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POSTOPERTIVE DELIRIUM AFTER CARDIAC SURGERY

The graduate thesis of the Master’s degree study programme “Advance Nursing Practice“ (state code 6211GX008 )

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DECLARATION OF THE AUTHOR’S CONTRIBUTION AND ACADEMIC HONESTY
1. ABSTRACT

Staniya Maniyankerikalam Siby. Postoperative Delirium after Cardiac Surgery. The graduate Master’s thesis. The tutor - PhD, MD Judita Andrejaitiene. Department of Cardiac, Thoracic and Vascular Surgery, Lithuanian University of Health Sciences, Medical Academy, the Faculty of Nursing, Nursing and Care. Kaunas, 2019; 1-48 pages. **Objective.** Postoperative delirium (POD) is a common complication of cardiac surgery associated with increased mortality, morbidity, and long-term cognitive dysfunction. Hypoactive delirium, which is also associated with a poorer prognosis, is probably more common than the hyperactive type but is frequently missed. The aim of study is to determine the risk factors of delirium after cardiac surgery. **Methodology of the research:** the literature search was performed in the databases PubMed, Science Direct, PLOS Google Scholar. Reviewed more than 40 literature reviews, published between 2009-2019. The analysis of the case report and the PICO questionnaire method is thoroughly performed in the literature review. **Participants of a research** – adult patients after cardiac surgery with cardiac pulmonary bypass in intensive care unit. Case report illustrates the complexity of assessment of postoperative delirium and reveals diagnostic difficulties. Hypoactive forms of delirium in particular can be difficult to detect and therefore remain undiagnosed. Delirium should be initially diagnosed from its clinical manifestations. **Conclusions:** POD is a common perioperative complication frequently observed in patients undergoing cardiac surgery. Our current analysis suggests that many risk factors cannot be changed or avoided but we can change the attitude and start a routine application of delirium screening checklists - and it depends from us. Delirium screening using the CAM-ICU measurements should be applied every 8 hours at best during post-operative period and it should be performed by the cardiovascular ICU nurses. All nurses should be educated and well trained in the application of the CAM-ICU in both ventilated and non-ventilated patients. It may reduce the number of patients who develop POD, and it is believed, to shorten the length of stay in ICU.
2. ABBREVIATIONS

POD - Post Operative Delirium
CPB - Cardiac Pulmonary Bypass
ICU - Intensive Care Unit
CABG - Coronary Artery Bypass Graft
PICU - Pediatric Intensive Care Unit
CAM - Confusion Assessment Method
RASS - Richmond Agitation Sedation Scale
HADS - Hospital Anxiety And Depression Scale
STAI - Situational Anxiety Syndrome
AVR - Aortic Valve Replacement
DDS - Delirium Detection Score
CIWA-Ar - Clinical Withdrawal Assessment for Alcohol
ASD - Acute Stress Disorders
PTSD - Post Traumatic Stress Disorders
3. INTRODUCTION

Postoperative delirium (POD) is a common complication of cardiac surgery associated with increased mortality, morbidity, and long-term cognitive dysfunction [1]. The condition is more common among old patients [2]. The pathophysiology of delirium is not fully elucidated, but the use of cardiopulmonary bypass (CPB) in cardiac surgery leads to systemic inflammation with endothelial dysfunction and blood-brain barrier disruption causing neuroinflammation and activation of microglial cells [3]. The reported incidence of delirium after cardiac surgery varies, exemplified by 8-52%. Hypoactive delirium, which is also associated with a poorer prognosis, is probably more common than the hyperactive type but is frequently missed. This contributes significantly to the 30 to 60% of all cases of delirium that remain undiagnosed. Therefore, hypoactive delirium poses a special diagnostic problem because the patient's attention deficit may seem to reflect nothing more than impaired cognitive performance. These patients can be easily overlooked on a busy ward, since they may respond appropriately, if monosyllabically, to greetings and brief questions. Patients with a more marked form of this variant may be very withdrawn and almost mute and may tend to drift off to sleep in the middle of conversation [4]. Failure to make an early diagnosis can result in delayed investigations and specific treatment. Delirium is a symptomatic manifestation of acute brain dysfunction during which patients can exhibit behaviours ranging from unresponsive and withdrawn to agitated and combative. It is a frequent complication after cardiac surgery and has been associated with prolonged stay, increased hospital cost and an increased risk of mortality [1].

Postoperative delirium which is characterized by a disturbance of consciousness with reduced ability to focus. It may even long term effects such as persistent functional decline and death may also occur. Mostly vascular patients are at increased risk of mortality. Postoperative delirium compared with other surgical patients particularly after open aortic surgery [2]. Delirium is characterized by acute and fluctuating disturbances in attention, awareness and cognition. Delirium needs long term care postoperative delirium mostly affect the cardiac patients. There are 3 types of delirium are which include hyperactive, hypoactive and a mixed [4]. Morbidity and mortality associated with delirium can be minimized by prevention or early detection and management of the condition. It is a preventable complications, it can be managed early which can improve the outcome from procedure and the patient quality of life [5]. The treatment of delirium are increasingly regarded as major public health priorities [9]. Delirium occur mostly after cardiac surgery it is a common acute neurocognitive disorder may occur sever problems to patients [10]. It is occur critically ill patients and has been occur more in mechanically ventilated
patients[13]. Some patients may occur death also. Mostly is occur in older patients. Postoperative delirium is a clinical reality being common after all types of surgery. Delirium is described as fluctuations in cognition and attention. By definition it is assumed to express an underlying cause and is often transient [4]. The reported incidence of delirium after cardiac surgery varies, exemplified by 8–52%. The condition is more common among old patients [8]. The span in incidence between studies may partly reflect various means for how delirium has been screened and diagnosed. Delirium is a psychiatric syndrome that hides various types of pre-existing (predisposing), inflicted brain injuries and side-effects of the medical management (precipitating). Advanced age, previous cerebrovascular disease and diabetes exemplify the commonly referred predisposing risk factors. Suggested precipitating factors are: ventilator time, postoperative infections and prolonged operating time[30]. Post-operative delirium affects prognosis and probability of survival. It is important for medical professionals to predict and prevent delirium as well as implement appropriate interventions early in the course of care. This study sought to reveal the risk factors for postoperative delirium based on general characteristics such as circulatory dynamics in patients admitted to the ICU after cardiac surgery[17]. Delirium is a common clinical syndrome characterized by deviations of consciousness cognitive function or perception, and it has an acute onset fluctuating course. Risk factors for delirium include patient characteristics, chronic pathology, environmental variables, and acute illness [33]. Delirium is a common complication in the intensive care unit (ICU). It is considered delirium is caused by multiple associated factors. The ICU, it is important to provide care for patients in consideration of these factors, as postoperative patients admitted to the ICU are more likely to experience changes in their general condition. The incidence of delirium in mechanically ventilated patients to be as high as 85% comparing with other problems [20]. In clinical practice be delayed, as a majority of patients with delirium continue to go undetected and untreated. Furthermore, while the ability to detect delirium has improved with the development of scoring methods, in a new way practitioners used a standardized tool for assessing delirium. Instead, they found on clinical impression for detection of delirium despite its sensitivity of only 29%. Prevention and early treatment of delirium may lead to improved patient outcomes and decreased healthcare cost [21]. Delirium is described as fluctuations in cognition and attention [30]. Delirium was independently associated with practical decline; in those with independent functioning preoperatively, delirium was associated with functional decline; and delirium duration was associated with functional decline. It was hypothesized that patients who develop delirium would be less likely to recover function 1 and 12 months after cardiac surgery. Among the risk factors associated with delirium are those related to the hospital and ICU environment, such as high levels of background
noise and an absence of natural light. Both of these factors have been found to disrupt normal sleep-wake cycles, resulting in patients who are sleep deprived and at a greater risk of delirium [1].

4. REVIEW OF LITERATURE

Delirium after cardiac surgery has always been a topic of discussion for years. Delirium is a psychotic condition, more or less a temporary disorder as in fever, disturbances of consciousness or intoxication, characterized by restlessness, excitement, delusions, hallucination and more usually patients who had undergone cardiac surgery has shown an increased prevalence of delirium. Moreover this may last 24 hours or even up to two weeks with various symptoms occurring at different times. Delirium is an acute cognitive disorder that manifests itself via fluctuations in cognition and disorganized thought, it is also known as intensive therapy syndrome as well as a common disorder during intensive therapies. Delirium is associated with disorder of psychomotor activity and it is classified into three. Hyperactive delirium, hypoactive delirium, and mixed delirium. Symptoms are used to differentiate between the several types of delirium; for example, agitation, restlessness, and hallucinations can be present in patients often shows an apathetic attitude that is accompanied by lethargy and drowsiness while subjects who demonstrate both attitudes fall into the category of displaying mixed delirium[34]. The clinical and structural factors that can be associated with the postoperative onset of delirium in patients who have undergone heart surgery are patients age, the duration of mechanically assisted ventilation, continuous exposure to artificial light, and the presence of sleep disorders, Through continuous monitoring of insomnia one's circadian rhythm as well as structural elements such as exposure to artificial light. This condition can be presented and treated[10]. Delirium is a syndrome followed cardiac surgery is particularly prevalent in the intensive care unit setting, where it is associated with longer hospital stay, prolonged mechanical ventilation, increased hospital costs, and increases in mortality[20]. The origination and development of post cardiac surgery delirium is very complex associated with neurotransmitter alterations, physiological stressors, metabolic derangements, inflammation, electrolyte imbalances, and genetic factors. The development of delirium typically depends on a combination of predisposing, often nonmodifiable, risk factors, which are then subject to a second hit in the form of precipitating and predisposing factors[20]. For example, an uncomplicated urinary tract infection, may be enough to precipitate delirium among vulnerable patients. But in case of a healthy patient, delirium may occur after exposure to a series of insults such as general anesthesia, sleep deprivation, multiple psychoactive medications, and an ICU stay. The predisposing risk factors related post cardiac surgery delirium were artificial fibrillation, cognitive impairment, depression
While the precipitating risk factor that was a red blood cell transfusion, an abnormal albumin level, low cardiac output and use of intra aortic balloon pump or inotropic medication are the relevant risk factors for this. Delirium or acute confusion is a temporary mental disorder. This is commonly among hospitalized elderly patient who undergo cardiac surgeries. Furthermore, they have an increased risk of developing delirium. This have an co-relation with many negative consequences such as prolonged hospital stay, nursing home placement and reduced cognitive and functional recovery. Therefore prevention and early recognition of delirium must be improved. In addition patients and caregivers must be better informed about the long term consequences of delirium and what they can do about it[18]. Delirium is a neuropsychiatric syndrome, which is also described as fluctuations in cognition and attention. It is a common problems in the post-surgical intensive care areas and fallouts in greater number of morbidity and mortality. Delirium is one of the complications of cardiac surgery and the underlying cause is transient. The reported incidence of delirium for patients after cardiac surgery ranged from 3% to 52%. Many believed that the continued expansion of minimally invasive cardiac surgery, including trans-catheter techniques, would result in a significant decrease in the incidence of postoperative delirium, this has not proven true. Evenits now proven high incidence and importance regarding negative patient outcomes, POD continues not to be afforded the respect it deserves as a serious complication. While the scientific literature on the subject of POD after cardiac surgery has increased dramatically over the last few years, finally giving it the “attention” it deserves, clinical practice continues to lag behind, as a majority of patients with delirium continue to go undetected and untreated[21]. By its definition POD is reliant on the underlying mechanisms to develop. Numerous risk factors for delirium have been described in the literature, pointing towards the multifactorial characteristics of POD. Delirium is thought ensue as an end effect of the inflammatory response and disturbances in neurotransmitter systems related to the surgical stress. The risk factors include history of stroke, old age, peripheral vascular disease, atrial fribillation, depression, nutritional status, low cardiac output states, intra aortic balloon pump, use of inotropes, blood cells transfusions and so on. Monitoring and detection of delirium after surgery remain inconsistent, due to fluctuating course and high prevalence of hypoactive manifestations. Associated with disorders of psychomotor activity delirium can be classified into several types- 

Hyperactive delirium- This type is characterized by hyper vigilance, increased state of arousal, increased psychomotor activity, restlessness, agitation. Hypoactive delirium- This type manifests
withdrawn, lethargy, decreased psychomotor activity, decreased responsiveness, apathy. Mixed delirium- This may show any symptoms that are included in hyperactive and hypoactive delirium.

The delirious subtypes differ in terms of casualty, detection, treatment and prognosis. A state of hyperactive delirium may alert health care professionals to respond. This may not be the case with hypoactive delirium in which the delirious condition has more subtle symptoms. Hypoactive symptoms are more common in older patients, and these symptoms may also be associated with dementia. It has been reported that patients with hypoactive delirium are subject to more postoperative complication than non-delirious patients[10]. Postoperative Delirium is a common complication of cardiac surgery especially in elderly patients but often remains undiagnosed. However, it has always been a topic of discussion for years. Delirium is a neurocognitive disorder characterized by acute and fluctuating disturbances in attention, awareness, and cognition which bearing severe consequences for the patient. Moreover, variety of symptoms like delusion, hallucination, restlessness, psychomotor disturbances overlapping with dementia and natural changes of aging brain makes this condition extremely difficult in elderly population. It commonly leads to multiple physical illness and affects the person's normal function so that there is increased risk for susceptibility to adverse events like increased functional dependence, fractures resulting from fall risk, pressure sore from immobility[5]. Delirium is a clinical syndrome and is diagnosed at the bedside, but it is not agitated, pulling at lines and tubes, climbing out of bed; in fact, they are sleepy and lethargy.

4.1. Risk factors

This geriatric syndrome comes under the category of unknown pathophysiology and etiology disorders. Nevertheless, certain risk factors that predispose to delirium have been identified. These include age, male gender, visual and hearing impairment, cognitive impairment, dehydration, drugs and alcoholism, existence of another multiple co-occurring conditions and post stroke patients or surgeries[4]. Etiology of postoperative delirium is multifactorial resulting from a combination of risk factors from the time of admission to the perioperative insults. These are the preoperative, intraoperative, postoperative risk factors. Development of delirium depends on a complex interaction of multiple risk factors. Some of these factors are modifiable and are potential target for prevention. Among elderly patients, dementia is the most prominent risk factor. Potentially modifiable risk factors:
• sensory impairment
• immobilization, Medication (for example sedative hypnotics, narcotics, anticholinergic drugs, corticosteroids).
• Acute neurological diseases (for example acute stroke, intracranial hemorrhage, meningitis and encephalitis).
• Intercurrent illness (for example infections, iatrogenic complications, severe acute illness, anemia, dehydration, poor nutritional status, fracture or trauma, HIV infection)
• Metabolic derangement
• surgery
• environment (for example admission to an intensive care unit)
• pain
• Emotional distress
• Sustained sleep deprivation

Non Modifiable Risk Factors;

• Dementia or cognitive impairment
• Advanced age (>65 years)
• History of delirium, stroke, neurological disease, falls or gait disorder.
• multiple comorbidities
• Chronic renal or hepatic disease.

4.2. Preoperative factors

Since the incidence of postoperative delirium is declined in cases of congenital heart operations, older age is an independent factor for delirium. Any history of neurological surgery, Alzheimer’s disease, Parkinson’s disease, stroke, transient ischemic attacks may also take part in the role to induce the risk. Continued use of psychoactive drugs preoperatively has also been pointing toward to the occurrence of delirium.

4.3. Intraoperative factors;
Length or duration and type of the surgeries influence the status of delirium occurrence. Because the duration of procedure often depend on the complexity of the procedure thus creates more challenging risks to the patient condition this will contribute to the definite chance of postoperative delirium, this two things directly proportional to each other. There is chances of releasing of microemboli and which will make an acute attack on the neurological status of the patient[14]. Consideration of type of surgery especially valve surgeries have the most peculiar role in this matter of play. Several studies has suggested that case of delirium mostly reported in operations that required replacement of both mitral and aortic valves. Avoiding cardiopulmonary bypass altogether decreases the incidence of psychiatric and neurological complications post operatively. At the same time there is no significant difference reported between on-pump and off-pump CABG. Minimal percentage of incidence of post operative delirium in the heart transplantation cases. Certain drugs like steroids using in surgeries and temperature management while performing CPB, hematocrit level during CPB also influence the occurrence. Especially high dose of steroid like Dexamethasone can make a significant difference in the incidence of delirium. Neuromonitors mainly used in cardiac surgeries such as cerebral oximetry, electroencephalogram monitors predicts post operative delirium status very commonly[14].

4.4. Postoperative factors:

There are any occurrence of postoperative stroke, prolonged mechanical ventilation, blood products transfusion during postsurgical period, acute kidney injury resulted from the surgeries can be the risk factors to delirium. Hemodynamic factors like low cardiac output, intra aortic balloon pump, use of inotropes are also associated with the development of postoperative delirium[14]. Older age fails in the absorption, distribution, and renal excretion of post operative medications like benzodiazepines, especially with the withdrawn symptoms affect very complicated results in such patients. Apart from that there are some environmental risk factors related to hospital and ICU environment, such as high levels of background noise, and an absence of natural light. Both of these factors have been disrupting normal sleep-wake cycles hence it deteriorate the patients condition who are sleep deprived and induce the risk of postoperative delirium status gradually.
Delirium can present in three different motoric subtypes: hyperactive, hypoactive, and mixed. It may also occur in continuous mechanical ventilated patient, sepsis patient, infection patients, and also occur tracheostomy patients too. Hypoactive delirium is characterised by apathy, unresponsiveness, and withdrawal, but this type does not commonly arouse concern by medical professionals. Hyperactive delirium associated with restlessness, agitation and emotional liability. They are hyperactive and with greatest risk for self extubation and self-inflicted harm. Therefore such patients have to be closely monitor and to prescribe more standard sedatives and narcotics to suppress this kind of manifestations of delirium. But the administration these drugs may dramatically induce the dangerous clinical outcomes in patients. Recent studies shows that hypoactive delirium was considerably more common than hyperactive delirium in adult medical ICU patients. While the mixed form of delirium has the majority of population in this category of patients. Symptomatically similarity shows between adult and critically ill child patients. Pediatric delirium may associated with certain symptoms like impaired alertness, inattention, confusion and disturbed sleep cycles on top of that some neuropsychiatric symptoms such as purposeless actions, inconsolability, and signs of autonomic deregulation[12]. The other main two types are subsyndromal delirium and sedation related delirium[41].

**Subsyndromal delirium:**

An intermediary state between delirium and lack of delirium known as subsyndromal delirium. It has very worsen clinical outcomes in ICU in patient with length of stay and long term cognitive impairment relative to patients with no symptoms of delirium. This is very common in ICU patients but it does not easily recognize in some patients. Despite the potential negative outcomes, the significance and management of subsyndromal delirium are still unclear.

