OUTCOME FOR PATIENTS PRESENTING TO INTENSIVE CARE UNIT WITH DENTAL ABSCESS

Department of Intensive care Unit
LSMUL Kauno Klinikos
Lithuania

Supervisor: Prof. V. Pilvinis MD PhD
Student: Nader El Nahhal
Faculty: MF VI
Group: 35
Date: 10/12/2015 – 30/05/2017
TABLE OF CONTENT

SUMMARY ................................................................. 3
ACKNOWLEDGEMENTS ............................................... 4
CONFLICT OF INTEREST ............................................. 5
ETHICS COMMITTEE CLEARANCE ............................... 6
ABBREVIATIONS LIST ................................................. 7
TERMS ........................................................................ 8
INTRODUCTION ........................................................ 9
AIM AND OBJECTIVES OF THE THESIS ..................... 10
RESEARCH METHODOLOGY AND METHODS ........... 17
LITRETURE REVIEW ................................................... 11
  ANATOMIC EXPLANATION ........................................ 11
  PATHOGENESIS OF DENTAL CARIES ...................... 12
  PATHOGENESIS OF PERIODONTAL DISEASE ............ 12
  PATHOGENESIS OF ODONTOGENIC INFECTION ......... 14
  COMPLICATIONS ...................................................... 14
  SURGICAL THERAPY .............................................. 14
  ANTIBIOTIC THERAPY ............................................ 15
  PREVENTION ......................................................... 15

RESULTS ................................................................. 17
DISCUSSION ........................................................... 22
CONCLUSION .......................................................... 23
  RECOMMENDATIONS ........................................... 24
LITERATURE LIST ..................................................... 26
SUMMARY

Nader El Nahhal, Medical Faculty student in Lithunian University of Health Sciences, under the supervision of Prof. Vidas Pilvinis, conducted this master research; Outcome for Patients presenting to Intensive Care Unit with Dental Abscess. Our aim of this research was a retrospective study of fifty-four cases of patients who admitted to ICU with dental abscess. The objective was to understand the course of the disease, the methods for managing this pathology, analyzing the outcome and observing prognosis for these patients. Patients for this research were chosen by selectively from the records kept in ICU department dating between 2013 and 2016, and then looking up their hospital file in the Kauno Klinikos archives. Patients were selected based on diagnosis and reason for visit to ICU. The results showed that patients admitting to ICU with dental abscess who presented with comorbidities ended up staying in department for longer than three days. The residence, whether coming from city or village also showed a positive correlation with duration of stay in department; Patients coming from village were amongst the group, which stayed in hospital for longer than three days.
ACKNOWLEDGEMENTS

The following have helped and/or supported the development of this research either through providing literature sources or aided in collection of data, which lead to better evaluation, and analysis of the results;

Prof. Vidas Pilvinis
Head of ICU Department, LSMUL KK
FMT Supervisor
CONFLICT OF INTEREST

There were no conflicts of interest in the completion of this master research.
ETHICS COMMITTEE CLEARANCE

The head of Bioethics Centre, Dr. Elmantas Peicius, was presented with request for permitting of realization for this research work titled, *Outcome for Patients admitting to ICU with Dental Abscess*, under document number BEC-MF-374 and was issued approval on the 23rd of March 2017.
ABBREVIATIONS LIST

Ab – Antibiotics
APACHE – Acute Physiological and Chronic Health Evaluation
CRP – C-Reactive Protein
CT – Computer Tomography
DA – Dental Abscess
Dx – Diagnosis
Hb – Hematoglobin
HRT – Hormone replacement therapy
HTN – Hypertension
H/O – History of
Hx – History
ICU – Intensive Care Unit
I&D – Incision and Drainage
Leu – Leucocytes
LOS – Length of Stay
LSMUL KK - Lietuvos Sveikatos Medicinos Universiteto Ligonine Kauno Klinikos
MF – Maxillofacial
MPM – Mortality Probability Model
N/V – Nausea and vomiting
SAPS – Simplified Acute Physiology Score
Tx – Treatment
WBC – White blood cells
TERMS

Abscess, Comorbidities, Dental abscess, Harvesian canal, Intensive care, Ischemia and Necrosis, Maxillofacial Surgery, Mediastinitis, Odontogenic infection, Osteomyelitis, Periapical abscess, Periodontium, