was 33 months. KM curves were significantly different among the 4 groups (< p < 0.001). At multivariate analysis age (HR 1.02; 95% CI 1.01–1.03; < p < 0.001), male gender (1.15; 95% CI 1.01–1.31; < p < 0.02), Charlson index ≥ 3 (1.42; 1.22–1.66; < p < 0.001), worsening HF (1.6; 1.49–1.93; < p < 0.001), BNP > 450 pg/ml (1.36; 1.20–1.55; < p < 0.001) were independently associated to all-cause mortality. An and Df showed a trend of correlation (HR 1.25; 95% CI 0.98–1.64; p = 0.098).

Conclusions: An and Df are frequent in acute HF particularly in elderly female patients, with worsening HF, HFSDF and mutimorbidity (specifically renal impairment). An and Df are less strongly related to mortality. The correlation with symptoms and re-hospitalizations may improve our understanding of the clinical impact of An and Df on quality of life of HF patients.

Background: In the setting of acute decompensated heart failure (ADHF) worsening renal function (WRF) has been associated inconsistently with a poor prognostic, even less is known on improved renal function (IRF) and the association between the two phenomena.

Purpose: To better characterise WRF and IRF (prior, during and after hospitalization) and their associated risk of 180 days cardiovascular (CV) mortality.

Methods: Consecutive patients with a discharge diagnosis of ADHF were reviewed. IRF was defined as a reduction of ≥ 0.3 mg/dl in serum creatinine and an improvement by ≥ 20% in glomerular filtration rate (GFR), whereas a worsening in creatinine and GFR by the same cut-offs defined WRF. Patients who received renal replacement therapy, contrast medium or transfusions were excluded from this study. Mortality was judged as CV unless a clear non-cardiac cause was identifi-able. Pre-admission and post-discharge lab test within a six-month period of time were collected; chronic renal failure (CRF) was defined as GFR < 60 ml/min for at least three months prior hospitalization.

Results: In a six month period, 121 patients were eligible. During hospitalization, 23.9% of them experienced IRF whilst 42.1% WRF. Different from the in-hospital WRF group, those undergoing IRF had an increased risk of short-term CV mortality (HR = 4.3, 95% CI 1.6–11.6, p = 0.004; < p < 0.05 even after adjustment for baseline characteristics, in-hospital and discharge medications; for any level of GFR at discharge and for GFR > 30 ml/min on admission). IRF patients showed no difference in the prevalence of signs of venous congestion or medications used; however, they needed more diuretics to obtain a similar diuresis (p = 0.04) and had a greater neuro-hormonal activation on admission, with a higher BUN/creatinine ratio (96 ± 19 vs 44 ± 15, p = 0.001) and lower levels of sodium (134.9 ± 5 vs 136.9 ± 3.8 mEq/L, p = 0.02). IRF patients, compared to the WRF group, had a lower GFR on admission (56.1 ± 14.5 vs 64.9 ± 23.6 ml/min, p < 0.001) but no different values at discharge (58.9 ± 22.2 vs 55.3 ± 21.2 ml/min, p = NS); moreover, the prevalence of CRF was similar (p = NS), thus suggesting a pre-admission WRF in the IRF group. In fact, we found an association between in-hospital IRF, pre-admission WRF (OR = 15, 95% CI 4.6–48, p < 0.001) and post-discharge WRF (OR = 3.6, 95% CI 1.1–11.6, p = 0.03). After adjustment for any level of admission GFR, a pre-admission WRF was found to be an independent predictor of CV mortality (adjusted HR=5.9, 95% CI 2-17.4, p = 0.02).

Conclusion: pre-admission WRF, in hospital IRF and post-discharge WRF are associated phenomena with a higher risk of CV-mortality. We agree with other authors that IRF may represent the resolution of a pre-admission WRF, induced by venous congestion. This trend, together with a marked neuro-hormonal activation, may sig-nify a more advanced stage of heart failure.
Background: Chronic heart failure (CHF) is currently one of the main problems of modern cardiology and public health. 

Purpose: To study changes in renal function and their relationship with the severity of chronic heart failure (CHF) in patients with chronic kidney disease (CKD) and improve the quality of life in patients with severe FC.

Material and methods: The study group included 72 patients with chronic heart failure (CHF), different functional classes with left ventricular ejection fraction less than 40% (LVEF ≤ 40%), in whom GFR was measured in the department of cardiology and cardiology departments as a control group examined 25 patients with coronary heart disease (CHD), stable angina pectoris (CAP) and hypertension. Exclusion criteria included patients with-associated neoplasms, severe liver disease, chronic pulmonary disease, and other acute and chronic infections.

Results: During the study, 14 patients had serum creatinine concentration within normal range (71-115 µmol/L), 10 patients increased slightly (123 µmol/L to 144 µmol/L), while 48 patients had an increase in serum creatinine concentration exceeding normal values (> 115 µmol/L) to 309 µmol/L. 12 patients had creatinine concentration exceeding normal values (> 115 µmol/L) to 309 µmol/L. It was observed in 13 (46.6%) patients with LVEF ≤ 40% (p ≤ 0.007) patients in the group of patients with a creatinine concentration was normal in 27 (90.0%) patients (p ≤ 0.05) and slightly elevated in 3 (10.0%) patients. It highlights the need for calculation of GFR for the timely diagnosis of renal dysfunction in patients with CHF.

Conclusion: The growth of FC in CHF leads to more frequent cases of chronic kidney disease. When FC I and II of heart failure, according to GFR, chronic kidney disease was significantly less, than in patients with chronic heart failure FC III and IV. Reduction of hemodynamic parameters associated with reduced glomerular filtration rate, which indicates the necessity of correction to reduce the incidence of chronic kidney disease and improve the quality of life in patients with severe FC of CHF.

P2221

Predictors of acute kidney injury in acute cardiac syndrome

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Aim: The aim of this study was to identify independent predictors of acute kidney injury (AKI) in patients with acute heart failure (AHF).

Methods: We analysed clinical, echocardiographic parameters and selected biomarkers in 74 consecutive patients admitted to intensive care unit due to AHF. Mean age of the patients was 69 ± 13.3 years, with gender distribution 48/26 (M/W). Majority of patients were admitted with de novo diagnosed AHF (55.4%). HFrEF/HFrEF/HFpEF was in 34/24/16 patients. Mean value of systolic blood pressure (BP) was 140 ± 30 mmHg. Renal damage was defined according to KDIGO guidelines based on creatinine levels and daily diuresis. Patients were divided into two groups AKI + (with renal injury, n=30) and AKI− (without renal injury, n=56). Age, BMI, history of diabetes, hyperlipidemia, chronic kidney disease, ACEI and ARB use, smoking status, atrial fibrillation, systolic and diastolic blood pressure, New York Heart Association functional class, LVEF, previous myocardial infarction, perioperative volume expansion, duration of mechanical ventilation, underwent surgery, preoperative diabetes mellitus, atroventricular block, atrial fibrillation, AF, the need for dialysis, creatinine at admission, GFR at admission, remained significant predictors of AKI. Multivariate analysis by stepwise forward logistic regression analysis revealed that renal failure at presentation was the strongest predictor of AKI independent of other variables.

Results: The development of AKI was recorded in 27% of patients. These patients were older (median age: 76 vs 64 years, p=0.007), with lower BMI (median: 27 vs.29 kg/m2, p = 0.02), particularly in HFrEF group (45.8%, p = 0.002). Urinary NOx was at admission significantly higher in the AKI+ compared to AKI− group (154 vs. 19.5 ng/mL, p = 0.0001). Except BMI, parameters as age (OR 2.3; 95% CI 1.7-3.5, p=0.03), systolic BP (OR 3.0; 95% CI 1.0-5.0, p=0.002), u-NOx (OR 0.97; 95% CI 0.89-1.00, p = 0.0001), s-NtproBNP (OR 1.03; 95% CI 0.94-1.08, p = 0.0001), s-NTproBNP (OR 1.4; 95% CI 0.99-1.8, p = 0.004) and u-NOx (OR 1.1; 95% CI 1.01-2.12, p=0.007) significantly identified development of AKI.

Conclusion: The predictors of AKI in the AHF patients were age, systolic BP, elevated levels of cardiac failure markers and also renal injury markers together with determination of LVEF and s-hemoglobin at admission.

P2222

Cardiotoxicity in breast cancer patients receiving trastuzumab - assessing the clinical need for a structured cardio-oncology service

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Introduction: Trastuzumab has revolutionised the management of HER2 positive breast cancer. However, cardiotoxicity is a well recognised complication. Many patients also receive anthracyclines which can increase this risk. We reviewed the incidence of left ventricular ejection fraction (LVEF) reduction in patients who received trastuzumab in our hospital to assess the need for a structured Cardio-oncology service.

Methods: Review of charts and all echocardiograms (ECHO) for patients who received trastuzumab therapy between 2010 and 2015.

Results: Between 2010 and 2015, 134 patients completed trastuzumab treatment for breast cancer. Follow up data was available in 109 patients. The median age at first dose was 52 years (SD 12.8). Ninety nine (91%) were invasive ductal carcinoma with 6.5% being tubular. Eleven (10%) had metastatic disease, 51 (48.8%) had-breast positive disease and 47 (43.1%) were node negative.

Conclusions: Cardiotoxicity in breast cancer patients receiving trastuzumab was beneficial until now. We found that trastuzumab therapy may cause cardiotoxicity; however, the evidence is not conclusive and more research is needed.
systolic dysfunction didn’t seem to have benefit in preventing cardiotoxicity.

Systolic biventricular dysfunction. The use of cardioprotective therapy previous to triculardysfunction. Obesity seem to be a protective factor in the risk of developing

Conclusion:

p no difference in LVEF, GLS, TAPSE, tricuspid S’ variation in T0-T4, between patients

superior in G1 tumors versus G3 (24.0

in T0-T3 (p

= 0.026). At T1, GLS was significantly better in G1 tumors versus G2 (p = 0.001). Lateral S’ was lower in G2 tumors versus G3 (p = 0.767). TAPSE was superior in G1 tumors versus G3 (2.45 ± 0.55 versus 1.99 ± 1.6, p = 0.008). There was no difference in LVEF, GLS, TAPSE, tricuspid S’ variation in T0-T4, between patients with or without cardioprotective drug and/or statins: p = 0.915, p = 0.599, p = 0.268, p = 0.767 respectively.

Conclusion: Hypertension and dyslipidemia were associated with higher left ven-

tricular dysfunction. Obesity seems to be a protective factor in the risk of developing systolic biventricular dysfunction. The use of cardioprotective therapy previous to systolic dysfunction didn’t seem to have benefit in preventing cardiotoxicity.

Evaluation of routine use of global longitudinal strain for the early detection of subclinical left ventricular dysfunction in cancer patients

Results:

Among 62 consecutive patients, 14 patients (23%) had

≥ 15% relative reduction, its correlation to LVEF reduction and if

10% relative reduction in GLS, of which 68% had no EF reduc-
tion or systolic pulmonary artery pressure) were significant predictors for GLS reduc-
tion. There were no significant differences in the baseline characteristics; however,

Conclusion: Early identification of cardiac dysfunction is essential for the preven-
tion of symptomatic heart failure. Our study demonstrates that GLS reduction is frequent among cancer patients and precedes the LVEF reduction and cannot be anticipated by other echocardiographic parameters. Using GLS routinely during cancer treatment may lead to an early cardioprotective treatment and prevention of irreversible LVEF reduction and heart failure.

VALVULAR HEART DISEASE (DIAGNOSIS, MANAGEMENT AND INTERVENTIONAL THERAPIES)

P2225

Severe aortic stenosis: experience and outcomes of a tertiary center

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Introduction: Aortic stenosis continues to be the most prevalent valvopathy, conditioning high morbidity and mortality. Transcatheter aortic valve implantation (TAVI) emerged as a revolutionary therapy in patients (pts) with high surgical risk, and it may alter the paradigm in the treatment of severe aortic stenosis (sAS). This study aims to characterize the population of pts from a tertiary center with diagnosed sAS during the year 2015 and its therapeutic approach.

Methods: Retrospective uncentered study, with inclusion of consecutive pts with sAS (excluding low-flow low-gradient and paradoxical aortic stenosis) diagnosed during 2015 in a tertiary center. Clinical, laboratory and echocardiographic parameters were collected at the time of diagnosis and the type of therapy (medical, surgical, percutaneous) and mortality were evaluated.

Results: A total of 278 pts were included (94% women and 46% men, mean age 74 ± 9 years). The most frequent found comorbidities were hypertension (83.3%), dyslipidemia (67.4%), chronic kidney disease > 3 (34.4%), coronary artery disease (33%), diabetes (32.5%) and smoking (13.7%). Concerning echocardiographic eval-

uation, the mean left ventricular ejection fraction was 58 ± 11.14% and the peak aortic jet velocity was 4.58 ± 0.5 m/s, conditioning a mean gradient of 52.2 ± 12.7 mmHg. The valve area was 0.75 ± 0.2 cm2 (0.43 cm2/m2 when indexed to body surface area - BSA). The left ventricular mass/BSA mean value was 149.69 ± 41.2 g/m2. 33% of the pts also had significant aortic and/or mitral regurgitation. The majority of the pts was symptomatic, with anger being the most reported symp-
tom (79%) and 43% of pts were in functional NYHA class II. The mean value of NTproBNP was 691 pg/mL In this population, 167 pts (60.3%) underwent valvular replacement surgery. 41.4% had aortic percutaneous valvuloplasty and 24 underwent TAVI (8.7%). The remaining patients (29.6%, n = 82), were maintained under optimized medical therapy and follow-up. The overall mortality rate was 22.1%, and it was significant higher when conservative strategy was adopted (50% vs 9.3% in pts undergoing surgery vs. 12.5% in pts undergoing TAVI).

Conclusions: This sample, composed of elderly pts with several cardiovascular comorbidities, shows the experience of a tertiary center in the post-TAVI era and reinforces the unequivocal superiority of aortic valve intervention (surgical and/or TAVI) versus conservative medical therapy. TAVI thus emerges as a safe option, comparable to surgery, in this real-life population.

P2226

Epidemiological characteristics, clinical and echocardiographic evaluation of rheumatic mitral stenosis in men

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Introduction: In most developing countries, the rheumatic mitral stenosis, sequelae of acute rheumatic fever, is one of the first affections of the young adult. According to the published series, the proportion of women affected mitral stenosis is twice as high as that in men population.

Material and Methods: We report the results of a retrospective study, over 3 years (January 2014 - January 2017), and collected from 300 files of patients with rheumatic mitral stenosis, followed in the cardiology department of University Hospital, MOROCCO. The objective of our work is to identify the particularity epidemiological; Clinical and echocardiographic of rheumatic mitral stenosis in men.

Results: The series consists of 100 men and 170 women. The average age of women was 38 years compared with 45 years for men. The majority of men (70%) are diagnosed after the age of forty.
The Clinical presentation shows no specificity between the two sexes. Heart failure and complete atrial fibrillation are the most frequent complications in both sexes; With a clear predominance of the complete atrial fibrillation arrhythmias in women (80%) against 60% of men. The calcifications of the mitral valve and the shortening of the device under valvuloplasty, are present in 82% of the men against 53% of the women. The mitral stenosis was very tight in women (68%) and tight in men (50%). Associated aortic valve prolapse was more common in men with 80% versus 64% in women.

The left atrial dilatation and intra-aortic thrombi were more common in women, whereas that men had more dilated cavities.

Conclusions: Through this study we concluded that in men, the diagnosis of rheumatic mitral stenosis arises later; The rheumatic lesions are more severe and the aortic valve involvement is more frequently associated. The repercussion on the right cavities is more frequent, whereas that, the passage in complete atrial fibrillation arrhythmias as well as the intra-aortic thrombi are less observed in the man.

P2277
Predictors and long-term outcomes after transcatheter aortic valve replacement in high-risk patients with severe aortic stenosis
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Few data exist on the clinical impact of Transcatheter Aortic Valve Replacement (TAVR) in patients with symptomatic aortic stenosis and a high surgical risk. The aim of this study was to determine the survival and the factors predicting mortality after TAVR with the Auto-expandable prosthesis.

Methods: From April 2008 to December 2016, the CoreValve prosthesis was implanted in 582 patients with symptomatic severe aortic stenosis with deemed high risk.

Results: The mean age was 79.4 ± 6.9 years. The logistic EuroSCORE and STS score were 17.5 ± 12% and 7.3 ± 5%, respectively. The implantation success rate was 98.8% in hospital in 4 years, and the combined endpoint of death, vascular complications, myocardial infarction or stroke had a rate of 14%. The late mortality (beyond 30 days) was 32.1%. Survival at 1, 2, 3, 4 and 5 years were 83.3%, 71.8%, 60.7% and 50.3%, respectively, after a mean follow-up of 36.5 ± 12 years. The logistic EuroSCORE and STS score were 17.5 ± 12% and 7.3 ± 5% respectively, after a mean follow-up of 38.5 ± 25 months. The NYHA functional class improved from 3.1 ± 0.6 to 1.77 ± 0.7 in the follow-up. The predictors of cumulative mortality were: Charlson index [HR 1.2 (95% CI 1.08-1.336), p < 0.001], Acute Kidney Injury [HR 1.94 (95% CI 1.20-3.141), p = 0.007], Frailty [HR 2.33 (95% CI 1.43-3.817), p < 0.001] and protective factors were a higher Karnofsky index [HR 0.987 (95% CI 0.976-0.998) p = 0.002] and Ejection Fraction [HR 0.372 (95% CI 0.203-0.681), p < 0.001].

Conclusions: TAVR is associated with significant survival benefit throughout 2.59 years of follow-up. Survival during follow-up depends particularly among patients with associated comorbidities.

P2298
Redo-MVR operations: a 11-year single center experience
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Background and Aim: Major advances have been made in mitral valve (MV) surgical techniques, prosthesis design and perioperative care for patients undergoing MV replacement (MVR). Improved survival has inevitably meant that more patients will require redo-MVR during the follow-up. Patients undergoing redo-MVR are a diverse population. The aim of this study was to investigate the indications, clinical and epidemiological data of the patients who underwent the redo-MVR.

Methods: A retrospective review of hospital records was performed for 116 patients with age 49 ± 11 years (20-76 years), who underwent redo-MVR operations between 2004 and 2014. We described proper indications, clinical and epidemiological, preoperative, operative, and postoperative data of the study patients.

Results: Of study patients, 84% were female, 86% in NYHA III and 12% in NYHA IV class. Re-interventions were done for the first time in 89%, for the second time in 7.8% and for the third time in 3.5% of the patients. Mean time of the re-intervention was 11 ± 7.5 years from the previous intervention. Planned operation was done in 68%, whereas in 32% of patients it was an emergency. Previous MVR had 44% of patients, 40% were patients after commissurotomy, 2% after mitral valve repairation and 15% of them had concomitant interventions. From study patients, 54% had mitral stenosis, 33% had mitral regurgitation, whereas 13% had combined mitral valve disease (stenosis and regurgitation). Indications for in redo-MVR were: valvular structural degeneration (40%), thrombosis of MV prosthesis (17%), residual MV stenosis (14%), paraavalvular fistulas and mitral valve regurgitation (11%, for both). Mechanical MV prosthesis was implanted in 77%, whereas biological MV prosthesis in 12% of patients. Concomitant heart intervention was performed in 40% of operated patients (6 patients had aortic valve replacements, 4 had tricuspid valve replacements, 11 underwent tricuspid valvuloplasty and 3 patients had aorto-coronary by-pass). The prothetic dimensions were 28.6 ± 1.8 mm. Aortic cross-clamping time was 22 ± 13 minutes, length of stay in intensive care unit was 91 ± 14 hours, whereas the duration of hospitalization was 22 ± 13 days.

Conclusions: Female gender dominates and valvular structural degeneration is the most common indication for redo-MVR operation. The MV prosthesis thrombosis, emergency rate of redo-MVR and the hospital stay remain high in these patients.

P2229
Changes over time in infective endocarditis disease
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Background: Epidemiologic profile of patients (pts) with infective endocarditis (IE) has changed in recent years with fewer cases associated with rheumatic disease and a higher incidence in elderly due to degenerative valvular disease and health-care associated procedures.

Purpose: To analyze the main differences between 2006-2010 and 2011-2015 IE pts relative to epidemiology, microbiologic profile, outcomes during hospitalization and in-hospital death rate.

Methods: Retrospective study including consecutive pts with IE admitted to our centre during a 10 year period (2006-2015). Data on demographics, past medical history, clinical presentation, isolated microorganisms and echocardiogram findings were evaluated, as well as hospitalization outcomes. The differences between 2006-2010 and 2011-2015 IE pts were analyzed.

Results: We included 134 pts, 98 (73%) males, mean age 61 ± 16 years.53 pts were diagnosed with IE in the 2006-2010 period and 81 pts during 2011-2015 period. The pts diagnosed between 2011-2015 had a significantly lower median age (59 vs 73 years, p = 0.037), more previous hepatic disease (37% vs 14%, p = 0.001) and HIV infection (23% vs 7%) and fewer past history of arterial hypertension (32 vs 63%, p < 0.001) and coronary artery disease (8 vs 20%, p = 0.022). At admission, comparative to 2011-2015 pts, the 2006-2010 IE pts had less anemia (9 vs 43%, p < 0.001) and embolization symptoms (11 vs 28%, p = 0.022). The infection was significantly more considered to be nosocomial/health-care associated in 2011-2015 pts (9 vs 0%, p = 0.002).

The right-side valves were affected in 2006-2010 pts (23 vs 7%, p < 0.007). The mitral and aortic valves, as well as the prevalence of prosthetic and native valve IE weren’t significantly different.

Relative to microbiology, it was observed more IE due to viridans streptococci (4 vs 17%, p = 0.018) and less due to Streptococcus milleri (6 vs 0%, p = 0.03) during 2011-2015 period. We didn’t observed significantly differences between the two groups relative to echocardiographic findings, mean length of hospital stay, adverse events during hospitalization, number of pts submitted to cardiac surgery and in-hospital death rate.

Conclusion: The IE profile pts had changed during the 10 years period, with more elderly pts, with more cardiovascular risk factors like arteriolar hypertension and coronary artery disease, more anemia and embolization symptoms at presentation, and more nosocomial/health-care associated infective endocarditis during 2010-2015 period. In this group, the right-side valves were less affected as well as isolation of Streptococcus milleri. On the other hand, the infection due to viridans streptococci was higher. Unfortunately, we didn’t observed a decrease in length of hospital stay, adverse events during hospitalization and in-hospital death rate.

P2230
Safety and effectiveness of percutaneous mitral commissurotomy for rheumatic mitral stenosis
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Background: Percutaneous mitral commissurotomy (PMC) has become the reference treatment for mitral stenosis in patients with favorable valvular anatomy.

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Conclusion: Twenty years after percutaneous mitral commissurotomy in a population of patients with mitral stenosis, the procedure has good mid-term functional results. Prediction of late functional results is multifactorial and strongly determined Wilkins score and the quality of immediate results. A simple validated scoring system is useful for estimating individual patient outcome.

Introduction: Antibiotic therapy (AT) for prosthetic valve endocarditis (PVE) is standardized by guidelines and depends on the etiology and on the type of PVE. Aminoglycosides (AGs), especially Gentamicin is often included in the antimicrobial combination for the management of PVE. Purpose: The objective of our study is to quantify the potential nephrotoxic effect of AGs and to verify those speculations from literature about their relationship with mortality and about the safety and efficacy of single dose administration in PVE patients.

P2232
Short-term mortality is not influenced by aminoglycoside decrease in renal function during treatment of prosthetic valve endocarditis
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3 Carol Davila University of Medicine and Pharmacy, Bucharest, Romania

Methods: Retrospective analysis of 56 patients admitted with PVE in two university hospitals over 5 years (2000-2004). We divided our patients in two groups: early and late PVE related to time of surgery for valve replacement. We evaluate the influence of antimicrobial therapy with AGs on renal function, kidney function abnormalities were determined by blood creatinine (Cre). We defined renal injury as low (LRI: Cre < 2 mg/dl), moderate (MRI: cre≥2 and < 3 mg/dl) and severe (SRI: cre≥3mg/dl).

Results: We found 52% patients with early vs 48% late PVE with high rate of negative blood cultures 55,2 % in early vs 48,2% late PVE. Patients outcome responders to antibiotics: 71,5%, in-hospital death 2%, transferred due to complications 27%.

Conclusion: Multiple dose AGs influenced the renal function. AGs were used according to the antibiogram or with infectious specialist decision. AGs duration was individualized according to renal function and guidelines.

P2233
How does pulmonary arterial pressure improve after mitral valve surgery in patients with preoperative pulmonary hypertension?
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Introduction and objectives: Left heart pathology, including mitral valve disease, causes damage on the pulmonary vasculature and, therefore, the development of pulmonary hypertension. The aim was to compare the reduction of preoperative pulmonary pressures with respect to one year control in patients who underwent mitral valve surgery with diagnosis of pulmonary hypertension.

Results: We reviewed all patients diagnosed with pulmonary hypertension who underwent any mitral surgery from January 2010 to June 2015. A total of 61 patients were included. Clinical and echocardiographic data both pre and postoperative were collected and compared changes in pulmonary pressure at one year follow up. In addition, a subdivision according to the type of surgery was performed.

Conclusion: Mitral valve surgery improves pulmonary arterial pressure in patients with preoperative pulmonary hypertension, being more evident with valve repair. Perioperative mortality is high, but patients who are discharged, have excellent survival follow-up.

P2234
Effect of hemodynamic status on postoperative outcome in infective endocarditis: a literature overview
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Purpose: Infective endocarditis (IE) is a serious condition with a high 30-day mortality. Surgery is needed in many patients. The preoperative hemodynamic status
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Despite these limitations, we developed methods to improve outcomes in patients with heart failure (HF) and cardiomyopathy. This resulted in a significant improvement in patient survival. This study highlights the importance of early intervention and emphasizes the need for ongoing research in this field.

**Methods:** A literature search was performed using "endocarditis AND hospital mortality" and "International Collaboration on Endocarditis – Prospective Cohort Study." In Web of Science database, (2010 to 2016). Manuscripts were excluded if no logistic regression was available or if hemodynamic status was not included in the analysis. The results in nine manuscripts. The predictors were ranked according the odd ratios (numerator: place of the parameter, denominator: total of identified predictors).

**Results:** Most studies are coming from one tertiary center and are retrospective, with different designs. Recruitment periods are long with small patient populations. Definitions of hemodynamic status are not uniform. Need for emergency surgery is mostly labeled as "needed within 24h." Thirty-day mortality varies between 10 and 50%. In almost all papers, the hemodynamic status is ranked as first, according to the odds ratio.

**Conclusions:** A compromised hemodynamic status is the dominant predictor for 30-day mortality after surgery for IE. However, IE is a heterogeneous condition. In spite of these limitations (listed above), development towards a compromised hemodynamic status could be prevented by timely surgery.

**Table 1:** Type of devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacemaker</td>
<td>16.84%</td>
</tr>
<tr>
<td>CRT + P</td>
<td>5.94%</td>
</tr>
<tr>
<td>CRT + D</td>
<td>27.72%</td>
</tr>
<tr>
<td>ICD</td>
<td>49.5%</td>
</tr>
</tbody>
</table>

**Conclusions:**

Cardiovascular Clinic Santa Maria, University of Antioquia, cardiology department, Medellin, Colombia. In a comprehensive review of recent literature, we identified key predictors of decompensation in heart failure. This provides an overview for future research directions.

**Methods:**

A literature search was performed using "endocarditis AND hospital mortality OR outcome AND predictor" and "International Collaboration on Endocarditis – Prospective Cohort Study." In Web of Science database, (2010 to 2016). Manuscripts were excluded if no logistic regression was available or if hemodynamic status was not included in the analysis. The results in nine manuscripts. The predictors were ranked according the odd ratios (numerator: place of the parameter, denominator: total of identified predictors).

**Results:** Most studies are coming from one tertiary center and are retrospective, with different designs. Recruitment periods are long with small patient populations. Definitions of hemodynamic status are not uniform. Need for emergency surgery is mostly labeled as "needed within 24h." Thirty-day mortality varies between 10 and 50%. In almost all papers, the hemodynamic status is ranked as first, according to the odds ratio.

**Conclusions:** A compromised hemodynamic status is the dominant predictor for 30-day mortality after surgery for IE. However, IE is a heterogeneous condition. In spite of these limitations (listed above), development towards a compromised hemodynamic status could be prevented by timely surgery.
bypass graft (CABG, >75% coronary occlusion), and faced the results with the conventional gold-standard TEE approach. While both ejection fraction (EF) and fractional shortening (FS) showed global left-ventricle recovery in all patients (EF: from 37.7±6.2 to 52.4±5.6; FS: from 25.0±5.2 to 40.5±2.6) our technique precisely detected an average improvement for kinetic energy (from 37.190±5216 ±40040±2.7617) and contraction force (from 26260±2862 to 32730±4612) but not for all patients, plausible due to the level of local myocardial stunning. Particle image velocimetry showed an average improvement for velocity (from 1.96±1.16 to 2.58±1.61) after CABG but not for those patients who did not display a recover of the aforementioned kinematic parameters.

Our functional imaging technique adds important kinematic values on cardiac outcomes and supports the intervention in contact-free and non-invasive mode by detecting the level of myocardial stunning. Moreover, it can be easily adopted in the cardiac theater with TEE and does not require particular operator-dependent skills.

P2239 Four years of baroreflex activation therapy in advanced heart failure: 3rd long-term follow-up report of a proof-of-concept study

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Funding Acknowledgements: The study was sponsored by CVRx, Inc., Minneapolis, Minnesota, USA.

Background and Purpose: In a proof-of-concept study of eleven heart failure patients with reduced ejection fraction (HFrEF), Baroreflex Activation Therapy (BAT) effectively reduced sympathetic activity in the peroneal nerve (MSNA) at 6 and 22 average months of follow-up. Hospitalization rate was also significantly lower during these follow-up periods relative to pre-implant baseline. The objective of the present study is to extend the long-term follow-up data on this patient cohort over 42 months.

Methods and Results: Eleven patients were enrolled in the study who presented with optimized, stable, guideline-directed medical therapy, NYHA Class III HFrEF with left ventricular ejection fraction (LVEF) ≤40%, and no indication for cardiac resynchronization therapy. For the present report, MSNA, baroreflex sensitivity data and hospitalization rate together with standard clinical data were collected at 6, 21.5 ± 4.2 and 42.5 ± 3.5 months following BAT activation. Four patients died during long-term follow-up. The remaining seven patients (two with ischemic heart disease) maintained the improvements observed at 6 months, including reduced sympathetic activity, reduced hospitalization rate and improved clinical variables as addressed in Table 1. Blood pressure and heart rate did not change over the course of follow-up.

Conclusion: BAT provides chronic reductions in sympathetic activity and restrains sympathetic activity, which may be contributing to gastrointestinal bleeding in LVAD patients. Furthermore, haemoglobin seems to be protective of WVF degradation and enhances platelet aggregation. As such, WVF may be lost in platelet aggregates. Thus, haemoglobin levels could reduce the risk of gastrointestinal bleeding, but contribute to the development of thrombosis in LVAD patients.

P2241 The predictive value of proteinuria for mortality or renal failure in patients receiving left ventricular assist devices

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Purpose: This study evaluated the predictive value of proteinuria before Left Ventricular Assist Device (LVAD) implantation in relation to renal failure and mortality during the first-year.

Methods: A retrospective multicenter cohort study was conducted, evaluating all LVAD patients (n = 241) implanted in the two participating centers with age ≥18 years and minimal survival >48 hrs. A urinary dipstick was available in 201 (83%) patients within a 7-day period before LVAD implantation. Proteinuria was defined as ≥trace (≥1+) and renal failure as the need for renal replacement therapy. Exclusion criteria were: positive for microscopic haematuria (≥3 RBC/hpf or positive dipstick for haematuria), 28 patients were excluded.

Results: Overall, 173 patients met the inclusion criteria (mean age 52.3 ± 13.3, 78% male, mean eGFR at baseline 60.1 ± 23.5 ml/min per 1.73 m2), of whom 42 (24%) had significant proteinuria (mean age 54, 76% male, mean eGFR 60 ± 32.3 ml/min per 1.73 m2). During the first-year 32% of the patients with proteinuria vs. 16% without proteinuria developed severe renal failure (adjusted HR 2.47, 95% CI 1.18 to 5.15, p = 0.016). The 1-year survival was 52% in patients with proteinuria vs. 78% in patients without proteinuria (Log-rank p < 0.001). In multivariate analysis proteinuria was identified as an independent predictor of 1-year mortality (HR 2.59, 95% CI 1.14 to 3.84, p = 0.017).

Conclusion: Proteinuria in patients undergoing LVAD implantation was highly associated with renal failure and mortality.

Table 1. BAT long-term follow-up data

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>21.5 ± 4.7 months</th>
<th>41.5 ± 3.5 months</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSNA (bursts/min)</td>
<td>41 ± 3</td>
<td>31 ± 8</td>
<td>26 ± 3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Minnesota living with heart failure score</td>
<td>31.3 ± 26.0</td>
<td>17.7 ± 9.2</td>
<td>16.9 ± 7.7</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Six-minute walk distance (m)</td>
<td>306 ± 31.4</td>
<td>365 ± 36.2</td>
<td>425 ± 116</td>
<td>0.001</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>31.1 ± 6.0</td>
<td>35.1 ± 3.6</td>
<td>37.1 ± 9.1</td>
<td>&lt;0.02</td>
</tr>
<tr>
<td>Hospitalization rate (days/year/patient)</td>
<td>17.18</td>
<td>0.93</td>
<td>0.87</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

P2240 The effects of haemoglobin and doxycycline in response to non-physiological shear stress in bovine and human blood

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Background: The effects of non-physiological shear stress were evaluated by measuring the activity and integrity of platelets and von Willebrand factor (vWF) in the presence of haemoglobin and doxycycline in human and bovine blood.

Purpose: Left ventricular assist devices (LVADs) exert high levels of non-physiological shear stress on the blood components. However, little is known about the relationship between haemoglobin, doxycycline and WVF.

Methods: Bovine and human whole blood, platelet-rich plasma and platelet-poor plasma containing haemoglobin, doxycycline, both or none were subject to shear stress in vitro. Platelet function and WVF activity and integrity was analysed using ELISA, immunoblotting and ristocetin-induced platelet aggreometry.

Results: Shear stress leads to reduced WVF activity and integrity. However, these effects can be minimised with doxycycline or haemoglobin. Immunoblotting and ELISA indicate that collagen binding activity is preserved. This study suggests that haemoglobin enhances ristocetin-induced platelet aggregation.

Conclusions: Shear stress results in WVF degradation and reduced platelet function, which may be contributing to gastrointestinal bleeding in LVAD patients. Furthermore, haemoglobin seems to be protective of WVF degradation and enhances platelet aggregation. As such, WVF may be lost in platelet aggregates. Thus, haemoglobin levels could reduce the risk of gastrointestinal bleeding, but contribute to the development of thrombosis in LVAD patients.
**P2242**

**Long term outcome of different responses to cardiac resynchronization therapy**

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**Introduction:** There is strong evidence that Cardiac Resynchronization Therapy (CRT) reduces mortality and hospitalization, and improves cardiac function in heart failure (HF) patients. However, response to CRT may vary widely (from negative-responders to super-responders). Aim: The aim of this study was to evaluate de long-term prognosis of patients with different responses to CRT.

**Population and Methods:** Retrospective single-centre study that included all patients submitted to CRT therapy between January 2006 and December 2015. Super-responders were defined as patients with at least a duplication of baseline left ventricular ejection fraction (LVEF) or a LVEF >45% at 6 months echo. Responders included all patients with an increase of LVEF > 25%, without super-response criteria. Non-responders were defined as patients with an increase in LVEF from baseline ≤25% and negative-responders as patients with a decrease in LVEF. During a median follow-up of 57 months (IQR=31-78), we evaluated all-cause mortality, transplantation and admission for heart failure. Survival curves were compared using the log rank test.

**Results:** In this cohort of 431 patients, 103 (23.9%) were submitted to CRT-P and 328 (76.1%) to CRT-D. There were 23.4% super-responders, 28.9% responders, 20.6% non-responders and 27.1% negative-responders. Regarding baseline characteristics, super-responders were more frequently female (48.5% vs 29.8 vs 25.0 vs 19.9%, respectively, p=0.001), had less ischemic etiology (16.2 vs 29.8 vs 37.3 vs 38.0%, respectively, p=0.019). The QRS duration was proportion to CRT response (152.3 ± 39.0 in super-responders vs 148.8 ± 30.5 in responders vs 144.3 ± 24.7 in non-responders vs 135.7 ± 27.0 ms in negative-responders, p=0.045). The were no significant differences in baseline echocardiographic parameters or other baseline characteristics between groups. During long-term follow-up, there were significant differences in global mortality, heart transplantation and readmission due to heart failure, with a continuum worsening of outcomes from super-responders to negative-responders. The global mortality ranged from 11.8% in super-responders, 25.0% in non-responders to 39.2% in negative-responders (p<0.001). Survival curves comparing the 4 profiles of response to CRT also show this continuum from super-responders to negative-responders (figure 1).

**Conclusions:** In our study population, the long-term prognosis of super responders was excellent. This study confirms the importance of wide QRS and also suggests that this continuum from super-responders to negative-responders (figure 1).

**Figure 1**

ROC curve

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**P2244**

**Sex differences in implantable cardioverter defibrillator utilisation and outcomes among patients with heart failure from Asia**

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**Objectives:** This study was to describe and evaluate the proper situation, timing and predicted outcomes of extracorporeal membrane oxygenator (ECMO) implantation in developing country and to validate prior proposed models for prediction of mortality.

**Methods:** Data on ECMO used for cardiopulmonary support and e-CPR in children and adults were extracted from database from January 2012 to August 2016. Demographic data included age, diagnosis, procedure codes, type and aim of ECMO support, pre and post-ECMO mechanical support parameters, postop complications, ECMO cannulation details and technique, and postop patient condition.

Data also included time interval from the point that ECMO was indicated to the point that ECMO was initiated. We validated prior proposed 4 models using receiver operative characteristic curve (ROC) and their area under the curve (AUC). 1 Respiration Extracorporeal Membrane Oxygenator Surviving Prediction (RESP) Score, 2 Extracorporeal membrane oxygenator network (ECMOnet) score for VV-ECMO, 3 Survival After Veno-arterial ECMO (SAVE) score and 4 the Sequential Organ Failure Assessment (SOFA) Score for VA-ECMO. The secondary outcomes were descriptive data of ECMO cost. Associations between each of 4 models and 30-day and one-year survival were determined by hazard ratio (HR) and 95% confidence interval (CI) calculated using Cox proportional hazards regression.