**Sedation-related Delirium:**

Sedation related delirium has been described in critically ill patients and associated with certain symptoms but it rapidly disappears once sedation is removed from a patient and it is not clinically leading to any particular worsen outcomes. Over sedation has been associated with an increased incidence of delirium.
4.5. **Diagnosis:**

Consciousness consists of two distinct components 1) Arousal, or the wakefulness 2) the content of consciousness, or the sum of mental function. There are many tools to assess the conscious level of the patient. Delirium is diagnosed based on four major criteria 1) an acute onset of fluctuation, 2) Disturbance of consciousness, which leads to the inability to focus, shift, or maintain attention, 3) Altered level of cognition which includes disorientation, language disturbances, memory defects, or perceptual disturbances. The fact that the manifestations of delirium may differ in variety of patients. While these features may be present but they are not required. Both psychiatrist and neurologist take part in the role play to assess and diagnose the post-operative delirium. Furthermore, it is clinical dysfunction of brain caused from the direct or indirect brain insults in the post-operative period [12]. There are two types of Diagnostic tools can be considered in relation with patient age:

There are certain terms used in diagnosis of delirium. They are:

- Alertness - level of consciousness
- Mental status - current state of mind
- Comatose - state of lack of consciousness
- Consciousness - A type of mental state – being awake or responsive
- Confusion - Deficit in orientation
- Delirium - Disturbance of consciousness
- Lethargy - Drowsy but easily arousable
- Psychosis - Inability to distinguish reality from fantasy
- Stupor - Difficult to make arouse

These components have the ability to diagnose and screen for all subtypes of delirium. However, the limitation of this tool is the inability to use it in children younger than 5 years of age. It is visible that the evaluation of mental status will be a challenge in young children and infants.

4.6. **Delirium in adults:**

Delirium resulting from brain dysfunction as a post-operative complication in adult ICU patients. Most notably, critically ill patients with delirium have more failed and self-ex-tubations, prolonged requirement of mechanical ventilation, accidental removal of catheters, prolonged hospital...
stay, higher health care costs and increased mortality. Unfortunately delirium is associated with high risk of death in adults with regards to controlling for presence of coma, severity of illness, and preexisting comorbidities. The physiologic and psychiatric aspects of the most life-threatening disorders like acute stress disorder and post traumatic stress disorder, which often developed by the the important risk factor Delirium. Generally delirium was assessed using the confusion assessment method (CAM) on cardiac surgery wards. This is a diagnostic algorithm based on diagnostic and statistical manual of mental disorders. There will be nine components to assess the mental status of the patient in order to complete the assessment. They are the below mentioned: Acute onset and fluctuation, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbance, psychomotor agitation or retardation, and altered sleep wake cycle. And additional data were included in some cases from the assigned nursing staff who is giving care to the particular patient. This CAM method is more effective in intensive care units and it is validated instrument consists of questions and non verbal answers to get in the conclusion of level of delirium stage. Richmond agitation sedation scale (RASS), a 10 point scale ranging from the score of -5 to +4 with four levels of anxiety or agitation (+1 to +4) one level to denote a calm and alert state (0) and five levels of sedation -1 to -5 (unarousable) there is RASS score of more or equal to -3 could be assessed, because they are at least minimally responsive to verbal stimuli and also other criteria like acute onset or fluctuation shall be evaluated involving again that nurses evaluations. Moreover fluctuation in RASS score assessment during previous 24 hours was evaluated as the presence of change in the mental status [12]. Severity of delirium usually assessed using the delirium index (DI) which is completed based on the CAM and MMSE in the cardiac surgery wards only, and consists of seven components (inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbance, and disorder of psychomotor activity) with each item being scored on a scale from 0 (absent) to 3 (present or severe). the total score maximum of 21 and higher score indicates the severity. There are some other tools to assess the anxiety level in ICU depressive and generalized anxiety symptoms were measured using the hospital anxiety and depression scale (HADS), it consists of 7 –item depression and 7- item anxiety subscale. Total score of maximum includes the 0-21 and greater score indicates more severity case with symptoms. (STAI) situational anxiety symptoms reflecting a temporal and transient emotional state with changing intensity as a reaction to environmental stimuli, were measured using the self report “state “scale of the state–trait anxiety inventory. This valid scale contains 20 items scored on a 4- point liker scale (not at all, a little, much, very much). Total new score ranges from 20 to 80. The relationship of delirium with poor
clinical outcomes and worsen end stages it is necessary early identification and treatment to the patients who are in the post operative wards suffering from the mental disability. Further more although anxiety symptoms may subside during the hospital stay but at the time of discharge there will reoccurrence in some patients and shows anxiety symptoms at discharge. The incidence of depression at discharge remained stable in studies shows and suggesting that depression is not solely related to the surgical procedure. On top of that these symptoms are associated with poor outcomes like greater pain, poor functional recovery, greater likely hood of readmission higher cardiac related and all cause mortality, and poorer quality of life [7]. Patients with delirium present with an acute fluctuating cognitive status that is highlighted by inattention and inability to form cohesive thoughts. The identification of delirium in critically ill patient should be facilitated using one of these tools. Screening checklist and confusion assessment ICU are recommended for the assessment of delirium patients in acute and chronic care departments. Delirium follows an unpredictable time frame to progress in patient to patient in ICU after admission. The majority of delirium events occur in within the first few days of ICU admission but the patient an also develop at any time during the stay. In some cases like hypoactive delirium is very difficult to screen out and recognize the incidence of delirium when it presents with symptoms like lethargy several tools are available for assessment. The main validated tools are 1) confusion assessment method for ICU patients (CAM ICU). Intensive care delirium screening checklist (ICDSC). Both tools were developed using the diagnostic and stastical manual of mental disorders criteria and can be administered quickly by a bedside staff. Either these CAM or ICDSC can be used to detect the assessment of the delirium patients in ICU care setup [13]. For the diagnostical purpose information on demographics, medical history, preoperative medications, cardiac surgery details, anesthesia drug doses, post-operative care, pharmacologic management, and laboratory investigation results, were abstracted from medical charts by 4 abstractors. The primary outcome was post operative delirium as diagnosed by an attending physician. This physician was either the attending anesthesiologist in the cardiac surgery intensive care unit or the psychiatrist from the consultation services. Nurses in the cardiosurgery units and wards screening the patient according to their present symptoms of delirium using the confusion assessment method. Which requires that a patients mental status demonstrates an acute onset and fluctuating course inattention, and cognitive disturbances, and altered level of consciousness [4]. According to the World Health Organization, the chronologic age of 65 years was accepted by most developed countries in the world as a definition of “elderly” or older person. Out of the group of patients above 65 years, we further extracted data regarding very elderly patients ($80 years). The inclusion criterion was major cardiac operation performed under general
anesthesia. The following exclusion criteria were used: known preoperative cognitive disorder (dementia, mild cognitive impairment, Mini Mental State Examination score below 24 points), psychiatric or mental disorder (epilepsy, schizophrenia, depression, and so on), and patients who died intraoperatively or within the first 6 hours after the procedure. The analysis was performed according to age in two groups: Group I included all patients with age equal to or above 65 years with and without delirium (\text{$65$ years delirium+ vs delirium−}) and Group II included all patients with age equal to or above 80 years with and without delirium (\text{$80$ years delirium+ vs delirium−}). All patients were screened for the presence of delirium by ICU physicians, attending cardiac surgeons, and nurses according to Diagnostic Statistical Manual of Mental Disorders, fifth edition (DSM-5) criteria during the postoperative course with data regarding the first 5 days after the operation included in the analysis. According to DSM-5 diagnostic criteria for delirium were 1) disturbance in attention (ie, reduced ability to direct, focus, sustain, and shift attention) and awareness (reduced orientation to the environment); 2) disturbance developed over a short period of time (hours to days), changed from baseline and fluctuated in severity during the course of a day; 3) additional disturbance in cognition (eg, memory deficit, disorientation, language, visuospatial ability, or perception). Moreover, criteria from 1 and 2 were not better explained by another preexisting, established, or evolving neurocognitive disorder or coma and there was no evidence from preexisting history, physical examination, or laboratory findings that the disturbance is a direct physiologic consequence of another medical condition, substance intoxication or exposure to toxin, substance withdrawal, or because of multiple etiologies.6 Initial delirium assessments were performed in the postoperative ICU by at least two health care professionals (doctor and/or nurse) with the patients sedated and undergoing mechanical ventilation and after the patient had been weaned from mechanical ventilation and extubated. Data regarding delirium were extracted from detailed nursing and medical staff records. [34] Many risk factors are associated with postoperative delirium. While some may predispose patients to delirium, other risk factors precipitate delirium such as medications given during the perioperative period. Predisposing risk factors are typically long-standing with the patient and should be recognized preoperatively in order to screen patients for increased risk. Precipitating risk factors must be considered by clinicians when treating any patient, especially patients already at high risk for postoperative delirium. Each type of risk factor can be modifiable or non-modifiable, and if possible, those that are modifiable should be optimized in the perioperative period. Delirium is a condition that may affect a patient for several days or weeks. It is associated with many significant adverse effects and poor outcomes. The progression of dementia after suffering from an episode of delirium may lead
to a significant decline in both physical and cognitive functioning. Modifications to medications administered before, during, and after surgery should continue to be investigated. The avoidance of medications such as benzodiazepines and opiates by using other sedatives and analgesics to decrease delirium[35]. The observation of patients during hospital admission was done by nurses specially trained to recognize behavioral changes related to delirium. The Delirium Observation Screening scale score was also obtained in all patients (surgical and nonsurgical) three times a day.[2] The primary outcome was postoperative delirium as diagnosed by an attending physician. This physician was either the attending anesthesiologist in the cardiac surgery intensive care unit or the psychiatrist from the consult liaison service. Nurses in the cardiac surgery intensive care unit and on the cardiac surgery wards screened patients for symptoms of delirium using the Confusion Assessment Method, which requires that a patient’s mental status demonstrates an acute onset and fluctuating course, inattention, and cognitive disturbances and/or altered level of consciousness [3]. The development of postoperative delirium, the patient’s neurological status throughout the hospital stay was analyzed. Because standard screening tools for delirium were not being used at the facility during this time, assessment data from registered nurses, physicians, and midlevel care providers were reviewed. Assessments made while the patient was sedated and receiving mechanical ventilation or immediately after the patient had been weaned from mechanical ventilation and sedation were not used as a basis in determining the development of postoperative delirium because these assessments could lead to inaccurate results. A patient was considered to have had postoperative delirium if at least one of the following indicators was noted in the records as a new-onset condition after surgery: encephalopathy, delirium, confusion, or altered mental status. The following cues from the nurses’ and medical staff’s documentation were also considered to help determine the development of postoperative delirium: agitation, altered level of consciousness, restlessness, disorientation, lethargy, hyperactivity, impulsiveness, poor or impaired judgment, and poor or impaired thought processes. Careful analysis and attention were given to the fluctuation of indicators as well as the patient’s baseline mental status to ensure accuracy in classification. Patients considered to have had postoperative delirium had changes in the neurological assessments between shifts or within a shift. For example, a patient was alert and oriented to person, place, time, and situation in the morning but was disoriented, confused, and agitated at night[8].