**Results:** 41 patients received ECMO, of which 23 were male (56.1%) at median age of 29.5 ± 27.4 year. Indication for ECMO were 6/41 for respiratory support, 27/41 for cardiac support and 8/41 in e-CPR group which correspond with VV-ECMO 14.6% and VA-ECMO at 86.4%. ARDS is the most common diagnosis in patients required ECMO while low cardiac output syndrome is the most common diagnosis in VA-ECMO. ECMO was successfully weaned off in 15/41 (36.6%) while the survival to discharge rate was 12/41 (29.3%). VV-ECMO survival rate was 3/6 (50%) and VA-ECMO survival rate was 9/35 (25.7%). Among survivor group, 4/12 patients (33.3 %) needed ventricular assisted device (VAD) implantation (1/4 LVAD and 3/4 BVADs). AUC of each model were 0.688, 0.664, 0.750 and 0.625 for SOFA, SAVE, ECMOnet and RESP score, respectively. Only ECMOnet score of ≥7.5 was associated with increased mortality at 30 days (p=0.03) and at 1 year (p=0.03). Median ECMO duration was 125.5 (8-745) hour and median length of stay was 22.00 (2-167) days. The median cost of ECMO was 7,980 USD.

**Conclusion:** Despite limited resource and ECMO fund, the external validation using data from developing country support prior proposed models compared to data from Extracorporeal Life Support Organization (ELSO). From the 4 models, SOFA, SAVE and RESP were not associated with survival at 30 days and 1 year. However, ECMOnet score of ≥7.5 was associated with increased mortality at 30 days (p=0.03) and at 1 year (p=0.03).
Background: Implantable cardioverter-defibrillators (ICDs) are guideline recom-
manded for heart failure (HF) patients with reduced ejection fraction (HFrEF). Yet, little is known regarding sex differences in ICD utilisation and outcomes in Asian patients with HFrEF.

Purpose: In a large prospective multi-centric cohort of Asian patients with HFrEF, we aimed to compare ICD utilisation, determinants and outcomes between men and women.

Methods: We studied guideline ICD eligible patients with HF and ejection fraction <35% and New York Heart Association Class II-III from 11 Asian regions (China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan, Thailand). ICD recipients had an ICD or cardiac resynchronisation therapy with defibrillator (CRT-D) at baseline. Patients were followed for indepen-
dently adjudicated events including all-cause mortality and sudden cardiac deaths (SCD). Multivariable regression models were used to examine the impact of sex on ICD utilisation and mortality outcomes.

Results: Among the 3081 (21% women) eligible patients (mean age 58 ± 13 y), there were 382 (17% women) ICD recipients. Compared to men, women were more likely to have non-ischemic HF (60% vs. 38%) and higher ejection fraction (>30% vs ≤30%), 27% vs 22%) but less likely to smoke (91% vs 47%) or con-
sume alcohol (94% vs 66%) (all p < 0.01). Educational status predicted ICD uptake (pre-university and above vs below, OR=2.25, 95% CI 1.80-2.88), with interaction by sex (p-interaction=0.03) such that less educated women were less likely to receive an ICD vs men (OR=0.81, 95% CI 0.38-1.98). Over a median follow-up of 394 days, 401 (13%) patients died (88% CV deaths, 39% SCDs). Women were at lower rate for SCDs (HR=0.47, 95% CI 0.26-0.85) compared to men. ICDs reduced all-cause mor-
tality (HR=0.96, 95% CI 0.44 – 0.04) and SCDs (HR=0.35, 95% CI 0.16-0.79) overall. Sex did not modify the effect of ICD on all-cause mortality (p-interaction=0.80) but significantly modified the effect of ICD on SCD (p-interaction=0.02), such that the protective effect of ICD was found in men (HR=0.23, 95% CI 0.08-0.63) but not women (HR=2.18, 95% CI 0.38-12.44) likely due to smaller numbers of events in women.

Conclusions: Among Asian patients with HFrEF, there is sex disparity in ICD utili-
sation particularly among the less educated. Despite lower usage of ICDs, women were at lower risk of SCD compared to men.

P2245 Additional value of contrast-enhanced cardiac magnetic resonance imaging for patients with coronary artery disease and ejection fraction over 35% presenting with unexplained syncope

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Background: In patients with coronary artery disease (CAD) presenting with unex-
plained syncope and preserved left ventricular ejection fraction (LVEF), a pro-
grammed ventricular stimulation (PVS) is indicated in those with previous myocardial infarction (MI). Providing evidence of infarct scar remains challenging. Purpose – We investigated the value of Cardiac Magnetic Resonance Imaging (CMR) to assess the presence of myocardial scar and to predict the inducibility of ventricular tachyarrhythmias during PVS.

Methods: From June 2011 to April 2014, all patients with CAD and LVEF over 35% presenting for unexplained syncope were included. Assessment of infarct scar was compared between conventional diagnostic work-up (medical history, ECG, echocardiography) and CMR. Results – The study population consisted of 66 patients (age 70 ± 10.6, males 81.8%; LVEF 54 ± 8%). Evidence of myocardial scar was provided by medical history (n = 26; 39.4%), ECG (n = 25; 37.9%) and echocardiography (n = 24; 36.4%). Discrepancies between conventional diagno-
sic work-up and CMR regarding the diagnosis of infarct scar were reported in 20 cases (30.3%). Among them, 6 had a positive PVS. A lower LVEF on echocar-
diography (48% vs. 55%, p = 0.04) and CMR (43% vs. 53%, p = 0.008), a greater left ventricular and diastolic volume by CMR (79ml/m² vs. 69ml/m², p = 0.01) and the presence of Q wave (71.1% vs. 28.9%, p = 0.03) were associated with positive PVS.

Conclusions: Among patients with CAD and LVEF over 35% presenting for unex-
plained syncope, discrepancies were reported in 30.3% of cases regarding the assessment of infarct scar between conventional work-up and CMR. The addi-
tional value of CMR to predict the inducibility of ventricular tachyarrhythmias remains unknown.

P2246 Ventricular arrhythmias after surgical correction of post-infarction left ventricular aneurysms II - III type for M. Di Donato - L. Menicanti in patients with an ejection fraction less than 30%.

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Patients with coronary heart disease with low ejection fraction and left ventricular aneurysm, constitute a high risk of sudden cardiac death. After surgical treatment of aneurysms II - III type classification M. Di Donato - L. Menicanti implanted in the early post-
operative period after surgical correction of coronary heart disease. Diagnosis of ventricular cardiac arrhythmias was carried out at full-time follow - up, and with the use of remote monitoring system CareLink. The duration of follow - up was 579 ± 285,3 days.

Results: In all the time of observation in 43.7% (7 of 16) patients had life-threatening ventricular arrhythmias. In-hospital ventricular tachycardia occurred in 5 patients. In the intensive care department ward VT recorded in 2 patients, 3 patients in the rehabilitation stage, which required the application of ICD - therapy. In-hospital mortal-
ity were not observed in this group of patients. In the late period VT occurred in 2 patients. Total observation time 3 patients died, mortality was 18.7%. In the dead patients according to the follow - up - up was not observed ventricular arrhythmias, presumably patients died from progression of chronic heart failure.

Conclusions: In our series of observations after surgical correction of left ventricular aneurysms II - III type for M. Di Donato - L. Menicanti in patients with an ejection frac-
tion less than 30% within one year of ventricular tachycardia occurred in 7 patients (43.7%). In 5 patients, these arrhythmias developed in the early postoperative period (up to 10 days). ICD implantation in the early postoperative period is useful for pre-
vention of sudden cardiac death in these patients.
months after the acute event by: recurrent MI with evolution in cardiogenic shock in 29% (n=2), acute pulmonary oedema in the context of heart failure in 42% (n=3) and unknown cause in 29% (n=2). Six patients (16%) lost follow-up by the cardiologist, but remain alive.

Conclusion: In our study, the death between the 40th day and 3 months after acute event was associated to heart failure or recurrent MI but not due to an arrhythmic event. The LVEF was recovered in about a quarter of pts. In this population, the ICD implantation between the 40th day and 3 months after acute event would not have been effective in reducing of the mortality.

P2248
Relation of QRS duration to response to cardiac resynchronization therapy in patients with left bundle branch block
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Introduction: Cardiac resynchronization therapy (CRT) is an established treatment in patients with drug-refractory heart failure and wide QRS complex as surrogate of left ventricular (LV) mechanical dyssynchrony. However, the relation between the LBBB electrical activation sequence and the consequent mechanical dyssynchrony of the LV is not completely clear, indeed a substantial percentage of patients with LBBB is still not responder to CRT.

Purpose: Our aim was to investigate the relation between QRS duration and LV dyssynchrony in LBBB patients who underwent CRT.

Methods: We retrospectively studied 165 patients with LBBB who underwent CRT implantation according to the current guidelines. A 6-month reduction of LV end-systolic volume ≥15% identified responders to CRT. Baseline LV dyssynchrony was defined as the delay between peak systolic velocities of the septum and lateral wall assessed by color-coded tissue Doppler imaging.

Results: Baseline characteristics of responders (61%) and nonresponders (39%) were comparable except for greater LV dyssynchrony (75 ms [25%–75% IQR 60–90] vs 30.5 ms [25%–75% IQR 14.5–70.5], p = 0.0001) and narrower QRS duration (160 ms [25%–75% IQR 148–171] vs 180 ms [25%–75% IQR 156–190], p = 0.0001) in responders. At multivariate analysis only QRS duration and LV dyssynchrony remained independent predictors of response to CRT. The ROC curve analysis showed that 61 ms was the lower limit of septum-to-lateral wall delay corresponding with the highest accuracy (sensitivity 72%, specificity 70%) to predict response to CRT (area under the curve = 0.705 [95% confidence interval 0.613 to 0.797]).

In patients with nonischemic etiology of cardiomyopathy the linear regression analysis documented a significant inverse relationship between QRS duration and LV dyssynchrony, as dyssynchrony progressively decreased as QRS widening increased (p = 0.006). This was not evident in patients with ischemic etiology.

Conclusion: In LBBB patients with nonischemic etiology and marked QRS widening the absence of LV dyssynchrony may account for a lower response to CRT as compared to patients with intermediate QRS widening.

P2249
Echocardiographic characteristics predictors of delayed response with cardiac resynchronization therapy
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Background: Delayed echocardiographic response (>1 year) to cardiac resynchronization therapy (CRT) has been described as a frequent entity with similar prognosis to initial response (>1 year).

Purpose: The main purpose of this study is to define the echocardiographic characteristics in patients with non-ischemic dilated cardiomyopathy (NIDCM) who present delayed response to CRT.

Methods: We realized a retrospective study of patients with NIDCM who underwent CRT implantation according to current indications. Echocardiographic data were collected at pre-implantation time (Tbase), approximately one year follow-up (Tini) and end follow-up (Tend). Echocardiographic response was defined by left ventricular ejection fraction (LVEF) if it increased ≥10% and by reverse remodeling (RR) if the end-systolic volume (ESV) decreased ≥15%. Patients were divided into 3 echocardiographic response groups: mid-term responders (MR) who showed a significant echocardiographic improvement at the 1-year follow-up; long-term responders (LR) who showed no improvement at 1 year but who exhibited significant improvement at end follow-up; and non-responders (NR) who never displayed significant echocardiographic improvement.

Results: From December 2002 to June 2014, 181 patients with NIDCM underwent CRT device implantation in our center. Of these, 96 had complete follow-up. The mean time from implant to echocardiographic assessment in the Tini was 331.4 ± 173.1 days and until Tend was 1654.6 ± 907.1 days. Considering RR, the distribution was 75% MR, 9.4% LR and 15.6% NR, taking into account the response to LVEF, 63.5% were MR, 9.4% were LR and 27.1% were NR. Regarding to RR, no significant differences were found comparing baseline echocardiograms among LR, MR and NR patients. Considering the response to LVEF, those with LR had larger ventricular volumes than MR (end-diastolic volume (EDV): 265.3 ml vs 191.4 ml, p = 0.03, ESV: 191.3 ml vs 146.2, p = 0.03), and worse LVEF than the NR (23.1% vs 30.3%, p = 0.04) (figure).

Conclusions: Delayed response in LVEF improvement after CRT exists and is associated with the presence of worse ventricular function and greater degree of adverse remodeling in the baseline study. However, baseline echocardiographic data do not discriminate patients with delayed RR response.

P2250
The prognostic role of NT-proBNP but not of Global Longitudinal Strain in heart failure patients receiving cardiac resynchronization therapy
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Background: Cardiac resynchronization therapy (CRT) is highly effective in a specific subpopulation with drug-refractory heart failure (HF). However, its beneficial impact on prognosis is not fully predictable.

Purpose: To investigate the prognostic role of baseline NT-pro-B type natriuretic peptide (NT-proBNP) and global longitudinal strain (GLS) levels in HF patients receiving CRT-D.

Methods: We enrolled 93 patients, aged 74 ± 10 years, with stable ischemic HF [NYHA class III/IV, ejection fraction ≤35%], who underwent CRT-D implantation, fulfilling the current international criteria. At baseline and 3 months after implantation, we assayed NT-proBNP and echocardiographic findings in all patients. Patients with >15% increase of end-systolic volume (ESV) were considered as CRT-responders (n = 67), while the rest as CRT-non-responders (n = 26). During follow-up we recorded deaths (primary end-point) or deaths/HF hospitalizations (secondary endpoint).

Results: At baseline, no significant differences were detected in all parameters between groups (p > 0.05). During a median follow-up of 58 months, 23 patients died, while another 17 patients were hospitalized for HF decompensation. A lower percentage of CRT-responders achieved either primary (log rank test p < 0.001), or secondary end-point (log rank test, p < 0.001) compared to non-responders. After adjustment for prognostic factors (age, gender, baseline NYHA class, QRS duration), baseline NT-proBNP levels, were associated with higher occurrence of primary (HR=1.31, 95%CI: 1.18-1.43, p = 0.002) and secondary end-points (HR=1.48, 95%CI: 1.29-1.57, p < 0.001) in the whole cohort. Notably, NT-proBNP remained an independent determinant of mortality (logistic regression analysis: p = 0.032) within CRT-responders group. On the other hand, baseline GLS values were not significantly associated with either response to CRT or prognosis.

Conclusions: In patients with ischemic HF undergoing CRT-D, baseline NT-proBNP levels, but not GLS values, showed an additive prognostic value to routine clinical and electrocardiographic selection criteria. Our findings require further investigation.
P2251
Acute effects of cardiac resynchronization therapy on left atrial size and function as assessed by conventional two-dimensional echocardiography
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Cardiac resynchronization therapy (CRT) has previously been shown to improve left atrial (LA) size and function within months after the procedure, but no data is currently available regarding the immediate impact of CRT. The aim of the current study was to assess acute changes in LA size and function and to provide possible explanations for these variations. We enrolled 25 patients with CRT who were evaluated before and within days after the procedure. Patients were submitted to an extensive investigation protocol, including echocardiography, which focused mainly on left atrial indexes recorded from body surface were measured at the end of ventricular systole (LAWI max), before atrial systole (LAWI pre), and at the end of ventricular diastole (LAWI min) and further used for calculating the total emptying fraction, active emptying fraction and passive emptying fraction of the LA. LAWI max decreased within days after the implant procedure 45.5 (38.2-56.7) vs. 42.9 (32.1 to 56.2), p < 0.05, as did LAWI min – 27.1 (22.9-41.9) vs. 25.9 (17.8-38.1), p < 0.05, and LAWI pre - 40.3 (31.3-53.5) vs. 30.5 (25.8-49.1). Mitral regurgitation was also significantly improved (p < 0.001). None of the LA function parameters changed significantly within days after CRT. Significant correlations were obvious between LA volumes and the degree of mitral regurgitation before the procedure, but not afterwards. The diastole duration to cardiac cycle ratio was correlated to LAWI max (Spearman’s rho = 0.441, p < 0.005) and LAWI min (Spearman’s rho 0.417, p < 0.05) after CRT, but not before. LA indexed volumes regress within days after CRT, most likely as a consequence of immediate mitral regurgitation improvement and atrio-ventricular dyssynchrony reduction, while functional parameters remain unchanged.

P2252
Cardiac resynchronization therapy: what is the prognostic value of ventricular function as assessed by conventional two-dimensional echocardiography
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Background: Cardiac resynchronization therapy (CRT) is recommended on patients with heart failure, ejection fraction less than 35% and QRS duration greater than 120 ms, independently of echocardiographic evidence of mechanical ventricular dyssynchrony (MVD).

The aim of this study was to evaluate the impact of MVD evaluation by echocardiography before CRT implantation in clinical response of patients.

Methods: Prospective and multicentre national registry in which patients with ejection fraction less than 35% who underwent implantable cardioverter-defibrillator or CRT were included. A sub-population of 82 patients underwent CRT implantation and MVD evaluation by echocardiography (55 men; age 68±10 years) were analysed. The primary endpoint was the relationship between the degree of improvement of the New York Heart Association (NYHA) functional class during the one-year of follow-up and the echocardiographic parameters of inter- and intraventricular dyssynchrony, determined previous to the device implantation.

Results: In the baseline assessment, 34% of the patients (n = 28) had ischaemic cardiomyopathy of etiology and 44% (n = 36) idiopathic dilated cardiomyopathy. The mean ejection fraction was 27 ± 6% and the majority of patients were in the class III (52%), n = 51 and in the class II (35%, n = 29) of NYHA. Intraventricular dyssynchrony was present in 67% of patients (n = 55) and interventricular dyssynchrony in 41% (n = 34). The mean duration of the QRS was 150 ± 33ms and 82% of the patients (n = 67) had QRS > 130 ms, which was classified as I (20%, n = 16) and II (60%, n = 49) - Figure 1. Intraventricular dyssynchrony was a predictor of NYHA class improvement (HR 8.1; 95% CI, 1.4 - 26.3; p = 0.015), univariate interventricular dyssynchrony.

Conclusion: Intraventricular dyssynchrony evaluated by echocardiography was a predictor of improvement in the symptoms of heart failure after CRT implantation. It suggests that MVD may be used for a better selection of patients proposed for cardiac resynchronization therapy.

P2253
Clinical and ultrasound correlates of cardiac resynchronization therapy in patients with congestive heart failure
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Background: Cardiac resynchronization therapy (CRT) improved greatly symptoms and survival in heart failure (HF) patients. Randomized clinical trials demonstrated that still a lot of patients with standard clinical selection criteria do not respond to CRT favorably. Accordingly, quantification of left ventricular (LV) dyssynchrony by echocardiography has emerged as an important potential tool to predict patient response. The aim of our study was to evaluate prognostic values of echocardiographic parameters for predicting CRT outcomes in heart failure patients with left bundle branch block.

Methods: 40 patients with HF at the mean age of 61.7±10.4 years were enrolled in our study. They were divided into 2 groups: group 1 (n = 25) included patients with dilatation cardiomyopathy (DCM), group 2 (n = 15) included patients with ischemic cardiomyopathy (ICM). The inclusion criteria were: NYHA functional class II-IV, LVEF < 35%, QRBS<130 ms. Ultrasound examination included detailed anatomical scan in 2-D and 3-D mode. We calculated LV systolic dyssynchrony indexes (SDI and Tmsv-Dif-16) based on the 16-segmental 3D LV model. Systolic dyssynchrony index-Ts-SD was calculated by Strain Rate Imaging, and intraventricular dyssynchrony was estimated by Speckle Tracking.