4.7. Management and prevention:

Delirium is a clinical syndrome associated with multiple short—and long term complications. Therefore prevention is an essential part of its management. Pharmacological and non-
pharmacological managements are there to expel the manifestations of delirium in patients[12]. Paying special attention to the risk factors can significantly eliminate the incidence of delirium.

**Prevention:**

Both pharmacological and non-pharmacological approach are the methods for the management of delirium.

**Non pharmacological approach:**

The lack of sleep or poor quality decreased ambient light and noise pollution can leads to the complicated stage of delirium. Therefore reduction in this stimulus and provides calm environment and psychological support will relieve the symptoms of delirium to some extent. A multi-disciplinary medication which has strategies on reorientation, limited usage of psychoactive drugs, early ambulation, adequate sleep, and well hydration, assisting hearing and visual aids are needed to lessen the occurrence of delirium in ICU[4].

Identically, provident geriatric consultation also proves helpful to post-operative patients. However neither of these non-pharmacologic approaches has been wildly approved and researched in ICU care settings.

**Pharmacologic approach:**

Prophylactic antipsychotic medications are still in the debate of research desk. However haloperidol and risperidone medications have still the roles in psychotic period of delirium, these categories of medications are still required to guarantee the merits of administration in post cardiac patients.[4] The primary goal in patient to eliminate any threatening factors which will induce the occurrence of psychotic stages of delirium. Treatment regime has a standardized medication management in order to prevent the further complications. For this placebo and risperidone also can be considered but risk of progression of delirium is variable according to the prescribed medications.

**Preventive measures**
Preventing delirium means using methods that can effectively decrease the risk of delirium incidents and ultimately, cause improvement in clinical outcomes in geriatric patients who show risk factors that may serve as the basis for delirium manifestation. To date, few clinical studies have been published on preventing delirium; nevertheless, they have already indicated that around 30% to 40% of delirium episodes are preventable. Paying attention to risk factors that make grounds for delirium manifestation in individuals exposed to increasing risk of delirium (such as old patients) could prevent delirium incidence and could ultimately improve the clinical outcomes of these patients. Immobility, using physical constraints, using bowl catheter, malnutrition, psychedelics, some types of drugs, associated diseases, and dehydration in the individual can cause delirium symptoms. Old age, severe illness, dementia, physical frailty, infection and/or dehydration, vision impairments, drug interference caused by polypharmacy, surgery, and excessive use of alcohol are among other risk factors for delirium. The core of studying the non-pharmacological interventions in preventing delirium is based on identification, followed by managing the precipitating factors and/or delirium risk factors. The 6 delirium risk factors in this study were cognitive impairment, sleep deprivation, immobility, visual impairments, hearing impairment and dehydration. The results of this study showed that delirium symptoms were 9.9% in intervention group in comparison with the 15% in usual-care group. The total number of delirium and the total number of its episodes showed a significant decrease in the intervention group. Nevertheless, the intensity of delirium and its recurrence did not show any significant difference. This intervention was associated with considerable improvement in the degree of cognitive impairment manifested in patients with cognitive impairment at admission as well as significant reduction in the rate of use of sleep medications in all patients in the intervention group. Controlling environmental factors is one of the effective ways in delirium control and improvement. Although there is no empirical evidence to show that environment by itself can cause delirium, it seems specific environments might intensify delirium. In general, environmental factors play a significant role in creating risk factors in delirium development; therefore, if those factors can be managed by some approaches, it will be possible to decrease the risk of delirium symptoms. Noise is one of the disturbing environmental factors. There are many noises in hospitals, especially in ICU, noises are caused by apparatuses, pumps, ventilators, alarms and/or the sounds of doing resuscitation. The noise in ICU has been recognized as a factor that disturbs sleep and disturbance in natural sleep, cycle might increase delirium symptoms. To prove this claim, the effects of noise on quality of sleep and delirium development was studied in a clinical trial in which headphones were used to protect the patients against hearing noise during night sleep. The results of the trial showed that the practice improved
sleep and reduced confusion in patients. In addition to interference with patients’ sleep and rest, the noise might stimulate and intensify the symptoms for the delirium patients who are suffering from confusion and dizziness. Thus, efforts must be made to reduce those noises as much as possible. Furthermore, in patients who are in verge of seizure and might suffer from seizure attacks with the least number of stimuli including hearing stimulation, it is better to protect their ears by headphones so they cannot hear the noises around them. In another word, silence is the best sound for these patients. On the other hand, low environmental stimuli can leave the patient with his/her delirium state. To eliminate disturbing noises in the environment, making the place soothing and peaceful by playing relaxing music, could help reduce confusion and delirium in patients, especially for mechanical ventilation treatment patients who receive sedatives and are provided with conditions to tolerate the system and stay relaxed. Because they are still attached to the surrounding environment through hearing, using soft music with no lyrics could be helpful in lowering their anxiety and confusion caused by their physical conditions. Using pleasant scents and air fresheners can be helpful in making the environment desirable for the patient. Although no study with high statistical population and suitable planning has been published on this topic, it seems that efforts to reduce disturbing environmental smells such as detergents and disinfectors, which are common in hospitals and replacing them with scents and air fresheners, could be helpful in preventing delirium and reducing confusion in patients.

Being placed in an environment where the changes in day and night hours are not noticeable contributes to sleep disorder and loss of alertness cycle, leading to, intensification of fatigue and confusion in patients. To improve these conditions, there are windows built in some ICUs to enable the patients to see changes in day lights and nights. In addition, in a room which might be dark at night, a dim light can reduce patient’s confusion at night. To help the patient on better perception of the 24-hour cycle, the patient should be provided with an analogue clock that shows the 24 hours of day and night and a calendar visible by the patient.

Aspects of delirium-The patients’ perspective The patients’ own experience of delirium varies widely. Some patients do not remember being delirious, whereas others describe the incidence clearly with feelings of anxiety, fear, and helplessness, being disorientated to place and time and hearing or seeing things that do not exist. These experience can be frightening, but also with neutral or enjoyable scenarios with a mixture of past and present events. One year after cardiac surgery, patients have described their experience as a scary complication with feelings of shame for their behaviour. An episode of POD may involve an altered body perception, due to illusions and hallucinations an
increased mortality risk in these patients linked to self-harming, with examples of arterial and venous catheters being removed by the patient. Patients with delirium are more likely to have functional decline resulting in more fall injuries during the hospital stay with a continuing lack of independency in activities of daily living up to 6 months after surgery. In the long-term, POD is associated with an increased risk of stroke, increased hospital readmissions and a decrease in cognitive dysfunction, seen one year after cardiac surgery. Some of these patients may never recover to their baseline cognitive function. A cognitive decline after POD has been associated with a poorer quality of life and an increased long-term mortality risk after cardiac surgery.

4.8. The nursing perspective

With their ongoing contact with the patient in clinical care, nurses are in the best position to recognize delirium symptoms. However, the syndrome remains under-recognized by nurses. In a busy hospital environment, delirium is challenging to detect. Poor knowledge about delirium and the lack of screening scales may be reasons behind this challenge. It has been reported that screening scales are mostly used for those patients that present a ‘suspicious behavior’ with agitation, restlessness, etc. Caring for a delirious patient has also been described by the nurses to cause stress in the working situation, with an emotional challenge, including frustration and physical exhaustion. Some nurses even feel uncomfortable in caring for delirious patients, due to distrusting irritable and sometimes violent behaviors. Communication with these patients can be meticulous with a feeling of ineffectiveness. Nurses have reported that they lack knowledge about delirium symptoms and how to manage these, which can be a barrier in the care of delirious patients. Moreover, a communication gap between professionals has been described, with co-operation lacking between physicians and nurses. Generally, there may be a lack of time, resources and opportunities to discuss and initiate a care plan within the team around the patient, and the care of these patients often requires more staff members. It has been described that the extra workload generated by a delirious patient is rarely taken into account and the nurses feel that they do not get the required support from their immediate supervisors.

The surgical perspective

POD after cardiac surgery is associated with complications for the patient both in the early postoperative period, but also in the long-term perspective. Delirium in general is known to increase the risk of complications including aspiration, pressure ulcers, pulmonary emboli and decreased oral
intake. POD was early identified as a complication to cardiac surgery, and brain protection has been an ongoing concern since the early days of surgery with cardiopulmonary bypass (CPB). The association between CPB and delirium directed the attention to oxygenator technology and wound-blood recycling. The condition was described as "post-craniotomy delirium". Nevertheless, POD is also observed among patients who have not been exposed to CPB, undergoing general or orthopedic surgery. Moreover, delirium is a psychiatric term regardless of surgery, and occurs also in non-surgery medical patients.

**Delirium characteristics**

Delirium might be the first symptom of an underlying disease or a side effect of a medical treatment. Older patients are at greater risk of POD, which may be explained by age-related changes in the brain. Atherosclerosis is more common among older patients, and the risk for neurological dysfunction increases. For patients admitted for cardiac surgery, atherosclerotic vascular disease might contribute to organ dysfunction, and cognitive- and functional impairment, which places these patients at an increased risk of developing POD. Delirium is a neuropsychiatric syndrome characterized by a disturbed consciousness accompanied with a change in cognition. It develops gradually within hours or days and fluctuates in course. Delirium varies in its psychomotor activity, with a subdivision into hyperactive, hypoactive and mixed hyper- and hypoactive forms. Clinical signs of hyperactive delirium include irritability, violence, restlessness, euphoria and anger. The hypoactive state of delirium is exemplified by ignorance, lethargy, staring and stupor. Disturbances in the sleep-wake cycle are symptoms that may be associated with delirium. Delirium may also be subdivided into its psychiatric symptom profiles, separating those with psychotic symptoms versus emotional symptoms. Examples of psychotic symptoms are hallucinations, paranoia or illusions, and emotional symptoms which include depressed mood, emotional liability and anxiety[33].

The delirious subtypes differ in terms of causality, detection, treatment and prognosis. A state of hyperactive delirium may alert health care professionals to respond. This may not be the case with hypoactive delirium in which the delirious condition has more subtle symptoms. Hypoactive symptoms are more common in older patients, and these symptoms may also be associated with dementia. It has been reported that patients with hypoactive delirium are subject to more postoperative complications than non-delirious patients[16]. POD is a common complication to cardiac surgery, with obvious negative consequences for the patient, medical ward and economy. Delirium has an underlying cause
that can be prevented and treated. Therefore, identifying risk factors becomes of crucial importance and needs further investigation. To accomplish these goals delirium must be correctly detected and documented. Screening instruments may offer a reasonable compromise between diagnostic accuracy and daily-care simplicity[25].

**Relationship between dementia and depression**

Dementia and depression are risk factors for delirium and have an additive effect on risk. Dementia means it is a chronic or persistent disorder of the mental processes caused by brain diseases or injury and marked by memory disorders, personality changes and impaired reasoning. Depression means feeling of severe despondency and dejection. And this to be recently, mild cognitive impairment has also been identified as a risk factor for delirium.Because delirium has been identified as an independent risk factor for incident dementia.A potential relationship of delirium with subsequent development of new-onset or worsening depression.

*Table Nr.1. Risk of Postoperative delirium: Sum of Predisposing and Precipitating Factors.*

<table>
<thead>
<tr>
<th>Risk factor category</th>
<th><strong>Predisposing factors(Preoperative)</strong></th>
<th><strong>Intraoperative</strong></th>
<th><strong>Postoperative</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Major[2 point]</td>
<td>Advanced age (80 y)</td>
<td>High-risk surgical procedure (eg, major cardiac, open vascular, abdominal surgery) Emergency surgery Major complication</td>
<td>Intensive care unit stay 2 d Major complication</td>
</tr>
<tr>
<td></td>
<td>Dementia or recent delirium, not resolved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor [1 point]</td>
<td>Older age (70-79 y)</td>
<td>Moderate-risk surgical procedure (eg, most abdominal, orthopedic, ear, nose,</td>
<td>2 d Minor complication Poorly controlled pain, exposure to high-dose</td>
</tr>
<tr>
<td></td>
<td>Mild cognitive impairment History of stroke Functional</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
disability Laboratory abnormalities High medical comorbidity, including cardiovascular risk factors Alcohol/sedative abuse Depressive symptoms and throat, gynecologic, urologic surgery) Unscheduled surgery General anesthesia Regional anesthesia with intravenous sedation Minor complication opiates/meperidine Exposure to sedatives

American Medical Association, Postoperative Delirium, 2012 [19].

Table Nr.2. Intervention trials for postoperative delirium.

<table>
<thead>
<tr>
<th>Nonpharmacological trials</th>
<th>Pharmacological trials</th>
</tr>
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<tbody>
<tr>
<td><strong>Prevention</strong></td>
<td></td>
</tr>
<tr>
<td>• Multifactorial intervention programs.</td>
<td>• Anesthesia and analgesia practices.</td>
</tr>
<tr>
<td>• Modified Hospital Elder Life Program vs usual care reduces delirium incidence.</td>
<td>• General vs epidural intraoperative anesthesia: no difference.</td>
</tr>
<tr>
<td>• Proactive geriatrics consultation vs usual care reduces delirium incidence.</td>
<td>• Intravenous vs epidural postoperative analgesia: no difference.</td>
</tr>
<tr>
<td>• Nurse-led multifactorial intervention program vs usual care does not reduce delirium incidence but reduces severity, duration.</td>
<td>• Gabapentin as opiate-sparing agent vs placebo reduces delirium.</td>
</tr>
<tr>
<td></td>
<td>• Light vs deep sedation during spinal anesthesia reduces delirium.</td>
</tr>
<tr>
<td></td>
<td>• Dexmedetomidine</td>
</tr>
<tr>
<td>Treatment</td>
<td>Multifactorial intervention programs</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Specialized geriatrics unit vs usual care for patients with hip fracture reduces duration of delirium</td>
</tr>
<tr>
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</tbody>
</table>

- Three studies of dexmedetomidine vs benzodiazepines or barbiturates show reduced delirium incidence or duration with dexmedetomidine.
- Antipsychotics
  - Low-dose oral haloperidol vs placebo reduces duration, severity.
  - Intravenous haloperidol vs placebo in intensive care reduces delirium rates.
- Oral olanzapine vs placebo reduces delirium incidence; increases duration and severity.
- Acetylcholinesterase inhibitors
  - Four placebo-controlled trials, 2 in elective orthopedic surgery, 1 in hip fracture, and 1 in cardiac surgery, show no benefit.

American Medical Association, Postoperative Delirium, 2012 [19].
The incidence of postoperative delirium varies depending on the characteristics of patients and type of surgery. For example, delirium is more common among older patients with baseline cognitive impairment compared with patients with normal cognitive function. Type of cardiac surgery is another factor that affects the incidence of delirium[19].

**Nursing Aspects of Delirium Prevention and Detection**

Although the management of delirium concerns the entire healthcare team, nurses in particular play a vital role in the prevention and early recognition of delirium. Because of their continuous contacts with patients, they are the most strategic of all healthcare workers to identify and target risk factors and to observe early signs of delirium.

**5. ORGANISATION AND METHODOLOGY OF A RESEARCH**

The analysis of the case presentation is thoroughly performed in the PICO questionnaire method.

**6. CASE PRESENTATION**

A 77-year-old woman was admitted to the hospital with heart disease. The patient presented with aortic stenosis and had a history of AV blockade during the past year. Comorbidities include type II diabetes treated with metformin, had hearing impairment. She is a non-smoker, occasional social drinker, and has a BMI of 42. This patient was be assigned ASA Class 3 (with severe systemic disease in/on The American Society of Anesthesiologists (ASA) physical status classification system). The patient is scheduled for elective isolated aortic valve replacement (AVR) on cardiopulmonary bypass (CPB). The standard general endotracheal anaesthesia was performed. The standardized cardiopulmonary bypass (CPB) was performed using a roller pump. Normothermia (36°C) and mean arterial blood pressure around 70 mmHg were maintained throughout the procedure. Duration of CPB was 158 minutes, and the aortic cross-clamp time was 98 minutes. After the operation the patient was transfer to the ICU on mechanical ventilation. Postoperative management - standardized and adopted
by that clinic. The patient was hemodynamically stable, with minimal bleeding and adequate diuresis, no neurological disorder. Laboratory results showed that no correction was necessary. However, the patient, due to pure muscle tone, was ventilated mechanically overnight and extubated the next morning. In post-extubation period the patient was weak, sluggish, exhausted, moody, non-cooperating, in low spirits and hypoactive, needed medical staff’s help but she was conscious, her vital functions were adequate. Due to general weakness and need of care, the patient stayed in the ICU. On the third postoperative day nurse used the intensive care delirium screening checklist to assess POD. Using the delirium severity scale on Confusion Assessment Method (CAM)-ICU-7 for this patient hypoactive delirium was determined. So, postoperative period was complicated by post-operative delirium, type of hypoactivity. As soon as the relatives of the patient brought the glasses and hearing aid, the situation got better. It is very important for re-orientation to have one’s sight and hearing aids, as delirium signs regressed and there was no need for special treatment. Supportive care was continued all this time, including sensible use of sedatives, hemodynamic management, fluid management strategy, nutritional support, control of blood glucose levels, improved oxygenation, prophylaxis against deep venous thrombosis (DVT) and gastrointestinal (GI) bleeding. The patient’s condition improved gradually. The levels of vital parameters slowly reduced during the next postoperative days, and the patient was discharged on the nine postoperative days. In summary, the patient required ventilatory support for one day, but the length of stay in intensive care unit was nine days, length of hospital stay - 17 days.