Results: We revealed, that SDI and Tmsv-16-Dif had an inverse relationship with LVEF. In patients with DCM LVEF increased from 34.9±3% to 39% ± 10% after CRT with a decrease in SDI from 11.32± 4.9% to 8.89± 2.1% (p < 0.05), and the Tmsv-16-Dif - from 42.7±4.7% to 21.5± 5.6% (p < 0.05). In patients with ICM LVEF increased from 37.4±3% to 42% ± 12% after CRT, while reducing SDI from 12.6 ± 4.4% to 8.1 ± 5.6% and Tmsv-Dif from 37.5 ± 6.9% to 29.3 ± 4.6% (p < 0.05 for both). The Ts-SD in the 1 group was 45.9± 15.1ms, in the 2nd group, 39.8± 7.2ms. Thus, after the biventricular pacing the dyssynchrony indexes (SDI, Tmsv-16-Diff) decreased and LVEF increased in both groups (n = 0.83, p < 0.05). Parameters of radial dyssynchrony were more important than longitudinal dyssynchrony concerning CRT outcomes. Radial dyssynchrony was initially greater in those patients who subsequently responded to CRT (n patients with ICM). There was a high correlation between LVEF and radial dyssynchrony (r=0.81, p < 0.05) in both groups.

Conclusions: The intraventricular dyssynchrony indexes (SDI, Tmsv-16-Diff and Ts-SD - DTD) were highly effective in predicting CRT outcomes in both groups. For patients with ICM the best predictor of CRT response is the radial dyssynchrony by Speckle Tracking, which appears to be associated with lower LVEF of this group.

P2254
New prospects of cardiac resynchronization therapy in patients with mild heart failure
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Objective: to carry out complex assessment of a functional condition of the blood circulatory system according to both echocardiography (BHoCG) and Spiro Biocardiography Test (spiroBET) at patients with mild chronic heart failure NYHA class II in various terms after cardiac resynchronization therapy (CRT).

Methods: The research included 25 patients (23% – women, 20% (71%) with mild chronic heart failure NYHA class II, 15 (58%) from 26 pts had ischemic cardiomyopathy, 11 (42%) – dilated cardiomyopathy. The age included in a research 8 (15) - 67 years (on average 55.0 ± 8.1 years). All patients received optimal medicament therapy including ACE inhibitors, diuretics, beta-blockers. Tolerance to physical loading (TPL) was estimated in spiroBET which was performed at Schiller AG AT-104 ErgoSprint using Bruce protocol. We also made transthoracic BHoCG with assessment of the standard structural and morphological parameters and also

Figure 1
myocardium dysynchrony was carried out. I test was made before CRT implanta-
tion, II test was made at 3 month after, III test – at 6 month and IV test – at 12 month
after CRT implantation.
Results: At the I test the Ejection fraction (EF) of Left Ventricle was 29.3 ± 5.9% in
averaged on group. TPL according to spiroBET was 61.4 ± 31.4 Wt, the maximal
oxygen consumption (VO2max) reached only 8.0 ± 4.2 ml/kg/min. All above demon-
strates significant impairment not only myocardial contractility, but also objective
TPL and aerobic capacity, despite existence only II NYHA class of heart failure. At
the II test 88% of patients had significant improvement in myocardial contractility –
EF increased up to 36.7 ± 5.9% (p < 0.05). The same tendency was at III and IV test –
EF was 34.9 ± 9.7% and 33.6 ± 15.4%, correspondingly (p < 0.05). Patients with
positive dynamics of contractility were made ‘Responders’ Group (RG). In others
12% patients significant improvement of structural and morphological parameters
we didn’t find, they made ‘Non-Responders’ Group (NRG). At III test the ratio of
RG/NRG was 78%/12%, at IV test – 82%/18%, respectively. However, improve-
ment of myocardial contractility didn’t bring to either TPL or VO2 max increasing.
TPL was 65.6 ± 22.9 Wt at II test, 52.6 ± 26.3 Wt – at III test and 61.4 ± 28.2 – at IV
test (p < 0.05). The VO2 max was 10.3 ± 1.5, 8.5 ± 3.9 and 8.5 ± 3.8 ml/kg/min at II, III and
IV test, correspondingly.
Thus, after implantation of CRT, despite significant improvement of myocardial con-
tractility didn’t bring to either TPL or VO2 max increasing. It can be bound to a small number of observations. Identification of
pathophysiological mechanisms of this phenomenon requires continuation of a research.

HEART FAILURE IMAGING

P2255
Left atrial mechanical function in patients with non-ischemic dilated
cardiomyopathy: A speckle tracking echocardiography study
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Background: Left atrium (LA) plays an integral role in maintaining optimal cardiac
performance throughout the cardiac cycle via three major functions: reservoir, conduit and contractile functions. LA volumes and function are well established independent prognostic factors in heart failure patients.

Purpose: Evaluation of mechanical functions of LA in patients with non-ischemic dilated
cardiomyopathy (DCM).

Methods: The study included 73 patients (Median age 36 years, 46 men) with
non-ischemic DCM and another group of 25 age and gender matched healthy
volunteers. The study took place in our University. Trans-thoracic echocardi-
ography was used for evaluation of left ventricle dimensions and function, LA antero-posterior diameter, maximal and minimal volumes and LA emptying fraction. Speckle tracking echocardiography was used for assessment of LA global longitudi-
unal strain (S) and strain rate (SR). The left atrium was divided into 6 segments; the
Speckle tracking echocardiography was used for assessment of LA global longitu-
dinal strain (S) and strain rate (SR). Speckle tracking echocardiography was used for assessment of LA global longitudinal strain (S) and strain rate (SR). The left atrium was divided into 6 segments; the
global longitudinal strain and strain rate was calculated as the mean value of these
6 segments. LA peak systolic strain (Ssys) and systolic SR (SRSys) measured at LV
systole were used as a surrogate for LA reservoir function while early diastolic SR
(SRs) and late diastolic SR (SRLate) were used as surrogates for LA conduit and active
emptying functions respectively.

Results: In comparison to the control group, DCM patients had significantly larger
left ventricular (LV) and diastolic dimension (68.0 ml vs 45 ml) and lower LV ejection fraction (32% vs. 65%). LA antero-posterior diameter was significantly larger in DCM patients (40.8 cm vs. 27.2 cm) with markedly lower LA emptying fraction (32.29 vs. 62.04). Analysis of LA speckle tracking showed significantly lower LA S sys (12.82% vs 39.6 %)and LA SRSys (0.76 S-1 vs. 1.84 S-1), significantly lower late SRs (0.83 S-1 vs. -2.04 S-1) and significantly lower SRs (0.71 S-1 vs. -1.23 S-1) in DCM patients compared to the control group.

Conclusion: In patients with non-ischemic DCM, all LA mechanical functions
are significantly reduced. Speckle Tracking Echocardiography can be used for
assessment of LA mechanical function in these patients for prognostic purposes.

P2256
Impact of total ischemic time on diastolic function and left atrial volume index
in patients with STEMI: late reperfusion is a major determinant of persistent
diastolic dysfunction
L Ludovico Lazzari1; D Bovelli1; G Ambrosio2; E Boschetti3
1Az. Osp. “S. Maria”, Cardiology Department, Terni, Italy; 2Hospital Santa Maria Delta Misericordia, Cardiology and Cardiovascular Pathophysiology Division \ University of Perugia, Perugia, Italy; 3Az. Osp. “Santa Maria” Terni \ University of
Perugia, Cardiology Department, Terni, Italy

Background: Data about the impact of total ischemic time (TIT) on left ventricular
diastolic function (LVDF) and on atrial remodelling after a ST-elevation myocardial
infarction (STEMI) are lacking.

Purpose: we assessed non-invasive left ventricular filling pressure (LVFP) and left
atrial volume index (LAVI) changes over time in patients with a first-ever STEMI,
undergoing primary percutaneous coronary intervention (PCI), to determine whether
the TIT could be a predictor of persistent left ventricular diastolic dysfunction (LVDD).

Methods: 29 patients (mean age 61 ± 9, 1 female) were enrolled. Exclusion criteria
were a TIT > 12 hours, history of coronary artery disease or cardiomyopathy,
presence of any moderate or severe valvular disease, age > 75 years old, post-PTCI
TIMI flow < 3, a LAVI > 28 ml/m2 and a left ventricular ejection fraction < 45%.
Serial echocardiographic evaluations were performed 48 hours after the onset
of symptoms and at a 6 months follow-up (FU). Evaluation of LVDF was based
on integrated assessment of trans-mitral Doppler flow pattern, tissue Doppler
imaging and PW-Doppler of pulmonary veins. The average E’/e ratio was used as
a non-invasive surrogate for LVFP. Patients were divided in two different groups
according to the mean TIT (323 ± 154 minutes) early reperfusion group (TIT ≤ 5
hours, 15 patients) and late reperfusion group (TIT > 5 hours, 14 patients). Left atrial
enlargement was defined as a LAVI ≥ 28 ml/m2 at FU.

Results: A normal diastolic function was observed only in the early group at baseline
evaluation (26.7% vs 0%, p=0.03). The average E’/e ratio showed no difference
at baseline between the two groups (8.6 ± 2.5 vs 8.6 ± 2.5, p=NS). At FU, the
estimated LVFP (average E’/e) remained stable in the early group (1.04, p=NS), while
it showed an elevation in the late group (+1.6, p=0.05), leading to a significant
difference (8.6 ± 2.8 vs 10.2 ± 3.2, p=0.02). Likewise, baseline LAVI was similar
in both groups (24.4 vs. 24.3 ± 2.3 mm², p < NS) but, while LAEI remained stable at FU in the early group (+0.8 ± 0.6 mm², p = NS), a left atrial enlargement was seen in the late group (+7.4 mm², p = 0.04), leading to a significant difference (25.2 ± 2.3 vs 31.7 ± 1.4 mm², p < 0.01); suggesting therefore a persistence of LVDd in the late revascularization group. Patients with LAVI > 28 ml/m² had longer TIT (388 ± 153 vs 220 ± 86 min, p < 0.003) and higher average E/e' ratio (10.4 ± 3.1 vs. 7.1 ± 1.5, p = 0.004) than those with LAVI < 28 ml/m². At FU, the main predictors of a LA enlargement were the TIT (p = 0.532; p = 0.03) = OR = 1.91, 95% CI 1.00 – 1.92, p = 0.01) and the average E/e' ratio (p = 0.525; p = 0.04 = OR = 2.07, 95% CI 1.10 – 3.88, p = 0.02).

Conclusion: TIT affects LVDd and atrial remodelling. An higher TIT lead to a persistent LVDd quantifiable through the progressive increase in estimated-LVFP (average E/e' ratio) and LAVI.

P2257

Is left atrial expansion index the best predictor of increased left ventricular filling pressures ?
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1Cardiology department, Military Hospital of Tunis, Tunis, Tunisia

Aim: The aim of the study was to assess the value of the left atrial expansion index (LAEI) for the estimation of left ventricular filling pressures and its relation with N-terminal pro-B-type natriuretic peptide (NT-proBNP) levels in patients with ischemic cardiomyopathy.

Methods: This prospective study enrolled 49 patients (mean age : 62.7 years, range 44-89, 85% male) with ischemic cardiomyopathy (mean Left ventricular ejection fraction : 47.57 %). All patients underwent transthoracic echocardiography and NT-proBNP measurement within 24 hours. The LAEI was calculated as (Vol max – Vol min) x 100% / Vol min, where Vol max was defined as maximal LA volume and Vol min was defined as minimal volume.

Results: Simple regression analysis demonstrated a significant linear correlation between LAEI and Log NT-proBNP (r=0.807, p < 0.0001). Significant but weaker correlations were found between Log NT-proBNP and E/e' (r=0.543, p < 0.006), mitral deceleration time (TDE) (r=0.268, p = 0.072), E/A (r=0.347, p < 0.001). Significant correlation was also found between LAEI and E/e' (r=0.517, p < 0.001).

The area under the receiver-operating characteristic curve showed that LAEI had good diagnostic power for E/e' > 15 at cutoff level of 52%, with a sensitivity of 84% and a specificity of 79%.

In a multiple linear regression model with Log NT-proBNP as dependent variable and age, E/A, TDE, E/e', LA max and LAEI as predictors, LAEI was the only parameter that remained an independent predictor of elevated NT-proBNP levels (R²=0.651, p < 0.0001), the relation to LAEI was the strongest (r= -0.807).

Conclusion: Reduced LAEI is an important predictor of elevated left ventricular filling pressures in patients with ischemic cardiomyopathy.

P2258

Enlarged left atrium and increased basal heart rate predict exercise capacity in heart failure patients
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2Faculty of Medicine, University of Prishtina, Clinic of Cardiology, Prishtina, Kosovo
3Department of Public Health and Clinical Medicine, Umea University, Umea, Sweden

Background and aim: Heart failure (HF) is a major and growing health problem characterized by high mortality, frequent hospitalization, reduced quality of life and a complex therapeutic regimen. Six minute walking test (6-MWT) may serve as a reproducible test for assessing exercise capacity in HF patients and can be clinically predicted. The aim of this study was to assess clinical, biochemical and echocardiographical predictors of limited exercise capacity in HF patients.

Methods: The study subjects were 135 consecutive clinically stable HF patients (64 ± 11 years, 66 [47%] female, classified as NYHA I-III). A 6-Minute walk test distance was performed in all patients, who were divided into two groups based on the 6-MWT distance (Group I: ≤ 300 m and Group II: > 300 m).

Results: Patients with limited exercise performance (< 300 m) were older (p < 0.001), more frequent female (p = 0.007) and diabetics (p = 0.003), had lower level of hemoglobin (p = 0.02), larger left atrium (LA, p < 0.003), higher basal heart rate (58 ± 16 vs. 64 ± 14, p < 0.001) and basal heart rate (64 ± 14 vs. 64 ± 11, p < 0.001).

Conclusion: Reduced left atrial expansion index (LAEI) and increased basal heart rate (HR) are reliable predictors of exercise capacity in HF patients.
P2261
Left atrial size influences on left ventricular longitudinal tissue velocity

patients with DCM associated with DMD have relatively preserved ejection fraction (EF) (50.02 ± 1.7) and 30.53 ± 1.38 months, p = 0.09) and for reservoir phase evaluated by the systolic peak velocity of lateral wall derived from DTI (S') (5.76 ± 0.71 vs. 5.34 ± 1.01 cm/sec, p = 0.08).

Conclusions: Remodelling of LA in athletes was marked by mild enlargement of LA with a preserved global systolic function and sub normal contribution of the reservoir phase for left ventricle filling at exercise.

**Echocardiographic parameters of LA**

<table>
<thead>
<tr>
<th><strong>P2262</strong> Exercise-induced atrial remodeling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S. Sondes Smaila</strong>¹</td>
</tr>
<tr>
<td>¹La Rabta University Hospital, Tunis, Tunisia</td>
</tr>
<tr>
<td><strong>Funding Acknowledgements:</strong></td>
</tr>
</tbody>
</table>

**Introduction:** Athlete's heart is characterized by a geometrical remodelling of the left atrium (LA).

**Purpose:** To evaluate atrial functional remodeling due to training.

**Methods:** 85 men aged 18 to 32 years old were included in this monocentric prospective study. 65 athletes (group trained T) training at least 8 hours per week were compared to 20 healthy sedentary subjects (group S). Transthoracic echocardiogram was performed on competitive period.

**Results:** Group T presented a higher end-systolic volume (83.56 ± 14.00 Vs 52.46 ± 7.39 ml, p < 0.001) compared to group S. During exercise there was no difference between groups for global systolic function evaluated by ejection fraction (EF) (60.02 ± 1.7 Vs 50.03 ± 1.38 %, p = 0.09) and for reservoir phase evaluated by the systolic peak velocity of lateral wall derived from DTI (S') (5.76 ± 0.71 vs. 5.34 ± 1.01 cm/sec, p = 0.08).

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**Echocardiographic parameters of LA**

<table>
<thead>
<tr>
<th><strong>P2263</strong> The results of applying different algorithms for the estimation of left ventricle diastolic function in the group of patients with chronic heart failure and preserved ejection function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>O A Olga Petrova</strong>¹, <strong>V N Larina</strong>², <strong>M N Alakhin</strong>³</td>
</tr>
<tr>
<td>¹Central state medical academy of department of presidential affairs, Moscow, Russian Federation; ²The Russian National Research Medical University named after N.I. Pirogov, Moscow, Russian Federation</td>
</tr>
</tbody>
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**Echocardiographic parameters of LA**

<table>
<thead>
<tr>
<th><strong>Unstandardized Coefficient</strong></th>
<th><strong>Standardized Coefficient</strong></th>
<th><strong>p-value</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>S' (p = 0.647)</td>
<td>Sex</td>
<td>-0.022 ± 0.009</td>
</tr>
<tr>
<td></td>
<td>LAVI</td>
<td>-0.330 ± 0.008</td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
<td>0.521 ± 0.364</td>
</tr>
<tr>
<td></td>
<td>ESRD</td>
<td>0.361 ± 0.726</td>
</tr>
</tbody>
</table>

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Cardiac sympathetic activity and ventricular dyssynchrony in patients with heart failure referred for cardiac resynchronization therapy
K Zavadovsky1; V Viktor Saushkin2; I Kostina3; Y Ishmanov2; D Lebedev4; S Popov5

1Cardiology Research Institute, Tomsk NRMC, Nuclear Medicine Department, Tomsk, Tomsk Russian Federation; 2National Research Tomsk Polytechnic University, Tomsk, Russian Federation; 3Cardiology Research Institute, Tomsk NRMC, Department of surgical treatment of cardiac rhythm disorders and pacing, Tomsk, Russian Federation

Funding Acknowledgements: The study was supported by grant from the Russian Science Foundation (N 15-15-10016).

Background: Cardiac resynchronization therapy (CRT) is currently one of the main treatment modalities for patients with severe heart failure. Unfortunately, about 30% of patients undergoing CRT are non-responders. In our opinion, assessment of cardiac sympathetic activity and ventricular dyssynchrony may help to develop new predictors of CRT outcomes.

Purpose: The aim of the study was to evaluate cardiac sympathetic activity and ventricular dyssynchrony in patients with chronic heart failure before cardiac resynchronization therapy.

Methods: The study comprised 51 patients (mean age of 49±8 years) with severe contractile dysfunction of the left ventricle (LVEF <30%; NYHA III-IV). All patients underwent a comprehensive clinical and functional examination including gated SPECT myocardial perfusion imaging (gSPECT-MPI), 123I-MIBG imaging and gated blood-pool SPECT (GBPSS). Systolic and diastolic functions (EDV, ESV, and EF) as well as mechanical intraventricular dyssynchrony of both ventricles were analyzed. Moreover, we analyzed abnormalities of 123I-MIBG (summed 123I-MIBG score) and 99mTc-MIBI accumulations (normalized SSS and SRS) in the left ventricular (LV) myocardium. All examinations were performed using GE Discovery NM/CT 70C with cadmium-zinc-telluride detectors.

Results: According to stress and rest gSPECT-MPI, all patients had heterogeneous myocardial perfusion pattern. The median values of normalized SSS and SRS were 14% (12-19%) and 5% (2-7%), respectively. Most often, areas of reduced 99mTc-MIBI accumulation were located in the LV apex. In all patients, decreases in contractility and dilatation of both ventricles were detected: median LV EDV was 401 ml (321-511 ml); median right ventricular (RV) EDV was 280 ml (196-388 ml); median LV EF was 26% (17-27%); and median RV EF was 23% (21-44%). Based on GBPSS data, severe mechanical dyssynchrony of both ventricles was detected. The median value of LV intraventricular dyssynchrony was 129 ms (103-163 ms); RV intraventricular dyssynchrony was 133 ms (92-152 ms). The value of interventricular dyssynchrony was less than 50 ms. The summed 123I-MIBG score was 25% (21-31%) which was significantly greater than normalized SSS and SRS (p=0.03 and p=0.04, respectively). Areas of reduced 123I-MIBG accumulation matched the myocardial perfusion defects localizations.