7. RESULTS AND THEIR DISCUSSION

The patient is hemodynamically stable in intensive care unit and the minimal bleeding, adequate diuresis the patient have no neurological disorders. The patient got admitted for surgery they scheduled elective isolated aortic valve replacement [AVR] on cardiopulmonary bypass replacement. The patient have very low blood pressure after surgery patient transfer to the ICU on mechanical ventilation. After post extubation the patient was weak, sluggish, exhausted, moody. The patient was non co-operating and have low spirit and hypoactive. She is very consciousness then her vital functions are adequate. Patient have general weakness is present so she stayed in the intensive care unit then the nurses assessed she have postoperative delirium[27]. Prolonged mechanical ventilation was another strong risk factor associated with in hospital delirium in this cardiac surgery population. When considering only the initial onset of delirium mechanical ventilation for longer than 24 hours appeared to have a combined effect on the development of postoperative delirium. However in our population
the cardiopulmonary bypass time, surgery duration and intraoperative blood transfusion were not identified as independent risk factors associated with the development of delirium. The age was an independent risk factors associated with the development of delirium. The age was an independent risk factors for delirium.[1]. From our observation of patients during hospitalized the specialty trained nurses recognize behavioral changes occur in delirium. By the examination identify a possible underlying cause of delirium such as sepsis electrolyte imbalances or pharmacologicabnormalities. Aftersurgery patient suffering from post operative delirium complications hospital length of stay, ICU admission, ICU length of stay and institutionalization after discharge. Studies have been identified postoperative present with aortic stenosis and AV blockade past year, prolonged mechanical ventilation surgery longer than 24 hrs, age 77 years or older, complicated comorbidities type 2 diabetes treatment with metformin. She is a non smoker occasionally social drinker. The post operative period was the strongest risk factor for cardiac surgery associated delirium. Prolonged mechanical ventilation was another strong risk factor associated with in hospital in this cardiac surgery population[1].

On top of that prolonged mechanical ventilation and delirium is directly proportional to each other that means both can induce each others development in ICU patients. Certainly, the drugs like benzodiazepines sedative level and the clearance of drugs secondary to renal or hepatic dysfunction have also roles. The ICU environment could have a heterogenous effect on delirium between older and younger patients. This might pointing towards that the mechanism of delirium differs across age groups and reveals more age specific interventions required. However, in our population the cardiopulmonary bypass time, surgery duration, and intraoperative blood transfusion were as not identified as the independent risk factors markedly[1]. Adhering to to a non pharmacologic multicomponent intervention strategy plays an important role in preventing delirium in patients considered to be susceptible for the development of delirium[2]. Therefore in the management and palliative care we can give the proper counseling to the geriatric patients in a rehabilitation center in order to eradicate the manifestations of delirium. Since the risk factors are multi factorial the medical team AHS to focus on different aspects of wings to achieve the goal in the management of delirium. Both predisposing and precipitating factors contributed to delirium and it is potentially possible to modify several of these factors in daily clinical practice[7]. Patients undergo cardiac major surgery has to be stay in ICU set up and spend considerable time during the post operative period for the close observation. Various factors like electrolyte imbalances, infections and multi drug resistance organism effects and worsening of co related conditions post operatively resulting in multi organ dysfunctions can contribute to the threatening stages of delirium. The exact mechanism behind the occurrence of
delirium in patients in ICUs is unknown. Further more absence of natural lighting, alteration in normal sleep wake cycle, unaddressed pain, infections, usage of psychotropic drugs and various other patient factors contribute to delirium. This article shows the importance of recognizing and managing postoperative delirium in geriatric patients to reduce the adverse outcomes. Recognizing delirium is a challenge but by systemic application of diagnostic tools and assessment plans can be make significant influence in reduction of occurrence of postoperative delirium in both pediatric and geriatric cycles.

Delirium after cardiac surgery is more than an acute, in-hospital problem; even short-lived, mild delirium can have functional consequences that persist long after hospital discharge. [31] There are important complications for postoperative delirium after surgery first; to tell the patient relatives and caregivers about the risk and its potential complications. Second assessment of preoperative important to facilitate detection of postoperative decline. Third provide rehabilitation care for patients. Functional status should be monitored for 1 year after cardiac surgery, and families should be informed that the recovery of functional status may be a prolonged process. Delirium or acute confusions perhaps the most common postoperative complication, yet it is often unrecognized by clinicians caring for surgical patients. Patients’ risk of delirium can be defined based on the sum of predisposing and precipitating factors. Effective approaches exist for the prevention of delirium, and the quest for improved detection and treatment is growing. Delirium may have long-term consequences, and these patients need careful follow-up to maximize their likelihood of full recovery Patients with delirium are at high risk of poor long-term outcomes. Surgeons and other clinicians who focus primarily on hospitalized patients may not be aware of all of its “downstream” effects on patient recovery [40]. POD remains one of the most common, yet least reported, complications after surgery, especially in the elderly. The POD incidence rate of 13.2 per cent reported in the present study is relatively low compared with that found in studies conducted in the general surgical population [11,6]. This probably reflects the fact that patients who were unable to perform the cognitive and psychometric tests were excluded from the study, in particular those with a previous diagnosis of dementia, in which delirium incidence can be especially high. The incidence of POD in patients operated on in an emergency setting was significantly higher (17.9 per cent) than that of those operated in an elective setting (6.7 per cent), consistent with previous studies. Although emergency surgery was not an independent risk factor for POD in the multivariable analysis, the high incidence in this setting may warrant the implementation of preventive measures. Many non-pharmacological interventions, for example, counseling for patient and family, adjustment of certain environmental conditions such as lighting and temperature, and ensuring patient comfort, have proved
highly effective in an electivesituation but are not always easily translatable to an emergency setting. Although the incidence rates of different delirium subtypes can vary from study to study, the rate of hypoactive POD of 55 per cent reported in the present study is certainly among the highest reported to date. This is probably due to the discrepant criteria used for defining POD subtypes in different studies, and to inherent differences between patients treated in various surgical departments. As delirium is a heterogeneous disorder with multiplierisk factors, some authors have pointed out the importance of predisposing and precipitating factors; susceptible persons, for example, can easily develop delirium even when confronted with minimal noxious stimuli. Among predisposing factors identified in this study, age, medical co-morbidity, cognitive impairment, depression and other psychopathological symptoms, functional impairment and glucose abnormalities have been described in previous studies. For instance, age, cognitive impairment, functional impairment and glucose abnormalities were among the factors. All precipitating factors (emergency surgery, perioperative transfusions and perioperative opiate administration) lost significance in multivariable analysis, suggesting that patient vulnerability is the most important factor in predicting POD, even in different surgical settings. These data underpin the need for the surgeon to make a comprehensive evaluation of the patient on admission in order to assess the risk of POD and undertake preventive measures. Minimizing the incidence and severity of POD will not only reduce patient distress, but also length of hospital stay, morbidity, mortality and associated costs. A high incidence of POD was found in both emergency and elective general surgery. Because POD is associated with high postoperative complication rates, leading to an increased length of hospital stay and perioperative mortality, preventive measures are paramount. To prevent the development of POD, intensive care should be provided for older patients who present with medical comorbidity, cognitive impairment, depression and other psychopathological symptoms, and preoperative glucose abnormalities. These observations stress the necessity to use available guidelines to check patients before surgery, because evidence suggests the possibility of prevention through management of risk factors, as well as the need for timely recognition and management of POD in the postoperative period. The incidence data for delirium in the elderly after cardiac surgery. Determining the current burden of postoperative delirium in the elderly undergoing cardiac surgery based on certain baseline patient characteristics will be important for clinicians providing care to this potentially vulnerable population and will help guide researchers as they develop interventional trials to prevent this important syndrome in the older population. Furthermore, understanding baseline (preoperative) patient characteristics that increase postoperative delirium is critical for balanced randomization in interventional trials to prevent
The largest samples of cardiac surgery patients undergoing systematic screening for delirium. This large sample size ensured that the effect of the ICU environment on the overall prevalence of delirium would not be masked by a lack of statistical power. Furthermore, it is one of the few studies that investigated delirium in both the ICU and the hospital ward using a systemic screening tool. A delirium incidence of 31% was found in patients of 70 years and older. Delirium or acute confusions perhaps the most common postoperative complication, yet it is often unrecognized by clinicians caring for surgical patients. Patients’ risk of delirium can be defined based on the sum of predisposing and precipitating factors. Effective approaches exist for the prevention of delirium, and the quest for improved detection and treatment is growing. Delirium may have long-term consequences, and these patients need careful follow-up to maximize their likelihood of full recovery. If such patients require surgery again, a thorough preoperative evaluation by a physician expert is indicated. If a patient’s cognitive status has not returned to baseline, it might be best to postpone additional surgery until recovery is complete. When surgery is undertaken, surgeons, anesthesiologists, and medical specialists should carefully consider ways to minimize the stress of surgery and the total dose of anesthesia and sedation administered. Postoperatively, these patients should be actively co-managed by geriatricians, hospitalists, or intensivists, with daily delirium case finding. If delirium is detected, appropriate evaluation and management should commence promptly. Delirium diagnosis, evaluation, and treatment should be documented in the medical record and discharge summary to facilitate management across transitions of care. ICU nurses and intensivists have difficulty in diagnosing the presence of delirium in their patients during daily care without a validated, reliable, and easy-to-use diagnostic instrument. The Delirium Detection Score (DDS) is a validated scale that considers eight of the symptoms of delirium. Each one of these symptoms receives a score of 0, 1, 4, or 7 points. The scale was created by modifying an instrument for the evaluation of alcohol withdrawal syndrome (Clinical Withdrawal Assessment for Alcohol - CIWA-Ar). Therefore, it is a useful scale to assess the degree of delirium and guide treatment, and the tool may also serve as a diagnostic scale. The scale exhibited good correlation between examiners, as long as the examiners were previously trained in the scale's application. It is mainly used in hospitals care settings. The most scales have variables that assess hyperactive delirium, such as agitation, anxiety, and hallucinations, but few are able to assess hypoactive delirium, which is the most common subtype of the disease, with specificity. The hypoactive nature of the disease (drowsiness, passivity, and inactivity), in most cases, is an intrinsic difficulty of disease, which makes it virtually unrecognizable without the use of a suitable tool. The evaluation of behavior (and not just the agitation), attention, sleep-wake cycle, and the level of
consciousness, such as the evaluation allows for the evaluation of patients with hypoactive delirium. The presence of a ‘delirium working group,’ the ICU team was insufficiently capable of detecting delirium in critically ill patients, which led to severe underestimation of its prevalence. Only 35% of the ICU days with delirium were recognized by bed-side nurses, while attending physicians performed comparably[32]. Postoperative delirium was present in almost one half of the elderly patients admitted to the surgical ICU after a major operation. Preoperative variables associated with the development of postoperative delirium included: older age, decreased albumin level, lower hematocrit, functional impairment, cognitive impairment, and a history of alcohol abuse. Intraoperative variables related to the development of postoperative delirium include hypotension and increased blood transfusion. Logistic regression found pre-existing cognitive dysfunction to be the strongest predictor of developing postoperative delirium. Outcomes were worse in elderly patients who develop postoperative delirium. The development of delirium predicted increased ICU/hospital stay, cost, post discharge institutionalization, and mortality at both 30 days and 6 months. Identification of risk factors for developing postoperative delirium allows surgeons to implement interventions aimed at reducing the incidence of delirium in this high risk group of patients. Previously identified risk factors for delirium after an operation include: age, dementia, functional impairment, depression, psychotropic drug use, increased comorbidity, laboratory abnormalities, visual impairment, hearing impairment, alcohol use, institutional residence, and prior postoperative delirium. There is substantial heterogeneity in the findings of these studies which determine risk factors for developing postoperative delirium.[2] The patients who have greater physical weakness and poorer endurance may be at greater risk of delirium.[3] Delirium is a challenging diagnosis in the critically ill and the huge amount of delirious patients go unrecognized. Although with more than 24 instruments used for the assessment of delirium, the most preferably and frequently used instrument is the Confusion Assessment Method (CAM), having a sensitivity of 94% and specificity of 89% against a gold standard of psychiatrist diagnosis. CAM-ICU perfectly diagnoses delirium effectively in intensive care unit patients, who are quite repeatedly intubated and mechanically ventilated. The sensitivity of CAM-ICU score is measure 95% and specificity of 89%[4]. Patients who undergo a major cardiac surgery has to spend considerable time in the ICU in post operative period for close observation and monitoring. The ICU environment which is stressful is found to contribute to occurrence of delirium especially in vulnerable elderly patients. Various factors like dyselectrolytemias, infections and worsening of comorbid conditions post operatively resulting in multi organ dysfunctions can contribute to delirium[28,29]. The patients had highest incidence of delirium in first post operative day in ICU compared to second day. It was also
reported that the patients who developed delirium had longer hospital stay and increased hospital expenses compared to those who did not had delirium. The exact mechanism behind occurrence of delirium in patients in ICUs is unknown. Some problems was shown that absence of natural lighting, alteration in normal sleep wake cycle, unaddressed pain, infections, usage of psychotropic drugs and various other patient factors contribute to delirium. It shows the importance of recognizing and managing post operative delirium in elderly patients to reduce the adverse outcomes [5]. Postoperative delirium and 5 adverse outcome measures: prevalence of in-hospital falls, increased length of postsurgical hospital stay, discharge to a nursing facility, discharge to home with home health services, and use of inpatient physical therapy[23]. From our findings also confirmed that postoperative delirium affects a substantial number of cardiac surgery patients. Patients with delirium are often agitated and restless, and because they are confused, they may not be able to cooperate with staff in implementing interventions to prevent falls. Or, patients with hypoactive delirium may have generalized weakness that puts them at higher risk for falls. Additionally, patients who have been treated with antipsychotic medications may manifest extrapyramidal signs and symptoms that can lead to an unstable gait and falls. Patients with postoperative delirium were also more likely than those without such delirium to use inpatient physical therapy. Patients who had postoperative delirium were discharged later than were patients who did not have postoperative delirium[26]. From our all studies also indicated that patients with postoperative delirium have longer hospital stays, because of the increased likelihood of impaired functionality in patients with postoperative delirium, patients with this complication are more likely than patients without delirium to be discharged to a skilled nursing facility, or, if discharged home, are more likely to need home health assistance. Our results indicating an association between postoperative delirium and the need for more care after discharge in which delirium among the elderly was associated with an increased rate of institutionalization. Postoperative delirium impairs a patient’s cognitive status and ability to perform activities of daily living independently. Hence, patients with this complication are more likely than those without delirium to be discharged to a nursing facility where they can be provided additional assistance. Patients with postoperative delirium also generally have slower postoperative progress than do those without delirium, thereby requiring extended skilled nursing care as well as rehabilitation for recovery from the surgical procedure[29]. Many professors said that development of delirium in cardiac surgery is related to a complex interplay between predisposing factors, disease-associated elements (ie, atherosclerosis, inflammation), factors related to the operative technique, but also to some environmental factors (ICU design, noise, bright light, and so on) Many of these factors, including health care professionals–associated elements (patient–nurse ratio, stress,
excessive workload, professional burnout), are generally not measured in clinical studies, including our analysis, but seem to have an important influence on delirium development. The risk factors of post-cardiac surgery delirium defined for a specific patient group allows patients and their caregivers to make informed choices rather than guesses of what can be expected after cardiac surgery. The population of elderly patients, the risk of postoperative delirium is increased. Both patients and their families expect health care providers to be able to reliably predict risks associated with cardiac surgery, including neurologic complications, such as postoperative delirium[35,31]. Brain dysfunction is very common in adults with critical illness. Delirium has been observed in 60–80% of ventilated adult ICU patients, and 40–60% of non-ventilated adult ICU patients. The high incidence of delirium during critical illness makes its associations with morbidities and adverse outcomes in survivors extremely important. Mostly, critically ill patients with delirium have more failed and self-extubations, prolonged requirement of mechanical ventilation, inadvertent removal of catheters, prolonged hospital stay, higher health-care costs, and increased mortality. Probably it is associated with a threefold increase in risk of death in adults after controlling for presence of coma, severity of illness, and preexisting comorbidities. The development of delirium during hospitalization has been implicated in the development of complications for survivors such as long term cognitive impairment (LTCl) and post-traumatic stress disorder (PTSD). Critical illness alone leads to neuropathology changes, ultimately associated with neurologic dysfunction. The physiologic and psychiatric consequences of critical illness has just begun to be recognized. Indeed, experts almost uniformly acknowledge that experiencing life-threatening illnesses often leads to acute stress disorder (ASD) and post-traumatic stress disorder (PTSD). [12] The study supports that POD[post operative delirium] is a multifactorial disease. The independent risk factors are cognitive impairment.