Conclusion: Our findings suggest that patients with chronic heart failure had severe ventricular contractility dysfunction and mechanical dyssynchrony of both ventricles. Moreover, sympathetic activity/perfusion disturbances mismatch was detected in these patients. This data will be used in the follow-up study after CRT device implantation in order to develop new predictors of CRT outcomes.

99mTc-HMPAO-labeled leukocyte SPECT/CT infective endocarditis evaluation in patients with heart failure
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1John Paul II Hospital, Jagiellonian University Medical College, Department of Cardiac and Vascular Diseases, Kraków, Poland; 2Department of Hygiene and Dietetics, Jagiellonian University Medical College, Krakow, Poland; 3John Paul II Hospital, Krakow, Poland; 4Department of Electrocardiology, Krakow, Poland

Background: Infective endocarditis (IE) is one of the most common life-threatening infection syndromes, with remaining high mortality. Single photon emission tomography and computed tomography with technetium99m-hexamethylpropyleneamine oxime–labeled leukocytes (99mTc-HMPAO-SPECT/CT) has added diagnostic value in patients with suspected IE.

Purpose: The aim of this study was to evaluate 99mTc-HMPAO-SPECT/CT inflammatory lesions in patients with heart failure (HF).

Methods: We included 40 consecutive patients with suspected IE based on standard medical diagnostic process. All participants had measured N-terminal pro-braainatriuretic peptide (NT-proBNP) serum level. Patients had thorasthoracic (TTE) and transesophageal echocardiography (TEE). There were evaluated: left ventricle ejection fraction (LVEF), Incapacited annular plane systolic excursion (TAPSE), size of heart chambers, morphology and function of the valves, lesions typical for IE.

Results: 72.5% of patients had diagnosed HF. 40% of 99mTc-HMPAO-SPECT/CTs were classified as positive for IE. Extracardiac foci were observed in 47.5% of patients. They were found in: intestine (26%), vascular system (26%), gallbladder (21%). Extracardiac accumulation of radiolabeled leukocytes was observed statistically significant more often in patients with HF (p = 0.05). Occurrence of those foci correlated with LVEF (p = 0.012) and both left ventricle end-diastolic diameter (LVED) and end-systolic diameter (LVEIS) (respectively p = 0.003 and p = 0.005).

Conclusions: This study highlights the diagnostic value of 99mTc-HMPAO-SPECT/CT in assessing IE suspicion, especially in evaluating the localization of infection. Extracardiac accumulation of radiolabeled leukocytes was observed statistically significant more often patients with HF.
BIOMARKERS

P2267
NT-proBNP correlates with LAVi and LVMMi in patients with beta-thalassemia major

M Di Novo1; BNKankazhev1; V Kaleva1; SGGercheva1; LG Gercheva1; KP Petrova1
1Medical University of Varna, Varna, Bulgaria

Background: The main cause of death in β-thalassemia major patients is early cardiac complications and especially heart failure that have been attributed to secondary iron overload despite optimal chelation.

Purpose: To discriminate high output state from high output failure in patients with β-thalassemia major by means of heart failure biomarkers – NT-proBNP and echocardiographic parameters.

Methods: In 32 treated adult patients (18-62 years) with β-thalassemia major NT-proBNP was investigated together with echocardiographic parameters to diagnose presence of heart failure. A control group of 28 healthy individuals was also used to compare with patients with both increased and normal NT-proBNP.

Results: Left ventricular mass index (LVMI) and left atrial volume index (LAVi) and relative wall thickness (RWT) of TM patients were bigger compared to controls and, and LAVi was significantly greater in TM NT-proBNP+ group. Correlations were as follow: NT-proBNP with LAVI: 0.672 and 0.399 with LVMMi. Strain, Systolic myocardial velocity (Sm) and end-diastolic diameter (EDD) were increased significantly compared to controls, but not between TM NT-proBNP+ and TM NT-proBNP- groups. NT-proBNP correlated poorly with MfR on loading T 0.199.

Conclusions: Left ventricular hypertrophy, structural remodeling and LA volumes were the most significant differences between healthy controls and TM patients. Strain and systolic myocardial velocity were also diminished. The only significant difference between TM NT-proBNP+ and TM NT-proBNP- patients were LA volumes.

P2268
Assessment nt-proBNP in patients with chronic systolic heart failure depending of the quality of life

V Ivanov1; YU Savitska1; V Maslovskyi1; O Kovachv1
1National Pirogov Memorial Medical University, Internal medicine #3, Vinnitsa, Ukraine

Purpose: To assess the level of NT-proBNP in patients with LV systolic chronic heart failure, depending from the quality of life by MHFLQ and MOS-SF-36 questionnaire.

Materials and methods: The study is based on the results of complex clinical and laboratory examination 113 patients aged 60.2 ± 0.74 with systolic chronic heart failure (CHF) II-III FC by NYHA of ischemic and hypertensive etiology. The basis of allocation of different clinical groups were taken the quality of life (QoL) indicators: total score by MHFLQ, physical and mental (MH) health determined by MOS-SF-36 questionnaire. The method of variation statistics were allocated 3 grades: relatively low (RL), relatively satisfactory (RS) and relatively high (RH). Thus was formed the following clinical groups of patients: — total score by MHFLQ: 1st group (RL QoL) — ≤ 61 points, 2nd group (RS QoL) — 60 — 41 and 3rd group (RH QoL) — ≥ 40 points; — largest PH of MOS-SF-36 questionnaire: 1st group (RL PH) — index ≤ 29, 2nd group (RS PH) — 30 — 35 and 3rd group (RH PH) — ≥ 36.

Results: It was shown that in patients with systolic CHF II-III FC by NYHA of ischemic and hypertensive etiology level of NT-proBNP, to some extent, associated with the quality of life (QoL) indicator of biomarkers and the number of patients with high level (≥ 2130 pg/ml) NT-proBNP dominated by similar values in groups RS and RH QoL (p = 0.008 and 36.4% vs. 12.5%, p < 0.05, respectively).

Conclusions: It was found that in patients with systolic CHF II-III FC by NYHA of ischemic and hypertensive etiology level of NT-proBNP, to some extent, associated with the quality of life (QoL) indicator of biomarkers and the number of patients with high level (≥ 2130 pg/ml) NT-proBNP dominated by similar values in groups RS and RH QoL (p = 0.008 and 36.4% vs. 12.5%, p < 0.05, respectively).
their peak tolerated dose. Biomarker profile at commencement and follow-up are detailed in Table 1, below.

**Conclusion(s):** Although serum BNP levels were not significantly altered at follow-up, it could be theorized that the greater than 50% fall in NT-proBNP reflects a reduction in prohormone secretion, but with reduced degradation of the active BNP moiety resulting in an overall “balancing” effect. Analysis of this early experience with a new compound demonstrates similar natriuretic peptide response to that seen in PARADIGM, a response that would support a positive impact on ventricular function. The failure to observe any change in ST2 in this population to date may reflect the short period of follow up but also indicate persistent high risk in this cohort.

**Biomarker profile before / after therapy**

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Baseline</th>
<th>Follow-up</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNP (pg/mL)</td>
<td>209</td>
<td>258</td>
<td>&gt;0.99</td>
</tr>
<tr>
<td>NT-proBNP (pg/mL)</td>
<td>1992</td>
<td>655</td>
<td>0.0078</td>
</tr>
<tr>
<td>ST2 (ng/mL)</td>
<td>47.3</td>
<td>58.3</td>
<td>0.3396</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>4.4</td>
<td>4.3</td>
<td>0.25</td>
</tr>
<tr>
<td>Creatinine (μmol/L)</td>
<td>99.8</td>
<td>113.3</td>
<td>0.0188</td>
</tr>
<tr>
<td>eGFR (mL/kg/1.73m²)</td>
<td>62.8</td>
<td>55.1</td>
<td>0.1416</td>
</tr>
</tbody>
</table>

**P2270**

B-type natriuretic peptide and stage B heart failure in the prediction of cardiovascular events and death in hypertension.

1 Galagher, D; Watson, C; Zhou, B; James, C; Keane, M; Liewald, G; M examining the role of BNP and stage B heart failure in predicting cardiovascular events and death in hypertension.

**Background:** The prevalence and morbidity of hypertension continues to grow globally and improved methods of stratifying risk and identifying organ damage earlier are required. Methods such as echocardiography and population based risk scores are suggested by guidelines as approaches to aid in risk stratification. However, biomarkers such as natriuretic peptides may help provide such an approach.

**Purpose:** This aim of this study was to determine the role of BNP and stage B heart failure defined as echocardiographic abnormalities in refining risk prediction in a community based population with hypertension and to determine the use of BNP and the SCORE cardiovascular risk prediction model in the cohort of patients with uncomplicated hypertension.

**Methods:** We analysed data from the STOP-HF cohort including participants with arterial hypertension with and without a history of a cardiovascular event at baseline. We investigated the ability echocardiography abnormalities at baseline and of B-type natriuretic peptide levels in predicting future major adverse cardiovascular events (MACE) and death. We also investigated the use of the European Society of Cardiology cardiovascular risk score - SCORE - to predict these events in the uncomplicated cohort. 81

**Results:** In total 572 patients (427 with uncomplicated hypertension) were included. Thirty three patients had a MACE or died during follow up. In a univariate analysis, BNP was predictive of MACE and death in all groups. Echocardiography abnormalities were not predictive of MACE and death in any group. Both BNP and SCORE had predictive value. BNP adds to the predictive value of SCORE as determined by likelihood ratios. The net reclassification improvement for BNP compared to stage B heart failure was 0.20.

**Conclusion:** This study demonstrates that in patients with hypertension, BNP is better than echocardiography abnormalities alone in the prediction of risk of MACE and death in a community-based cohort of patients with complicated and uncomplicated hypertension.

**P2271**

Features of correlation between NT-proBNP and circadian blood pressure profile in patients with arterial hypertension and chronic heart failure with preserved ejection fraction of the left ventricle.

1 Gubareva, N; Kryukov, E; Gubareva, S
2 Samara State Medical University, Internal Medicine Department, Samara, Russian Federation

The aim of the study is to examine the characteristics of brain natriuretic plasma level (NT-proBNP) in patients with arterial hypertension (AH) and heart failure (HF) with preserved ejection fraction of the left ventricle (HFpEF).

**Research methods:** The study included 346 men, whose average age was 64.8 ± 10.44 year. The patients were divided into groups: group 1 - patients with AH and without HF (n = 180); group 2 - patients with AH and HFpEF (n = 86). The control group included representative by age healthy men with normal blood pressure, without HF (n = 80). All patients underwent echocardiography, daily monitoring of arterial pressure (MAP), defined NT-proBNP in plasma by ELISA.

**Results:** Most patients of group, according to MAP remained a two-phase rhythm (“dipper”) systolic blood pressure (SBP) and diastolic blood pressure (DBP). In 20% of cases there was a lack of decrease in SBP and DBP (“non-dipper”). In group 2 diurnal profiles of BP were heterogeneous for SBP and DBP. In the daily profile of SBP equally met “dipper” 33% and “non-dipper” - 44%. In 21% of cases there was excessive blood pressure reduction at night – the “over-dipper” in 21% of cases – “night-peaker”. Circadian profile of DBP was dominated by patients with “non-dipper” - 51% of cases, the “dipper” - 21%. Equally noted excessive reduction and increase of DBP at night “over-dipper” and “night-peaker” - 14%. The level of natriuretic peptides was the highest in the group “non-dipper”, “night-peaker” and differed significantly from patients with a normal circadian profile of blood pressure and profile of the “over-dipper” as for SBP and the circadian profile of DBP. Correlation analysis of the data revealed an inverse relationship of NT-proBNP and the daily index (p = 0.0006; p = 0.006). The regression model to determine diastolic myocardial stress, within the parameters of MAP and the level of NT-proBNP was developed.

**Conclusion:** Natriuretic peptides are involved in the formation of circadian profile of arterial pressure and can be used for stratification of a cardiovascular risk in patients with arterial hypertension.

**P2272**

Brain natriuretic peptide levels and renal function in the diagnosis of heart failure in the elderly.

1 ME Escande; 2 MB Emmanuel Bellard; 3 NE Nathalie Escande Bellard
4 Private Hospital Beauvallon, HOYRAL, PRINCE 13012 MARSEILLE, Marseille, France; 5DUKE-NUS Medical School, singapour, Singapore; 6Institute of Medical Biology, Biopolis, Singapour, Singapore

**Aim of the study:** BNP levels are accurate in the diagnosis of heart failure and useful in clinical practice. Relationship between BNP heart failure (HF) and renal function are little known in the elderly. Renal function influence the optimal cut point of BNP in patients with a Glomerular Filtration Rate (eGFR) lesser than 60 ml/min/1.73 m².

**Methodology:** A total of 71, patients (mean age 85 years) were admitted in a Cardiogeriatric Unit. We noted several parameters, age, gender, the presence or the absence of Systolic Heart Failure (clinical history and physical examination), the echographic measure of the left ventricular ejection fraction, the eGFR value calculated by simplified MDRD formula and the BNP value. We divided these patients into six groups according the presence of HF and eGFR value higher than 60, between 30 and 60 or between 15 and 30.

**Results:** Our results show that the BNP value is higher in all the three groups of patients with Heart Failure with or without diminution of the eGFR: for example, 1200 pg/ml in the presence of HF versus 788 pg/ml in the absence of HF in the two groups with the eGFR is calculated between 15 and 30 ml/min/1.73 m².

**Conclusion:** BNP is a helpful tool in clinical practice for the diagnosis of Systolic Heart Failure in the presence of renal impairment in the elderly with a higher biomarker cut-point.

**P2273**

Association of the novel cardiovascular biomarkers ST2, GDF-15, suPAR and H-FABP with clinical parameters in heart failure patients.

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12 Paracelsus Private Medical University, Internal Medicine II, Cardiology, Salzburg, Austria; 13 University Hospital of Jena, Department of Cardiology, Jena, Germany; 14 Medical Faculty, University Duesseldorf, Division of Cardiology, Pulmonology, and Vascular Medicine, Duesseldorf, Germany; 15 Elisabeth Klinikum, Clinic of Internal Medicine II, Schmallfuelden, Germany

**Background:** Heart failure (HF) with reduced ejection fraction still remains a major therapeutic challenge and has an impact on morbidity, hospitalisation rates and health-care costs. Biomarkers represent an indispensable tool in the clinical setting for diagnosis and monitoring of treatment in patients suffering from HF.

**Purpose:** Aim of this study was to investigate the role of novel cardiovascular biomarkers, namely suppression of tumorigenicity (ST2), growth-differentiation factor 15 (GDF-15), soluble u-lectin plasmacytoid-activator-receptor (suPAR) and heart-type fatty acid binding protein (H-FABP) in patients suffering from ischemic cardiomyopathy (ICM) or dilative cardiomyopathy (DCM).

**Methods:** A total of 200 patients were enrolled in this current study, 65 that were diagnosed with DCM and 59 patients that suffered from ICM were included. 76 © 2017 The Authors European Journal of Heart Failure © 2017 European Society of Cardiology, 19 (Suppl. S1), 5–601
patients without coronary artery disease or signs of heart failure that underwent coronary angiography because of angina pectoris were included as controls. Diagnosis of cardiomyopathy was established after a complete diagnostic work-up including coronary angiography for validation of diagnosis. During outpatient visits, plasma samples of all patients were obtained and analyzed for ST2 (assessing hemodynamics and inflammation), GDF-15 (remodeling and inflammation), suPAR (inflammation) and H-FABP (ischemia) by use of ELISA after informed consent.

**Results:** Levels of ST2, suPAR and H-FABP were significantly higher in ICM and DCM patients compared to the control group (p < 0.0001), while GDF-15 showed a significant increase in ICM patients (p = 0.0139) but not in DCM patients (p = 0.176). However, there were no significant differences between ICM and DCM in biomarker levels (ST2 p = 0.6725, GDF-15 p = 0.3503, suPAR p = 0.3251, H-FABP p = 0.1191). Ejection fraction correlated inversely with cardiac biomarkers (ST2 p = 0.0001, GDF-15 p = 0.0394, suPAR p = 0.0028, H-FABP p = 0.0001), while BNP levels showed a positive correlation with biomarker levels (ST2 p < 0.0001, GDF-15 p < 0.0001, suPAR p < 0.0001, H-FABP p < 0.0004). Similarly, CRP levels showed a positive correlation with cardiac biomarkers (ST2 p = 0.0006, GDF-15 p = 0.0041, suPAR p = 0.0058, H-FABP p = 0.0002). Renal insufficiency (ST2 p < 0.0001, GDF-15 p < 0.0001, suPAR p < 0.0001, H-FABP p < 0.0001) and diabetes (ST2 p = 0.0021, GDF-15 p = 0.0055, suPAR p = 0.0339, H-FABP p = 0.0010) were significantly associated with a rise in cardiac biomarkers, while hypertension seemed to have no effect on biomarker levels in HF-patients (ST2 p = 0.4911, GDF-15 p = 0.4593, suPAR p = 0.2410, H-FABP p = 0.3141).

**Conclusion:** By integrating the information obtained by measuring levels of several biomarkers associated with a rise in cardiac biomarkers, while hypertension seemed to have no effect on biomarker levels in HF-patients (ST2 p = 0.4911, GDF-15 p = 0.4593, suPAR p = 0.2410, H-FABP p = 0.3141).
P=0.006). The prognostic value of hs-TnT was confirmed in the Generation Scot-
land cohort. In sensitivity analyses, after excluding participants with CAD during follow-
down, our findings remained consistent.

Conclusions: Circulating hs-TnT identifies patients with non-ischemic hypertensive
HF at high risk of HFH or cardiovascular death for whom more intensive monitoring
and management of cardiomyocyte injury may be needed.

P2278
Combined baseline and one-month changes in Big Endothelin-1 and BNP
plasma concentrations predict clinical outcomes in patients with left
ventricular dysfunction after acute myocardial infarction
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Nancy, Institut Lorrain du cœr et des vaisseaux, Nancy, France and IRM-CRCT
2FRIN Network, Vandoeuvre-les-Nancy, France; 3Inserm, UMRs 1148 University
Paris Diderot, Paris, France; 4Université Catholique de Louvain, Brussels, Belgium;
5Pfizer Inc, New York, United States of America; 6Institute for Cardiovascular
Pharmacology & Epistemology, Mahlow, Germany; 7University of Michigan, School
of Medicine, Ann Arbor, United States of America

Objective: Increased levels of neuro–hormonal biomarkers predict poor prognosis
in patients with acute myocardial infarction (AMI) and left ventricular
systolic dysfunction (LVD). The predictive value of repeated (one-month interval)
Brain natriuretic peptides (BNP) and Big-endothelin 1 (BigET-1) measurements
were investigated in patients with LVD after AMI.

Methods: In a sub-study of the Eplerone Post-Acute Myocardial Infarction
Heart Failure Efficacy and Survival Study (EPHESUS) trial, BNP and BigET-1 were
measured at baseline and at 1 month in 476 patients.

Results: When included in the same Cox regression model, baseline BNP (p for
slope<0.0003), HR for 3rd tertile vs 1st tertile=9.02 (3.0, 8.0), p=0.0001 and
BigET-1 for trend<0.0026; HR=3.35 (1.36 – 7.73), p=0.039 as well as the relative
changes (after 1 month) from baseline in BNP (p for trend<0.049; HR=2.25 (1.13 –
0.47), p=0.02) and BigET-1 (p for trend<0.045; HR=1.54 (1.31 – 3.73), p=0.09) were
predictive of the composite of cardiovascular death or hospitalization for worsening
heart failure. Adding baseline and changes in BigET-1 to baseline and changes in
BNP led to a significant increase in prognostic reclassification as assessed by
integrated discrimination improvement index (5.0%, p=0.01 for the primary endpoint).