Open aortic surgery or amputation surgery,>80 years age. One of the important finding was that post operative outcome was worse in delirious patients in terms of hospital length of stay, mortality and more institutionalization, making it a serious complication after surgery. Patients who have above mentioned risk factors should be considered with high standard delirium care[22]. If delirium can prove to be preventable, it certainly will be helpful in ushering a new era of improved quality in cardiac surgery. In the meantime we consciously study investigation into potential interventions for reducing the incidence and severity of POD[18]. We still lack effective pharmacologic interventions. Short term prophylactic oral administration of rivastigmine to prevent delirium in elderly patients undergoing elective cardiac surgery with cardiopulmonary bypass was not effective and cannot be recommended. In the cardiac surgery patients, utilization of the appropriate history and physical screening and initial
diagnostic tests in the preoperative planning phase can prospectively identify patients at high risk for delirium. Identification of cognitive, substance and alcohol abuse, mood disorders and frailty in addition to the previously discussed risk factors can be identified in elective patients[38]. For patients undergoing cardiac surgery, surgical stress and/ or cardiopulmonary bypass can produce hyper-inflammatory and stress response, both of which are important factors leading to delirium. Meanwhile patients in ICU after major surgery often develop sleep disturbances, which are also associated with increased risk of delirium. Dexmedetomidine is a highly selective alpha 2 adrenoceptor agonist with sedative, analgesic and anxiolytic properties. In previous studies of elderly patients admitted to ICU after non-cardiac surgery, continuous infusion of low dose dexmedetomidine during nighttime improves sleep quality, reduces delirium and improves 2 year. Patients had highest incidence of delirium in first postoperative day in ICU followed by second day. Hospital expenses for those patients with delirium had found to be increased. The exact mechanism behind occurrence of delirium in patients in ICUs is unknown. In recent studies, the reported incidence of delirium following cardiac surgery ranged from 13.5% to 41.7%. Prevention or early recognition of delirium is important since delirium correlates with a prolonged hospital stay, nursing home placement, reduced cognitive and functional recovery, and increased morbidity and mortality. The onset of delirium in each individual patient is caused by an interaction of predisposing and precipitating factors. The likelihood of developing delirium increases proportionally with increased risk of developing delirium as mentioned above. Delirium is poorly understood, particularly in ICU patients. It has been shown that trainee doctors lack the basic knowledge required to diagnose and manage delirium, rather than lacking awareness of its high prevalence and clinical significance. An educational package on delirium will decrease its prevalence in older medical inpatients. The teaching has to be directed at medical and nursing staff. It need not be lengthy or expensive but will require resources and time, from both trainers and trainees. Directing the programme at a specific patient group or particular risk factors will be important, for example increasing the awareness of the role of steroids in delirium when teaching trainee anaesthetists in choosing which drugs to use for post-operative nausea and vomiting. Implementing delirium screening in a unit must include an ongoing educational programme.

8. CONCLUSIONS

POD is a common perioperative complication frequently observed in patients undergoing cardiac surgery. Delirium remains a constant and frequent group of manifestations especially in the cardiac
surgical population and induce the rate of morbidity, mortality, and resource utilization. While many studies have proven the prevailing risk factors and preventive strategies, however the ideal treatment and management yet to be determined by the healthcare system. There have to be proper survey in the wide surgical population of patients to define better the optimal approach to managing delirium after any surgeries. According to studies performed in cardiac surgery patient population delirium is a common complication. ICU environment factor was the primary factor studied. It might interact with factors such as age in a complex manner. We found that adjusting the ICU environment in isolation is not a comprehensive multimodal approach, so we need to find other ways. Open aortic surgery or amputation surgery; >80 years age. One of the important finding was that post operative outcome was worse in delirious patients in terms of hospital length of stay, mortality and more institutionalization, making it a serious complication after surgery. Patients who have above mentioned risk factors should be considered with high standard delirium care. Other risk factors include pre-operative cognitive impairment, history of stroke, old age, peripheral vascular diseases, atrial fibrillation, and nutritional status. Delirium is hard to diagnose. Most commonly used method is CAM [confusion assessment method]. Delirium can be treated both pharmacologically and non-pharmacologically. Pharmacologically atypical antipsychotics are used to avoid delirium. Non-pharmacologically lack of sleep, decreased ambient light, noise pollution etc have been implicated to contribute to postoperative delirium. Delirium is an extremely common syndrome in critically ill patients and is associated with many extremely negative outcomes. It can present at any time during a patient’s ICU stay and in a variety of different manners. Both the CAM-ICU and ICDSC are validated for detecting delirium in critically ill patients. Practitioners should seek to actively prevent delirium before it occurs via modification of risk factors and non-pharmacologic protocols; once delirium develops in patients, pharmacotherapy options are limited. Delirium is a prominent issue in the care of critically ill patients, and all inpatient pharmacists should have an understanding of this syndrome in order to provide optimal patient care.
9.PRACTICAL RECOMMENDATION

There are certain specific factors have been identified to for the recommendation of postoperative delirium patients. This recommendation is mainly focuses for nurses and medical peoples for providing care patients. Delirium is a common, costly and potentially damaging illness in elderly postoperative patients who are staying hospitals for longer periods. Thus preventing delirium is the most complicated challenging goal for medical health care team. To prevent delirium symptoms in ICU patients certain factors can be considered. The patient should get the opportunity of receiving physical therapy, occupational therapy, and performing primary mobility in the first possible chance. Provides safe, calm and noise free environment in order to get enough sleep and rest during hospital stay, therefore the factors predisposes to the mental irritation can be expelled from ICU environment. Clients will be peacefully lead a hospital stay and thus will get a insults free outcome. The musical therapy also has some role to make the environment pleasant and to reduce anxiety and confusion caused by the disease condition [11].

On top of that, pleasant fragrance and scents can be used to make the environment comfortable for the patient. In order to reduce the confusion and and to make orient the present a clock and calendar can be place in patients room to familiarize the surrounding environment. In addition, if possible the patient’s bed should be placed near to the window so he/she can notice the changes in the day and night light, and if not changes can be made in lighting based on the morning and night light. Glasses for patients with vision impairments and hearing impairment patients with hearing aid providing also feel better for them during hospital stay. Healthcare professionals can communicate well and make proper interpersonal relationship maintain can also helpful. Proper prevention and diagnosis. Delirium is a common, costly and potentially damaging disorder. To prevent delirium in elderly patients, try to minimize modifiable risk factors and precipitating factors that is discussed detailed in this article[11]. It says that conventional conception that postoperative delirium is a multifactorial disease[2]. Postoperative outcome was significantly worsen in some cases during their stay in hospital, patients who have mentioned like that should be considered for high –standard delirium care [1]. The identified risk factors have to be resolve to some extend in order to eliminate the rate of incidence of delirium. In developing preventive strategies and interventional protocols for addressing delirium, adjusting the ICU environment in isolation will likely not be sufficient and instead will require a more comprehensive multimodal approach.
The quality of sleep was the strongest independent predictor of postoperative delirium patients. Together with the calm and quite environment we should provide the psychological support as well as spiritual support related to their religion. Some factors cannot be changed or avoided but some can be modified and it depends on different components which related to the particular patients. If to shorten the length of stay in the hospital to reduce the days. It may reduce the number of patients who develop postoperative delirium.

To prevent delirium symptoms in ICU patients the followings are recommended [11]:

1. The patient should be provided with the opportunity of receiving physical therapy, occupational therapy, and performing primary mobility in the first possible chance.
2. Disturbing noises in the patient’s environment should be decreased too improve patient’s sleep and rest.
3. Soft and soothing music should be played for the patient to make the environment pleasant and to reduce anxiety and confusion caused by his/her physical conditions.
4. Pleasant fragrance and scents should be used to make the environment pleasant for the patient.
5. A clock should be placed in view of the patient along with a calendar to help him/her with lower confusion and improve communication with the surrounding environment. In addition, if possible, the patient’s bed should be placed close to the window so he/she can notice the change in the morning and night light, and if not, changes should be made in lighting based on the morning and night light.
6. Glasses for patients with vision impairments and hearing aid in patients with hearing impairment will help them communicate better with the environment and reduce their confusion.
7. Arranging for educational classes for work therapy on delirium recognition, prevention, and diagnosis is also very helpful.
10. LIST OF SCIENTIFIC REPORTS/PUBLICATIONS

11. LIST OF LITERATURE SOURCES


27. Godfried R, Ettema A; Predicting and preventing postoperative decline in older cardiac surgery patients; 2014

28. Marcantonio ER; Postoperative Delirium: JAMA. Author manuscript; 2012: 73–81


LITHUANIAN UNIVERSITY OF HEALTH SCIENCES
MEDICAL ACADEMY
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STANTIYA MANIVANKERIKALAM SIBY LSMU 175998

(Full name of the post-graduate student, student ID No)

DECLARATION OF THE AUTHOR'S CONTRIBUTION AND ACADEMIC HONESTY

The 19th of 04 2019

Title of the graduate Master’s thesis POSTOPERATIVE DELIRIUM AFTER CARDIAC SURGERY

(Title)

COMPLICATIONS AFTER CARDIAC SURGERY

I have (please tick the right line with “x” and fill in as appropriate):

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(Full name of the post-graduate student)
V. ANNEXES

ANNEX 1
APPROVED
by the Council of the Faculty of Nursing of LSMU
2018-09-13 protocol No SLF-9-5

INDIVIDUAL PLAN OF PREPARATION OF THE GRADUATE MASTER'S THESIS

The study programme "Master In...Admission...Nursing..." year 2017-2018 group 2nd (Name)

A post-graduate student...Staniša Marijankevičiūtė...Siby... (Full name)

A topic of the graduate thesis: Postoperative Delirium


A supervisor of the graduate thesis...Dr. Judita Andrejevičienė, M.D., Ph.D... (Scientific degree, full name)

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Post-graduate student...Staniša Marijankevičiūtė...Siby... (Full name, signature)

Supervisor of the graduate thesis...Dr. Judita Andrejevičienė... (Full name, signature)

Chairman of the Qualification Commission... (Full name, signature)
V. ANNEXES

Annex 1
APPROVED
by the Council of the Faculty of Nursing of LSMU
2018-09-13 protocol No SLF-9-5

INDIVIDUAL PLAN OF PREPARATION OF THE GRADUATE MASTER'S THESIS

The study programme: Masters In Advanced Nursing Practice, year: 2017-2019, group: 2nd

A post-graduate student: Staniya maniyankerikalam siby

A topic of the graduate thesis: Post operative delirium after cardiac surgery

A supervisor of the graduate thesis: Dr. Judita Andrejaitiene, MD, Phd.

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Post-graduate student: Staniya maniyankerikalam siby

(Signature and full name)

Supervisor of the graduate thesis: Judita Andrejaitiene

(Signature and full name)

Chairman of the Qualification Commission:

(Signature and full name)
STANIYA MANIYANKERIKALAM SIBY

TITLE
Postoperative Delirium After Cardiac Surgery
Pooperacinis delyras po širdies operaciją

SUPERVISOR
Dr Judita Andrejaitiene

REVIEWER
Dr. Juozas Kapturauskas

KEYWORDS
cardiac surgery, cardiopulmonary bypass, delirium, postoperative delirium, extubation

SUMMARY
The number of older people undergoing surgery is constantly increasing, and the number of postoperative complications in older patients can reach as much as 65%. Postoperative delirium (POD) is a common complication that occurs in 8-52% of cases after heart surgery and is associated with increased mortality, morbidity and long-term cognitive impairment. This condition is more common in the post-operative period among older patients, especially hypoactive delirium, which is associated with a worse prognosis, as very often, about 30-60% remains unrecognized. This study analyzes the effect of postoperative delirium on postoperative progression. Thanks to the clinical case analysis, we can understand the importance of delirium recognition in the early postoperative period and consider what measures can be taken to prevent delirium.
SANTRAUKA

Vyresnio amžiaus operuojamų žmonių skaičius nuolat didėja, ir pooperacinių komplikacijų skaičius vyresnio amžiaus pacientams gali siekti net 65%. Pooperacinis delyras (POD) yra dažna komplikacija, po širdies operacijos pasitaikanti 8-52% atvejų ir susijusi su padidėjusiu mirtingumu, sergamumu ir ilgalaikiu pažinimo sutrikimu. Ši būklė pooperaciniu laikotarpiu dažniau pasitaiko tarp vyresnio amžiaus pacientų, ypač hipoaktyvios formos delyras, kuris siejamas su blogesne prognoze, nes labai dažnai, apie 30–60%, lieka neatpažintas. Šiame tyrime analizuojama pooperacino delyro įtaka pooperacinei eigai. Klinikinio atvejo analizė dėka galime suprasti delyro atpažinimo svarbą ankstyvuoju pooperaciniu laikotarpiu ir apsvarstyti, kokias priemones galima įgyvendinti delyro prevencijai.