Conclusions: Both increased baseline and changes after one month in BigET-1
concentrations were shown to be associated with adverse clinical outcomes,
independently from BNP baseline levels and one month changes, in patients after
recent AMI complicated with LVD. This novel result may be of clinical interest since
such combined biomarker assessment could improve risk stratification and open
new avenues for biomarker-guided targeted therapies.

P227
Biomarker prognostic value in heart failure with mid-range ejection fraction
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C Diez-Quevedo1; C Pastor1; A Bayest1; 2University of Valencia, Valencia, Spain

Background: Recently the ESC created a new classification of heart failure (HF)
according to left ventricular ejection fraction (LVEF). Reduced (LVEF<40%)
and preserved (LVEF≥50%) contractility. The rationale for this classification is
that the awareness that the disease is largely unknown but inflammation, especially increased expression
of pro-inflammatory cytokines, i.e. IL-6 and TNFα have been reported in African
PPCM patients. In order to get new insights into the pathophysiology and to identify
PPCM-specific biomarkers, we performed a multiplex cytokine profiling in serum of
PPCM patients from a German cohort and healthy postpartum controls.

Methods and Results: Serum levels of 27 different cytokines were measured using
a cytokine multiplex assay (STP, BioRad) in PPCM patients (n = 51) at the time of
diagnosis. Healthy pregnancy-matched postpartum (PP) women served as controls
(n = 24). Cardiac function was impaired in PPCM patients with an average LV ejection
fraction (LVEF) of 24 ± 7% at diagnosis and 49 ± 11% after 6 months.

The cytokines and chemokines that appeared significantly (Shapiro-Wilk normality
test for significance using unpaired t-test or Mann-Whitney test) elevated in
PPCM compared to PP included CCL4, CCL5, CCL11, CCL13, CCR3 and CXCL9.
In contrast, to African patients, neither IL-6 nor TNFα were significantly upregulated
in this German PPCM patient cohort.

Next we analysed if baseline cytokine levels could predict recovery from PPCM
by stratifying patients with a persistently severely reduced systolic left ventricular
function (LVEF<35%) versus patients with partial or full recovery (LVEF>35%) after
6 months follow up. Only CCL4 serum levels at diagnosis were significantly higher
(p = 0.0055) in patients with persistently reduced LVEF compared to patients with
recovered LVEF.

Conclusion: The broad elevation of immune mediators underlines the importance
of inflammatory processes in this German PPCM cohort. However, the cytokine
pattern differs from African PPCM patients suggesting potential differences in the

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>HFrEF (N=800)</th>
<th>HFrEF (N=943)</th>
<th>HFrEF (N=135)</th>
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<tbody>
<tr>
<td>NTproBNP</td>
<td>1.71 (1.55-2.00)</td>
<td>2.71 (1.88-3.89)</td>
<td>1.28 (0.87-1.68)</td>
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<td>hs-TnT</td>
<td>1.72 (1.51-1.95)</td>
<td>4.58 (2.73-7.66)</td>
<td>2.08 (1.50-2.89)</td>
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<td>ST2</td>
<td>1.38 (1.13-1.56)</td>
<td>1.95 (1.41-2.70)</td>
<td>1.05 (0.81-1.37)</td>
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<td>Galectin-3</td>
<td>1.40 (1.24-1.57)</td>
<td>1.85 (1.44-2.37)</td>
<td>1.78 (1.35-2.35)</td>
</tr>
<tr>
<td>hs-CRP</td>
<td>1.32 (1.14-1.53)</td>
<td>1.64 (1.13-2.39)</td>
<td>1.19 (0.89-1.60)</td>
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<tr>
<td>Cystatin-C</td>
<td>1.39 (1.25-1.55)</td>
<td>1.67 (1.32-2.11)</td>
<td>1.46 (1.16-1.84)</td>
</tr>
<tr>
<td>Neprilysin*</td>
<td>1.11 (0.98-1.25)</td>
<td>1.14 (0.86-1.50)</td>
<td>1.37 (1.03-1.80)</td>
</tr>
</tbody>
</table>

All log-transformed and per 1 SD. *Age included in the model.

Funding Acknowledgements: Conflict of interest: the ST-2 ELISA-Kits were pro-
vided free of charge by bostonde GmbH.

Background: Peripartum cardiomyopathy (PPCM) is defined as heart failure with
systolic left ventricular (LV) dysfunction emerging towards the end of pregnancy
or in the first postpartum months in previously healthy women. The aetiology of the
disease is largely unknown but inflammation, especially increased expression
of pro-inflammatory cytokines, i.e. IL-6 and TNFα have been reported in African
PPCM patients. In order to get new insights into the pathophysiology and to identify
PPCM-specific biomarkers, we performed a multiplex cytokine profiling in serum of
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Methods and Results: Serum levels of 27 different cytokines were measured using
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recovered LVEF.

Conclusion: The broad elevation of immune mediators underlines the importance
of inflammatory processes in this German PPCM cohort. However, the cytokine
pattern differs from African PPCM patients suggesting potential differences in the
MicroRNA-423-5p levels correlate with markers of hypoperfusion and organ injury and are associated with 90-day mortality in cardiogenic shock. T A J Toni Antti Juhani Jantti1; H Segersvard2; T Tarvasmaki1; J Lassus1; Y Deuax2; M Vauquelin1; K Ikkonen2; P Pulkki2; P Lakkisto2; V-P Harjola1
1Helsinki University Central Hospital, Helsinki, Finland; 2Minerva Foundation Institute for Medical Research, Helsinki, Finland; 3CRP-Sante, Luxembourg, Luxembourg; 4Eastern Finland Laboratory Centre, Kuopio, Finland

On behalf of: CardShock study group

Funding Acknowledgements: This study was supported by grants from the Finnish Foundation for Cardiovascular Research and Aane Kskalo Foundation.

Background: MicroRNAs (miRNAs) are short non-coding RNAs that have a central role in regulating gene expression. MiRNAs can be detected in plasma, body fluids and tissues. Circulating miRNAs are emerging diagnostic and prognostic biomarkers of cardiovascular disease. Past studies have shown an association between circulating levels of miR423-5p with the diagnosis and prognosis of heart failure. However, there have been no studies of miR-423-5p in cardiogenic shock.

Purpose: To examine the levels of miR-423-5p in cardiogenic shock patients and their potential to predict mortality.

Methods: We measured the admission plasma levels of miR-423-5p in 179 patients enrolled in the prospective European multi-center CardShock study. The associations of miRNA levels with established biomarkers (high-sensitivity troponin T [hsTnT], alamine aminotransferase [ALT], lactate and creatinine), clinical data and 90-day all-cause mortality were analysed using SPSS statistical software.

Results: The etiology of cardiogenic shock was mainly acute coronary syndrome, comprising 79% of the patients in the cohort. The 90-day all-cause mortality was 42.9%. Median miR-423-5p level was 0.005 (interquartile range 0.002-0.013). MiR-423-5p levels at baseline were significantly higher in non-survivors than in survivors (median for non-survivors 0.008 vs. 0.004 for survivors; Mann-Whitney U-test, p = 0.003). Patients with above median levels of miR-423-5p also had higher levels of lactate (3.7 vs. 2.4 mmol/L, p = 0.001) and lower eGFR (66 vs. 70 mL/min/1.73m2, p = 0.002) compared to patients with below median levels of miR-423-5p. Levels of miR-423-5p correlated significantly with markers of hypoperfusion and organ damage, namely ALT, lactate and creatinine (Spearman correlation coefficients r = 0.38, 0.28 and 0.19, respectively, p < 0.001 for ALT and lactate and p = 0.01 for creatinine). MiR-423-5p also correlated with hsTnT level at 24 hours (r = 0.38, p < 0.001). In Kaplan Meier analysis, above median levels of miR-423-5p were associated with higher all-cause 90-day mortality (Figure 1). In Cox regression analysis, above median levels of miR-423-5p were associated with all-cause 90-day mortality with an unadjusted hazard ratio (HR) of 1.95 (95% confidence interval CI 1.2-3.2, p = 0.006). After adjusting for the risk factors included in the CardShock risk score, the association between above median levels of miR-423-5p and all-cause 90-day mortality remained significant (HR 2.0, 95% CI 1.2-3.2, p = 0.007).

Conclusions: Circulating plasma levels of miR-423 at baseline are associated with mortality and markers of hypoperfusion in cardiogenic shock and may potentially aid in the early risk stratification in cardiogenic shock.

Survival function for miR-423-5p

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Background: An increase in the ratio of the brachial pre-ejection period to brachial ejection time (PEP/ET) is correlated with a decrease of left ventricular ejection fraction (LVEF).

Purpose: To investigate whether the change value (Δ) of PEP/ET is a useful predictor of LVEF in patients with LV systolic dysfunction.

Methods: We consecutively enrolled 104 patients with LVEF < 45%, PEP/ET, B-type natriuretic peptide (BNP), and LVEF were evaluated at baseline and at 6-month follow-up.

Results: Compared to the baseline measurements, the 6-month values of ΔLVEF, ΔBNP, and ΔPEP/ET were 9.8 ± 9.0% (from 36.3 ± 9.2% to 46.3 ± 12.5%, p < 0.001), -168.5 ± 255.4 (from 271.4 ± 282.5 to 104.1 ± 129.6, p < 0.001), and -0.066 ± 0.3699 (from 0.413 ± 0.087 to 0.309 ± 0.079, p < 0.001), respectively. There were significant correlations between ΔLVEF and ΔPEP/ET (r = 0.515, p < 0.001) and between ΔLVEF and ΔBNP (r = -0.081, p < 0.001). We evaluated about ΔPEP/ET&BNP, which was formulated as ΔBNP added to ΔPEP/ET*1000. The correlation between ΔLVEF and ΔPEP/ET&BNP was significant (r = 0.063, p < 0.001). However, ΔPEP/ET&BNP did not have a stronger correlation with ΔLVEF compared to the correlation between ΔLVEF and ΔBNP (r = -0.630, p < 0.001 vs. r = -0.081, p < 0.001; Steiger's Z = 0.496, p = 0.620; Figure).

Conclusions: In patients with LV systolic dysfunction, ΔPEP/ET is a useful indicator of changes in LVEF. However, there is no additional benefit to using PEP/ET over BNP.
Diastolic myocardial dysfunction in patients with chronic heart failure due to arterial hypertension and ischemic heart disease

MA Osadchuk1; NP Korzhenkov1; IN Vasilyeva1; KS Solodenkova1; MA Osadchuk1; NP Korzhenkov1; IN Vasilyeva1; KS Solodenkova1

Purpose: To identify the features of left ventricle (LV) diastolic function (DF) disturbances in patients with chronic heart failure (CHF) caused by arterial hypertension (AH) and coronary heart disease (CHD).

Methods: The study involved 65 pts, mean age – 57.6 ± 2.2 years. The study group consisted of 22 pts with AH in combination with CHD with NYHA FC 2–3. Another 22 pts with AH and CHD were included in a control group, composed of 21 pts with NYHA FC 1–2. The groups showed more pronounced disorders: decrease in the transmitral flow peak velocity ratio (VE/VA MV) in comparison with AH pts – 36.7%, and in comparison with CHD pts – 16.5% (p < 0.05). In pts with CHF we observed higher values of linear and volumetric parameters of the left atrium in comparison with pts with isolated forms of disease without heart failure (p < 0.05). Furthermore, diastolic dysfunction amplified with increasing of blood pressure degree in pts with AH and CHD. This was confirmed by established correlation relationship between the isovolumetric relaxation time (IVRT), values of atrioventricular index and left ventricular myocardium mass (r = 0.61 and r = 0.60, p < 0.05) in pts with CHD and III degree hypertension indicating an increase of myocardial stiffness. Also, in pts with CHF we established correlation relationship between IVRT and stroke volume index (r = 0.7455, p = 0.007), which confirms the obvious reduction in the functional activity of the myocardium in the absence of reliable evidence of impaired contractility.

Conclusions: Comparative analysis revealed features of diastolic dysfunction in pts with CHF due to the influence of two diseases. On the basis of this data it can be concluded that it is the state of diastole to a large extent determines the functional reserve of the heart and determines the degree of progression of CHF.

BASIC SCIENCE: CANCER AND CYTOKINES

P2286

Inhibition of cardiac lymphangiogenesis in imatinib-induced cardiomyopathy

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Background: Imatinib mesylate (IM) is the backbone drug for the treatment of patients with CML, GIST, and other cancers. However, IM also induces a cardiotoxic effect that leads to clinical heart failure due to left ventricular dysfunction. The mechanisms leading to cardiac toxicity are not fully understood. In a recent study, we demonstrated that IM induced a marked increase in lymphangiogenesis in the myocardium of imatinib-treated mice. This pathological lymphangiogenesis is associated with downregulation of key lymphatic genes, such as LYVE1, and changes in cardiac lymphatic morphology. In light of these findings, we hypothesized that the lymphatic system may act as a “sink” of cardiotoxicity in IM-treated patients, with the potential to mediate cardiotoxicity through the production of pro-inflammatory cytokines and chemokines.

Methods: To test our hypothesis, we performed a study in imatinib-treated mice. We used a mouse model of cardiac toxicity induced by IM and evaluated the expression of key lymphatic genes and cytokines in IM-treated mice. We also assessed the effects of IM on lymphangiogenesis in the myocardium of mice treated with a lymphangiogenesis inhibitor.

Results: We found that IM induced a marked increase in lymphangiogenesis in the myocardium of imatinib-treated mice. This effect was associated with downregulation of key lymphatic genes, such as LYVE1, and changes in cardiac lymphatic morphology. In addition, we observed a marked increase in the expression of pro-inflammatory cytokines and chemokines in IM-treated mice, suggesting that the lymphatic system may act as a “sink” of cardiotoxicity in IM-treated patients.

Conclusions: Our findings provide new insights into the mechanism of cardiac toxicity induced by IM and suggest that targeting the lymphatic system may be a novel strategy for preventing or treating IM-induced cardiotoxicity.

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Poster Session 4

P2284

Diastolic myocardial dysfunction in patients with chronic heart failure due to arterial hypertension and ischemic heart disease

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Purpose: To confirm the obvious reduction in the functional activity of the myocardium in the state of diastole to a large extent determines the functional reserve of the heart and determines the degree of progression of CHF.

Methods: The study involved 65 pts, mean age – 57.6 ± 2.2 years. The study group consisted of 22 pts with AH in combination with CHD with NYHA FC 2–3. Another 22 pts with AH and CHD were included in a control group, composed of 21 pts with NYHA FC 1–2. The groups showed more pronounced disorders: decrease in the transmitral flow peak velocity ratio (VE/VA MV) in comparison with AH pts – 36.7%, and in comparison with CHD pts – 16.5% (p < 0.05). In pts with CHF we observed higher values of linear and volumetric parameters of the left atrium in comparison with pts with isolated forms of disease without heart failure (p < 0.05). Furthermore, diastolic dysfunction amplified with increasing of blood pressure degree in pts with AH and CHD. This was confirmed by established correlation relationship between the isovolumetric relaxation time (IVRT), values of atrioventricular index and left ventricular myocardium mass (r = 0.61 and r = 0.60, p < 0.05) in pts with CHD and III degree hypertension indicating an increase of myocardial stiffness. Also, in pts with CHF we established correlation relationship between IVRT and stroke volume index (r = 0.7455, p = 0.007), which confirms the obvious reduction in the functional activity of the myocardium in the absence of reliable evidence of impaired contractility.

Conclusions: Comparative analysis revealed features of diastolic dysfunction in pts with CHF due to the influence of two diseases. On the basis of this data it can be concluded that it is the state of diastole to a large extent determines the functional reserve of the heart and determines the degree of progression of CHF.
Purpose: Anthracycines, like doxorubicin (Dox), are among the most potent anti-tumor drugs, but their clinical use is hampered by severe cardiotoxicity leading to heart failure. We demonstrated previously that genetic inhibition of phosphoinositi- 

	dride 3-kinase (PI3K) protects against Dox-induced cardiomyopathy (manuscript in preparation), but the underlying molecular mechanisms are still unexplored. Here, we test the hypothesis that PI3K acts as a sensor of the cardiac damage elicited by anthracycines and promotes maladaptive remodeling through inhibition of protective autophagy.

Methods: Neonatal cardiomyocytes (NCMs) were isolated from mice expressing a kinase inactive PI3K (PI3K kinase-dead; KD) and wild-type (WT) controls, and treated with Dox (1 mM) or TLR9 agonist ODN1826 (1 μM) for 1 hour before analyzing Akt/mTOR/ULK1 signaling. In vivo studies, WT and KD mice were treated with 4 mg/kg Dox and hearts harvested for electron microscopy (EM) and morphometric analysis.

Results: We found that in Dox-damaged hearts, PI3K participates downstream of toll-like receptors, and in particular TLR-9, which have been previously reported to sense danger signals generated by injured cardiomyocytes, like mitochondrial DNA (mitoDNA)(Oka et al. Nature 2012). In NCMs, Dox significa-

cantly increased the phosphorylation of PI3K downstream targets and autophagy inhibitors, Akt, mTOR and Ulk-1. These effects were completely prevented by the TLR9 antagonist ODN2088, the PI3K-selective inhibitor AS600240 and genetic PI3K inactivation (KD NCMs). Notably, the TLR9 agonist ODN1826, mimicking mitoDNA, similarly upregulated Akt/mTOR/ULK1 signaling in WT but not in KD NCMs. In vivo, enhanced activation of this PI3K-dependent pathway correlated with a significant block of autophagy in Dox-treated hearts. Notably, genetic inhibi-


tion of PI3K impaired autophagosome formation, as evidenced by enhanced accumulation of LC3II. In addition, EM studies confirmed the presence of autolysomi-

omes containing injured mitochondria in KD but not in WT hearts. This event transition occurred with completely preserved ultrastructure in KD cardiomyocytes in con-

trast to severe mitochondrial damage and vacuolization in WT controls.

Conclusion: Altogether, these data demonstrate that PI3K participates upstream of autophagic pathway, and most likely to metabolic derangement and, ultimately, to heart failure. We propose PI3K inhibition as a novel strategy to reverse targeted autophagy and limit cancer therapy–related heart disease. Intriguingly, PI3K inhibitors also have major anti-tumor properties and might provide the unique opportunity “to kill two birds with one stone” in cancer patients undergoing chemotherapy.

P2289 Galectin-3 inhibition prevents cardiac dysfunction in murine experimental type 3 cardio-renal syndrome

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Funding Acknowledgements: SFHTA

Introduction: Acute Kidney Injury (AKI), being associated with relatively high short-term mortality is a major problem of public health. It is characterized by a sudden decline of renal function. In the intensive care setting, AKI remains an impor-

tant predictor of clinical outcomes and success in cardiac dysfunction in type 3 cardio-renal syndrome (CRS-3). We recently demonstrated that Galectin-3 (Gal-3) is involved in cardiac inflammation and fibrosis. The objective of this study was to determine Gal-3 role in AKI following renal ischemia / reperfusion (IR) and to analyze its implication in the CRS-3.

Materials and Methods: 2-month-old C57BL16 WT and KO Gal-3 mice underwent renal IR injury nephrectomy followed by 25-minute ischemia and reperfusion of the left kidney at different time points (6, 24, and 48h), or a sham operation. Mice were divided into 4 groups, WT Sham, KO Sham, WT IR and KO IR.

Results: IR induced a peak of histological and functional renal damage in WT mice 24 hours after reperfusion, as well as an increase in the expression of Gal-3 at both mRNA and protein levels. Immunohistochemical showed that Gal-3 was localized in the renal tubular cells and in the macrophages of the injured kidneys. Furthermore, KD Gal-3 mice presented more severe renal damage than WT at 48 h, with more pro-

ounced macrophage infiltration.

Conclusion: The expression of Gal-3 is increased after renal IR. This protein could have a protective role in AKI following an IR, given that Gal-3 KO presents improved renal structure and function. In contrast, we observed less cardiac damage in these mice. Thus, Gal-3 could play a dual role in CRS-3.

P2291 RAAS genetic polymorphism and glomerul filtration reduction in patients with chronic heart failure

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Aim: To estimate RAAS genetic polymorphism association with glomerul filtration reduction in patients with CHF. Materials and methods. 51 patients with CHF were included into investigation (27 women, mean age -73.1 ± 11.3 years old) with clinical features of CHF. 3-4 NYHA class. Having analyzed genomic DNA with PCR ARMS analysis we detected some polymorphisms of ACE (insertion/deletion; I/D), AGT (I/D), and ANGII (C/T). All patients were divided into three groups: patients with polymorphisms and patients without polymorphisms. Results: In I/D polymorphism frequency was higher in patients with CHF compared to volunteers. The D allele was significantly associated with lower creatinine level (114.2 ± 20.14 g/l versus 111.12 ± 30 ml/min, p=0.043). In I/D polymorphism frequency was associated with comorbidity in patients with CHF. In conclusion. The association of common polymorphisms of ACE and AGT with CHF is possible and might provide the unique”kill two birds with one stone” in cancer patients undergoing chemotherapy.

P2290 Role of Galectin 3 in acute renal disease.

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Introduction: Acute kidney injury (AKI), being associated with relatively high short-term mortality is a major problem of public health. It is characterized by a sudden decline of renal function. In the intensive care setting, AKI remains an impor-
tant predictor of clinical outcomes and success in cardiac dysfunction in type 3 cardio-renal syndrome (CRS-3). We recently demonstrated that Galectin 3 (Gal-3) is involved in cardiac inflammation and fibrosis. The objective of this study was to determine Gal-3 role in AKI following renal ischemia / reperfusion (IR) and to analyze its implication in the CRS-3.

Materials and Methods: 2-month-old C57BL16 WT and KO Gal-3 mice underwent renal IR injury nephrectomy followed by 25-minute ischemia and reperfusion of the left kidney at different time points (6, 24, and 48h), or a sham operation. Mice were divided into 4 groups, WT Sham, KO Sham, WT IR and KO IR.

Results: IR induced a peak of histological and functional renal damage in WT mice 24 hours after reperfusion, as well as an increase in the expression of Gal-3 at both mRNA and protein levels. Immunohistochemical showed that Gal-3 was localized in the renal tubular cells and in the macrophages of the injured kidneys. Furthermore, KD Gal-3 mice presented more severe renal damage than WT at 48 h, with more pro-

ounced macrophage infiltration.

Conclusion: The expression of Gal-3 is increased after renal IR. This protein could have a protective role in AKI following an IR, given that Gal-3 KO presents improved renal structure and function. In contrast, we observed less cardiac damage in these mice. Thus, Gal-3 could play a dual role in CRS-3.

P2292 Pi3Kgamma inhibition rescues mice from acute cardiac contractile dysfunction and sudden death caused by calcineurin inhibitors

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Here, we test the hypothesis that PI3K acts as a sensor of the cardiac damage elicited by anthracycines and promotes maladaptive remodeling through inhibition of protective autophagy.
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Purpose: Calcineurin inhibitors (CNI) as cyclosporin A and tacrolimus are the most commonly used immunosuppressive drugs following solid organ transplantation and in various autoimmune diseases. But, CNI therapies are also associated with severe side effects like arterial hypertension, atherosclerosis, insulin resistance, brain, liver and renal complications, and cardiotoxicity. However, the effects of CNI on cardiac contractile function are poorly studied. In this study, we have investigated the acute effect of CNI on cardiac contractile function and the beneficial effects mediated by PI3Kg inhibition.

Methods: The impact heart left ventricle contractility (Pressure-Volume-Conductance) was evaluated in mice 5h after intra-peritoneal injection of CNI in WT, PI3Kg KO (total deletion of PI3Kg), PI3Kg KD (“kinase dead”; lacking PI3Kg kinase function) and in WT treated with selective inhibitor of PI3Kg. Thereafter, cardiomyocytes were studied using several biochemical approaches to investigate the beta adrenergic signaling pathway including PLB activation, CAMP production and phosphodiesterase (PDE) activity. Finally a long term follow up with histological studies in cardiac sections (H&E, TUNEL) 15h after CNI, the presence of necrotic cells as well as myofibre break up indicating a possible sign of ventricular fibrillation. Whereas the observed side effects of CNI were correlated with higher mortality, the group of mice simultaneously treated with PI3Kg inhibitor interestingly exhibited a better survival rate (p < 0.05).

Conclusions: In this study, we observed an acute cardio-depressive effect of CNI associated with sudden death and established the rationale for PI3Kg inhibition as a potential therapeutic approach.

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Role of matrix metalloproteinase-2 isoforms in diabetic heart
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Background: Diabetic cardiomyopathy (DM CMP) is defined as cardiomyocyte damage and ventricular dysfunction in diabetic condition, which is independent of the concomitant coronary artery disease and/or hypertension. Matrix metalloproteinases (MMPs) are reported to account for pathogenesis of DM CMP by modulating the extracellular matrix (ECM). However, their role in the diabetic heart remains poorly studied. Therefore, we aimed to evaluate the intracellular isoforms of MMP-2 in vivo and in vitro diabetic heart model. Purpose: We hypothesized that intracellular isoforms of MMP-2 are associated with sudden death and established the rationale for PI3Kg inhibition as a potential therapeutic approach.

Methods: The impact heart left ventricle contractility (Pressure-Volume-Conductance) was evaluated in mice 5h after intra-peritoneal injection of CNI in WT, PI3Kg KO (total deletion of PI3Kg), PI3Kg KD (“kinase dead”; lacking PI3Kg kinase function) and in WT treated with selective inhibitor of PI3Kg. Thereafter, cardiomyocytes were studied using several biochemical approaches to investigate the beta adrenergic signaling pathway including PLB activation, CAMP production and phosphodiesterase (PDE) activity. Finally a long term follow up with histological studies in cardiac sections (H&E, TUNEL) 15h after CNI, the presence of necrotic cells as well as myofibre break up indicating a possible sign of ventricular fibrillation. Whereas the observed side effects of CNI were correlated with higher mortality, the group of mice simultaneously treated with PI3Kg inhibitor interestingly exhibited a better survival rate (p < 0.05).

Conclusions: In this study, we observed an acute cardio-depressive effect of CNI associated with sudden death and established the rationale for PI3Kg inhibition as a potential therapeutic approach.

PP2294
The role of BNP on adipose tissue adaptations promoted by left ventricular chronic pressure overload
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Introduction and aims: The progression of chronic pressure overload (CPO) is associated to cardiac cachexia as a consequence of insufficient energy supply. Additionally, some studies demonstrate that the heart secretes cardionkeines able to modulate the adipose tissue (AT) structure and function promoting adiposopathy. In this study we investigate the effects of CPO in AT during the early stages of the disease.

Methods: Wistar rats were submitted to ascending aortic banding (Ba group; 0.6mm diameter) or sham procedure (Sham group). After 8 weeks, left ventricular (LV) function and structure (echocardiography and invasive hemodynamics) was evaluated and samples (LV and AT) collected for histological and molecular evaluations. Plasma was obtained for quantification of circulating B-type natriuretic peptide (BNP). Finally, normal visceral AT from normal rats was incubated with the BNP plasma concentrations detected in the Sham and Ba group (0.27 and 0.47ng/ml respectively) for 24h and then collected for molecular studies.

Results: Eight-weeks of banding increased LV systolic pressure and triggered cardiac remodeling with fibrosis and cardiomyocytes' hypertrophy when compared to Sham animals. The same group was at a compensated stage of the disease with higher ejection fraction, however a stiffer myocardium was observed with increased end diastolic pressure-volume relation and passive force of isolated cardiomyocytes. Despite similar adiposity between the 2 groups, aortic constriction triggered adipocyte atrophy as well as AT increased fibrosis and dysfunction, as observed by overexpression of pro-inflammatory adipokines. The incubation of AT from normal rats with BNP confirmed that the elevated circulatory levels of this cardiokine were able to induce increased expression of pro-inflammatory adipokines by the AT.

Conclusions: We demonstrated that higher circulatory levels of BNP promoted by LV CPO are able to induce adiposopathy characterized by remodeling of the AT and overexpression of pro-inflammatory adipokines.
Effects of ranolazine in a model of doxorubicin-induced left ventricle diastolic dysfunction

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Background: Doxorubicin (DOXO) is a highly effective anticancer drug but its clinical application is impeded by cardiotoxicity. Asymptomatic diastolic dysfunction can be the earliest manifestation of DOXO cardiotoxicity. Therefore, a search for therapeutic intervention that can interfere with early manifestations and possibly prevent late cardiotoxicity is warranted. Increased DOXO-dependent reactive oxygen species may explain, in part, Ca2+ and Na+ handling proteins and Na+/K+ ATPase-mediated transport processes.

Methods: Fischer 344 rats received a DOXO cumulative dose of 15 mg/kg over a period of 2 weeks. After the assessment of diastolic dysfunction, the animals were administrated with RAN (80 mg/kg/die) for the following 4 weeks.

Results: While diastolic and systolic function progressively deteriorated in DOXO-treated animals, treatment with RAN relieved diastolic dysfunction and prevented worsening of systolic function decreasing mortality. RAN lowered myocardial NADPH oxidase 2 expression and 3-nitrotyrosine content. A reduced NCX and Nav 1.5 expression and an increment of SERCA2 were also detected. In addition, RAN lowered DOXO-induced increased phosphorylation and oxidation of Ca2+ -calmodulin-dependent protein kinase II and decreased fibrosis.

Conclusions: RAN, by modulating cardiac Ca2+ and Na+ handling proteins and oxidative stress, was effective in attenuating DOXO-induced diastolic dysfunction.

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Allogenic amniotic membrane-derived mesenchymal stem cell therapy is cardioprotective, restores myocardial function, and improves survival in a model of anthracycline-induced cardiomyopathy

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Introduction: Recent data suggests that anthracycline induced cardiomyopathy (AM-MSC) could be an effective therapy for this condition. Using a model of AICM, we evaluated the effects on ventricular systolic and diastolic function as well as survival, of AM-MSC therapy administrated via intravenous route (IV), compared to administration via percutaneous contrast echocardiography-guided intramyocardial injection (IMI).

Methods: Cardiomyopathy was induced in New Zealand rabbits with IV daunorubicin (4 mg/kg, weekly for 6 weeks). One group received IV therapy with 5 million/kg AM-MSC (IV Group, n=8), 24 hours after each weekly cycle of daunorubicin. A second group received one dose of 5 million AM-MSC, 8 weeks after the first dose of anthracycline, via contrast echocardiography-guided percutaneous IMI (IMI Group, n=8). A third group received no cell therapy (AICM Group, n=8). A final group neither received daunorubicin nor cell therapy, constituting an age-matched Control Group (n=8). A complete echocardiographic exam was performed at baseline and repeated every two weeks.

Results: In all groups, ventricular systolic and diastolic function was normal at baseline (Figure 1A-B). The IV group did not exhibit significant alterations of myocardial function at 8 weeks, consistent with a cardioprotective effect (Figure 1A-B). In contrast, significant alterations of both systolic and diastolic function by daunorubicin were observed in IMI and AICM groups at 8 weeks, consistent with the development AICM. Whilst ventricular systolic function significantly improved at 10 and 12 week time points in IMI group, it continued to deteriorate in AICM group. Of note, significant alterations in myocardial function were apparent in IV group after 10 weeks, but significantly less conspicuous than in AICM group, suggesting delayed-onset cardiotoxicity. Survival in rabbits from IMI and IV groups was improved (77% and 75%, respectively) compared to AICM group (22%) (p < 0.04).

Conclusions: The observation of early cardioprotection from AICM in IV group at 8 weeks, with later decline of LVFE from 10 weeks suggests that anthracyclines induced delayed-onset cardiotoxicity, which affected, at least in part, endogenous as well as exogenous stem cells, thus hindering long term cardioprotection. The significant recovery of LVFE at 10 and 12 weeks in the IMI group, suggest that this is an effective therapy once cardiomyopathy ensues. Further studies with an extended time course of IV administration of allogenic AM-MSC are required to evaluate whether this therapy may confer prolonged cardioprotection from AICM, as well as to elucidate the mechanisms of delayed-onset cardiotoxicity observed in IV group.

Figure 1
Given the relevance of TH in cardiac pathology, our results may provide the basis for new therapeutic approaches based on TPO for treating ICU.

**Purpose:** Cardiovascular complications are common in type I diabetes mellitus and, for example, there is an increased risk of bradyarrhythmias as a result of dysfunction of the cardiac conduction system (1). The sinoatrial node (SAN) is the pacemaker of the heart and one component of the cardiac conduction system. We have shown that in vivo there is a decrease in heart rate in the streptozotocin-induced diabetic rat (296 ± 13 versus 316 ± 11 beats/min; P < 0.05). The aim of this study was to investigate the cellular basis of the bradycardia in the rat model.

**Methods:** We generated streptozotocin-induced diabetic rats as previously described (2). We investigated function using the Langendorff-perfused heart, isolated SAN and isolated SAN cell (patch clamp). Protein expression was investigated using immunohistochemistry. We labelled HCN4 (responsible for the funny current, If) and Kv3.1 (responsible for the A-Ch-activated K+ current, IKACH) and RyR2 (sarcoplasmic reticulum Ca2+-release channel). The research was conducted in accordance with legislation in UAE and UK.

**Results:** Compared to control rats, diabetic rats showed a 426% increase in blood glucose and 16% increase in heart to body weight ratio (n = 16 control and n = 16 diabetic rats; P < 0.05). The heart rate measured in the Langendorff heart was decreased by 17.4% in diabetic rats (296 ± 13 beats/min) compared with controls (316 ± 11 beats/min; n = 16 diabetic and n = 4 diabetic rats; P < 0.05). The beating rate of the isolated SAN preparation was decreased by 17.3% from 305 to 252 beats/min (n = 4 control and n = 3 diabetic rats; P < 0.05). Application of 2 μM m-isoproterenol to the SAN preparation to incapacitate RyR2 caused arrhythmia in the diabetic preparations, but not in control preparations (n = 4 control and n = 3 diabetic rats). It was measured in nodal cells isolated from 4 control rats (n = 20 cells) and 3 diabetic rats (n = 33 cells). The If density was 21.9 ± 2.8 versus 14.3 ± 1.2 pA/pF, and the cell capacitance was 20.2 ± 1.0 versus 14.7 ± 0.9 pF in control and diabetic rats, respectively. Immunobanding of SAN tissue sections showed that HCN4 channel expression was significantly increased by 73%, whereas Kv3.1 and RyR2 expression was significantly decreased by 9% and 34% in diabetes (n = 4 control and n = 4 diabetic rats). Downregulation of If density and RyR2 could explain the lower heart rate of the diabetic rats.

**Conclusions:** We conclude that there are complex functional changes in the SAN in diabetes. Such remodelling may increase the risk of bradyarrhythmia in type I diabetes.
Background: As a key regulator of energy metabolism, the transcriptional co-activator PGC-1α appears as a relevant therapeutic target to rectify the chronic energy deficit observed in heart failure (HF). Based on results obtained from a cellular screening assay showing a positive effect of covalamin (Cb, vitamin B12) on PGC-1α signalling pathway, the present study aimed at investigating the potential protective role of Cb in pressure overload-induced HF.

Methods: and results: Mice were pre-treated with Cb and folate supplemented diet (SD) for 3 weeks before transverse aortic constriction (TAC). Four weeks after TAC, cardiac parameters were measured by echocardiography and animals were sacrificed. TAC-induced left ventricle (LV) hypertrophy and drop of ejection fraction (EF) were significantly lower in mice treated with SD than in mice fed with normal diet. Alterations in mitochondrial oxidative capacity and mitochondrial biogenesis induced by pressure overload were markedly improved by SD. In SD-TAC mice, the signaling of the pathways involved in the post-translational regulation of PGC-1α showed a higher activation in AMPK, a lower expression level of the acetyltansferase GCNS and a higher expression level of PPAR1. This was associated with a lower protein acetylation and a higher protein methylation levels in SD-TAC mice that were accompanied by a sustained expression of genes involved in mitochondrial biogenesis (Tfam, Nrf2, Cox1 and Cox4), suggesting a preserved transcriptional activity of PGC-1α. In SD-TAC mice that were accompanied by a sustained expression of genes involved in mitochondrial biogenesis, the TAC-induced LV hypertrophy in response to acute VO that is mediated by titin phosphorylation was attenuated by PP incubation while those from non-stretched LV decreased PT after PKG incubation. Stretched samples showed increased cGMP levels and hyperphosphorylation of VASP. Titin phosphorylation was higher in stretched samples and lesser by PP, LPC was significantly blunted by PKG inhibition or by joint NPRA + NOS inhibition + NO scavenging and was also absent in TAC animals. TAC hearts showed titin hypophosphorylation and no increase upon VO. In humans, healthy volunteers and cardiac surgery patients showed E/E' and end-diastolic pressure decrease after VO, respectively. In patients with severe LV hypertrophy the effect was blunted.

Conclusions: We describe a novel adaptive mechanism of increased myocardial compliance in response to acute VO that is mediated by titin phosphorylation through cGMP-PKG signalling. The mechanism was translated to human physiology and may be abolished in the hypertrophic heart suggesting a potential role in the pathophysiology of HFpEF.

Purpose: In this study, we assessed the functional significance of endothelium-derived CNP in the regulation of blood pressure in vivo.

Methods: We generated and analyzed vascular endothelial cell-specific CNP knockout (CNP ecKO) and vascular smooth muscle cell-specific GC-B knockout (GC-B smKO) mice.

Results: Both CNP ecKO and GC-B smKO mice showed neither the skeletal abnormality nor the early mortality observed in systemic CNP or GC-B knock-out mice. CNP ecKO mice exhibited significantly increased blood pressures and an enhanced acute hypertensive response to nitric oxide synthetase inhibition. Acetylcholine (ACh)-induced, endothelium-dependent vasorelaxation was impaired in rings of mesenteric artery isolated from CNP ecKO mice. Furthermore, the impairment of ACh-induced vasorelaxation was even more pronounced when the NOS inhibitor L-NAME and the cyclooxygenase (COX) inhibitors pretreated with the NOS inhibitor L-NAME and the cyclooxygenase (COX) inhibitors pretreated with the NOS inhibitor L-NAME, suggesting that the impairment of endothelium-dependent vasorelaxation in CNP ecKO mice involves NO- and prostaglandin-independent pathways, possibly an endothelium-derived hyperpolarization factor (EDHF) system. In addition, endothelin-1 (ET-1) gene expression was enhanced in pulmonary vascular endothelial cells from CNP ecKO mice, which also showed significantly increased blood pressures in response to ET-converting enzyme inhibitors pretreated with the NOS inhibitor L-NAME and the cyclooxygenase (COX) inhibitors. By contrast, GC-B smKO mice exhibited reduced blood pressures, similar to control mice, and acetylcholine-induced vasorelaxation was preserved in their isolated mesenteric arteries. Nonetheless, CNP-induced acute vasorelaxation was nearly completely abolished in mesenteric arteries from GC-B smKO mice. Consistent with this finding, acute hypotensive effects induced by intravenous administration of CNP were markedly attenuated in GC-B smKO mice.

Conclusions: These results demonstrate that endothelium-derived CNP contributes to the chronic regulation of vascular tone and systemic blood pressure by maintaining endothelial function independently of vascular smooth muscle GC-B.

Purpose: Adverse remodelling after myocardial infarction (MI) is an essential pathological characteristic in heart failure (HF), and microRNAs (miRs, miRNAs) are known to play a key role in this condition. Previously, our group identified miR-132 as
Background: Angiotensin 1-7 (Ang 1-7) comprises consistent evidences regarding cardiovascular regulatory benefits due to Ang II receptor A1 modulation via mass receptor and early stage. Hypertrophy and fibrosis in the remote myocardium are also mechanisms involved in adverse remodeling highlighted the protective cardiac effects of antimiR-132 treatment ameliorated cardiac function: both left ventricular diastolic volume and systolic LV pressure and CO fallen respectively by 13.2% and 9.6%. Ang 1-7 insured whether miR-132 intervention would be beneficial in this process.

Methods: We measured β1AR versus β2AR contractile compartment. The redox states of NAD(P)H and FAD (autofluorescence) were oxidized by EMD. Cardiac myocytes were isolated from guinea pig and mouse hearts and field-stimulated at 1.5 Hz and 37°C. EMD 57033 shorted diastolic and systolic sarcomere lengths without affecting cytosolic Ca (measured by indo-1). The time of relaxation, and increased baseline diastolic tension. These effects on sarcomere function were associated with slight (though significant) oxidation of NADPH/FAD, while the mitochondrial membrane potential (measured by TMRM) remained unchanged. Low (1 nM) or intermediate (30 nM < 100 μM) stimulated by Ang 1-7 via β1AR action as well as significant diminution of NLEDPV during ischemia-reperfusion syndromes.

Conclusions: AntimiR-132 treatment led to a less decline of CO compared to control (34.8 ± 1.8 vs. 29.4 ± 1.3 ml/min, p < 0.05). NE stimulation in control and OM-treated (10.7%) hypertrophic response by LV end-diastolic pressure (LVEDP) elevation of 30.3%, while in medicated series response was better: CO increased by 14.4% and LVEDP boosted only by 17.6% (193.8 ± 1.6 vs. 174 ± 2.4 μl/min). These effects on isolated heart responded by a negative inotropic effect, and both systolic LV pressure and CD fallen respectively by 12.6% and 3.6%. Ang 1-7 insured a positive inotropic response during ET-1 action leading to CO and LV systolic pressure increase respectively by 10.5% and 11.7%. Ang 1-7 also improved the dynamics of LVEDP during ischemia-reperfusion. Thus, LVEDP was in medicated series significantly less than control index at finish of both ischemic periods (13.2 ± 55.4, 4.4 mm Hg) and reperfusion (17.2 ± 1 vs. 28.7 ± 2.2 mm Hg periods). Conclusion: Angiotensin 1-7 is a component of renin-angiotensin-aldosterone system which has a benefit action on acutely developing heart failure due to energy privation, manifested by improvement of inotropic response of NE and reinstated positive inotropic of ET-1 action as well as significant diminution of LVEDP during ischemia-reperfusion syndromes.

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Potential role of the Nav1.5 sodium channel in cardiopulmonary remodeling in a context of heart failure following myocardial infarction in mice. A Fontenla1; E Amo1; B Jagu1; A Carcat1; A Hronova1; L Le Tourneau1; F Charpentier1; G Gilles Toumaniants1
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The sodium channel Nav1.5, encoded by the Scn1α gene, is responsible for the initiation and propagation of the cardiac action potential. In heart failure following myocardial infarction, which remains the major cause of morbidity and mortality in cardiovascular field, modifications of ionic channels are described and associated with lethal arrhythmias.

Objectives: Mutations carried by genes encoding for channels with acquired forms of arrhythmias and post-MI remodeling, are not well characterized. In this context, we have investigated the role of Nav1.5 genetic alterations in the occurrence of ventricular arrhythmias, structural remodeling and cardiac contraction abnormalities during the acute phase of MI.

Methods: The Nav1.5 contribution was evaluated after permanent occlusion of coronary artery performed on mouse invalidated at the heterozygous state for Scn1α (Scn1α+/mice; 12 weeks old). After validation of the infarction by echocardiography, these animals were studied in vivo by echocardiography and ECG and in vitro using molecular and biochemical investigations during the first 48 hours post-MI.

Results: Animals placed in this context, revealed that Scn1α+/- mice have a higher mortality due to arrhythmic events. In addition, the ECG recorded by telemetry during 48 hours post-MI revealed that Scn1α+/- mice present an increased incidence of premature ventricular beats (5.6±2.7 & 3.3±1.1 9PB/hour respectively for WT-MI and Scn1α+/+ MI mice) without any difference in structural and functional remodeling compared to WT-MI. However, mRNA expression revealed that Scn1α+/+ MI mice present an up-regulation of pro-inflammatory factors IL-6 (3.7±0.9 & 17±4.3 9Relative Expression respectively) and IL-1β mRNA (1.8±0.3 & 4.6±0.8 9Relative Expression respectively) and downregulation of C4x3 mRNA (0.01±0.08 & 0.39±0.3 9Relative Expression respectively) without interstitial fibrosis induction. During our investigations, the Scn1α dominantly expression in heart was confirmed but a significant expression was recorded in lungs, suggesting possible Nav1.5 inter-organ functional implications. Pulmonary function tests on transgenic mice have shown respiratory hyporesponsiveness under metacholin (Penh/base=5,9 Imp/m). Pulmonary function tests on transgenic mice have shown respiratory hyporesponsiveness under metacholin (Penh/base=5,9 Imp/m).

Conclusions: These observations, 48 hours post-MI, suggest that Scn1α expression to be concomitant to inflammatory response. Moreover, it would be possible to study in case of loss of Nav1.5 expression and/or function the pulmonary impacts in post-ischemic heart failure via inter-organ implications.

Expression of angiomotin in myocardial infarction: relationship with Ki-67 expression and the vascular endothelial growth factor. A Angelos Tsipis1; AM Athanassiadiou1; E Petrou1; D Milipoulos2; A Giokouliou2; P Athanassiadiou2
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Introduction: Angiomotin (Amot) is an angiotatin binding protein that promote endothelial cell migration and angiogenesis and has been found to be involved in tumorigenesis. Ki-67 is a nuclear antigen, strictly correlates with cell proliferation and is expressed in all phases of the cell cycle except G0. The aim of this study was to investigate the expression of angiomotin, Ki-67 and VEGF in myocytes after myocardial infarction.

Material and methods: We studied myocardial samples of hearts with histologic findings of acute myocardial infarction (group A, n=50), old myocardial infarction (group B, n=50) and myocardial samples of normal heart (control group, n=20). An immunohistochemical method was performed with the use of Angiomotin, Ki-67, VEGF and Bos-2 antibodies.

Results: Amot expression was observed in the nucleus and cytoplasm of tissue cells. High concordance of Angiomotin and VEGF expression was detected in 82% of samples with old myocardial infarction (p<0.002), Bos-2 positive expression was intense at the risk areas in 75% of samples with acute myocardial infarction. In old myocardial infarction the Bos-2 positive samples demonstrated weak staining as in the control groups. The expression level of Amot was increased in cases from positive samples with a high level of ki67 (p<0.001).

Conclusions: The increased expression of angiomotin, Ki-67 and VEGF in infarcted myocardium, suggest the presence of myocyte proliferation and this may be a compensatory mechanism that could replace damaged myocardium.

NTU-B alleviates fibroblasts activation during cardiac remodeling H-C Hui-Chun Ku1; J National Taiwan University, Taipei, Taiwan ROC

Fibroblast is the most common cell type of the connective tissues and the principal source of the extensive extracellular matrix. Differentiation of fibroblast into myofibroblast is a critical event in the progression of diseases that leads to tissue remodeling and dysfunction. Polynaphenol has been demonstrated to exhibit free radical scavenging activity; however, the low bioavailability limits the use in clinic. So we modified the chemical structure with side chain to improve stability. In the present study, we examined the effect of the novel compound, NTU-B, on fibroblasts activation. Cardiac fibroblasts were isolated from adult mice hearts, and were incubated with angiotensin II (Ang II), a peptide hormone that cause cardiac remodeling, in the presence or absence of NTU-B. Ang II exposure induced the differentiation of cardiac fibroblasts into myofibroblasts. Moreover, NTU-B decreased Ang II induced fibroblast proliferation, while using NADPH oxidase inhibitor also found the similar results, indicating that inhibition of superoxide production by NTU-B may contribute to the alleviation of fibroblast activation. Our results provide new insights regarding the cardioprotective effects of NTU-B and provide an efficient therapeutic strategy to attenuate cardiac fibrosis and remodeling.

RDX7675 reduces intestinal potassium absorption to a greater extent than patiromer or sodium polystyrene sulfonate in mice J P Davidson1; C Dowd1; A J King1; P Kumarawamy1; J S Caldwell1; R C Banks1; J W Jacobs1
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Background: Patients with heart failure or chronic kidney disease, especially those taking RAAS inhibitors, are at risk of developing hyperkalaemia, which can lead to cardiac arrhythmias and even death. Available therapies for hyperkalaemia include the potassium-binding resins sodium polystyrene sulfonate (SPS) and the calcium salt patiromer. In (the US). RDX7675, the calcium salt of a novel polystyrene sulfonate-based resin, is a potassium binder being investigated as a potential treatment for hyperkalaemia.

Purpose: To evaluate the effects of RDX7675 on absorption of potassium and other electrolytes in mice and compare them with SPS and patiromer. We hypothesised that the magnitude of the effects of RDX7675 on potassium absorption would be similar to, or greater than, those of the other treatments.

Methods: Seven groups of eight male mice (CD-1, 8 weeks old) were given either standard chow (control) or chow containing 4% or 6.6% by weight RDX7675, patiromer or SPS for 72 h. To account for the different salinity and chemical structures of the ion exchange resins, the weight of the negatively charged resin (active moiety) was used to calculate the dosage. Following a 48-hour acclimation period, excreta were collected over 24 h for electrolyte analyses. The potassium-binding capacity was calculated as stool potassium excreted (mEq) per gram of resin administered (calculated as both active moiety, and total resin including counter ion). Statistical analyses were performed using one-way analysis of variance followed by Tukey’s test (post hoc).

Results: Compared with control, 24-h stool potassium was higher in all treated groups except SPS 4%, with the highest levels seen in the RDX7675 0.1% group (p<0.0001; Figure). Urinary potassium was lower in mice treated with RDX7675 or patiromer vs control; the lowest level was seen in RDX7675 6.6% group (p<0.0001; Figure). The potassium-binding capacity of RDX7675 was similar at both doses, and was greater than both patiromer and SPS (p<0.0001; Figure). The SPS groups had a large increase in sodium load, where mean 24-h stool and urinary sodium levels were significantly greater than all other groups (p<0.0001). The RDX7675 and patiromer groups had higher 24-h stool sodium excretion compared with control (p<0.05), and significantly lower urinary sodium levels than control (p<0.001). The effects on potassium and sodium were similar when normalised for wet/dry stool mass and food intake.

Conclusions: RDX7675 reduced potassium absorption to a greater extent, and had higher potassium-binding capacity, than either patiromer or SPS in mice.
Compared with control, calcium-based agents RDX7675 and patiromer reduced intestinal sodium absorption; in contrast sodium-based SPS increased sodium absorption. Studies in humans are required to confirm the potential of RDX7675 as a treatment option for patients with hyperkalaemia.

The efficiency of growth hormone in pts with heart failure due to dilated cardiomyopathy

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The aim. To study the clinical efficacy of growth hormone in pts with idiopathic dilated cardiomyopathy (DCM) on a background of optimal therapy.

Materials and methods: 13 pts (Wed age 41.1 ± 6.4 y.o.) with DCM of both sexes (7/6 as m/f) who were on optimal medical therapy of CHF in the state of compensation over the past year. All pts were on optimally selected basic treatment (the maximum recommended dose reached 92% of pts). We added 12 units of Human Growth Hormone per week as subcutaneous injections. Duration of treatment / follow-up was 1 month. In addition to assessing the clinical condition at the end of a six-minute walking test (6MWT) and the scale of assessment of the clinical status by Mareev, echocardiography assessment of the data was carried out. At baseline and after 1 month of observation the concentration of growth hormone (GH) (originally, 4.2 ± 2.2 mIU/l) and insulin-like growth factor (IGF1) (originally, 126.4 ± 124.4 mIU/ml) were determined

Results: Tolerance of treatment assessed as satisfactory, in one case there is a violation of elapsing independently after the course. After 1 month IFR1 reliable growth was recorded at 25.1% (up to 168.4 ± 8.9 mkg / ml) and growth hormone - by 37.3% (up to 67.2 ± 2.0 mIU / L) and both p < 0.05. At the same time, there was a subjective improvement in well-being pt, reflected in a reduction of weakness, increase of physical activity. Objectively score for Mareev scale decreased insignificantly by 12% (p > 0.05), meanwhile, there is an increase in 6MWT initially 271.3 ± 22.1 meters, the dynamics of 310.8 ± 38.0m (p <0.05).

Conclusions: 1 month course of injections of growth hormone in the treatment of pts with DCM well tolerated, improves both clinical and functional parameters.
Background: Grape juice has vascular protective effect by stimulating endothelial eNOS expression, but the mediator is still unknown. Recent evidence showed that C-type natriuretic peptide (CNP), secreted by the endothelium, is a paracrine mediator of cardioprotection against ischemic injury through activation of endothelial nitric oxide synthase (eNOS) after binding its specific guanylyl ciclease receptor B (NPR-B).

Methods: To evaluate whether Tuscany Sangiovese grapevine juice (SGJ) stimulates the gene expression of NPR-B and preserves the mRNA profile was assessed by Real-Time PCR analysis, where each value was normalized with the expression of three mostly stabilized genes (RPL13a, Pspia, Tbp).

Results: The aim of this study was to evaluate whether Tuscany Sangiovese grapevine juice (SGJ) protects stressed coronary endothelial cells in a CNP-dependent manner.

In stressed cells, we have observed similar transcriptomic changes: group F (CNP: 0.826 ± 0.161; eNOS: 1.33 ± 0.93 l.u.) vs. group G (CNP: 0.206 ± 0.063; eNOS: 0.56 ± 0.131) with p = 0.047 and p = 0.017 respectively. NPR-B gene expression in MCEC-1 was stimulated by HG20 per se (+170%, p = 0.013), but treatment with SGJ 10% or 25% vol/vol further increased its expression compared to untreated cells by 168% (p = 0.008) and 188% (p = 0.011).

Moreover, VEGF mRNA expression increased in stressed cells (group C vs. group D, p = 0.029). Conclusion: We have demonstrated, for the first time, that grapevine juice from the Tuscany Sangiovese variety enhances CNP and eNOS mRNA levels in coronary endothelial cells at rest and under oxidative stress. Accordingly, the treatment with SGJ stimulates the gene expression of NPR-B and preserves the decay of cell viability following exposure to H2O2. Our data open a new avenue in treatment with SGJ.

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C-type natriuretic peptide receptor C (NPR-C) is responsible for removal of natriuretic peptides (NPs) from the circulation to the same extent as neutral endopeptidase; it is not solely a clearance receptor. The effects of NPR-C include regulation of vascular tone and blood flow. It appears that some of the antiproliferative actions of ANP and endothelial growth factors (e.g., regulation of calcium currents) of CNP are regulated by the NPR-C via modulation of c-AMP-dependent pathways. Aim: We sought to determine whether modulatory effects of NPR-C on adenylyl cyclase (AC) could be observed in cardiac tissue and whether NPR-C function changes in the heart as well as other tissues under pathological conditions of heart failure.

Methods: NPR-C activity was measured by assessing cAMP levels before and after stimulation of the receptor with an NPR-C-specific ligand: cANF4-23. Receptor activity was evaluated in 11 failing hearts (left ventricle) from patients undergoing heart transplantation (HTx) and 11 hearts (left ventricles) of healthy donors not allocated to HTx. For comparison, NPR-C activity was assessed in aortic tissues obtained from 17 heart failure patients and 8 control aortas obtained from heart donors. Results: In heart tissues, no change in cAMP levels was observed in failing or non-failing hearts following NPR-C stimulation compared to baseline (respectively: p = 0.1153 and p = 0.7283). In aortic tissues, there was no change in cAMP levels from baseline following NPR-C stimulation in specimen obtained from heart failure patients (p = 0.1519), while in the aortic tissues of healthy subjects the change was significant (p = 0.0383). Conclusions: Our studies suggest that in the heart NPR-C plays predominantly a role of a clearance receptor, while its anti-proliferative actions may be significantly diminished as implicated by lack of response to stimulation. Consequently, in the vasculature the modulatory action of NPR-C on cAMP levels is retained, but only under physiological conditions. In heart failure the effect is abolished – possibly due to overstimulation by high levels of circulating NPs or receptor regulation by other humoral factors. Therefore, blocking of NPR-C in heart failure, likely to significantly increase NP levels without causing adverse effects on cardiac remodeling or regulation of vascular tone. The in vivo effects of NPR-C blockers are yet to be examined, but the receptor itself seems to be a grateful therapeutic target in treatment of heart failure.

P2317

Cardiac expression of Gal-3, GDF-15 and TIMP1, but not their plasma levels, are related to cardiac function; a heart failure biomarker lesson from mice

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Background: With the promise of added diagnostic, prognostic and guided therapy potential, heart failure (HF) biomarkers have reached center stage in clinical research. Comprehensive animal studies that allow more in-depth investigations, are, however, scarce. We investigated atrial natriuretic peptide (ANP), Galectin-3 (Gal-3), Growth Differentiation Factor-15 (GDF-15) and Tissue Inhibitor of Matrix Metalloproteinases-1 (TIMP-1) at multiple levels and within different tissues in mice post myocardial infarction (MI) and after transverse aortic constriction (TAC). Methods: For MIs, the left ascending coronary artery was either ligated temporally (small infarcts) or permanent (large infarcts). Mice were analyzed at multiple time points up to 8 weeks. For cardiac pressure overload a constriction was generated at the aortic arch and these TAC mice were investigated at 4 and 8 weeks. Sham operated animals were used as controls. Magnetic resonance imaging, hemodynamic pressure measurements and histochemistry were performed to investigate cardiac function and structure. ANP, Gal-3, GDF-15 and TIMP-1 mRNA expression and protein levels were determined in multiple tissues, including blood plasma.
**Results:** ANP, Gal-3, GDF-15 and TIMP-1 cardiac gene expression and protein levels were all increased after TAC and MI and showed significant inverse relations with ejection fraction (EF). Moreover, cardiac protein levels of Gal-3, GDF-15 and TIMP1 correlated with cardiac fibrosis. In plasma, NT-proANP levels correlated with ejection fraction, but plasma levels of Gal-3, GDF-15 and TIMP-1 were not elevated 8 weeks post-MI, despite low EF. Increased plasma Gal-3 and TIMP-1 levels were only observed shortly (within one week) after MI, concomitant with a strong transient increase in cardiac expression. This suggests that cardiac contribution to plasma levels is limited and that other organs, in which these biomarkers were highly expressed, co-determine plasma levels. Importantly, after TAC, plasma levels of TIMP-1 and GDF-15 increased, and this paralleled increased expression of these genes and proteins in the lung.

**Conclusions:** Only plasma NT-proANP levels were strongly correlated with LV function in mice. Increased Gal-3, GDF-15 and TIMP1 cardiac expression is related to myocardial fibrosis, but cardiac expression does not substantially influence plasma levels. Their increased plasma levels in heart failure most likely reflect stress in other tissues, or only becomes apparent in severely diseased hearts.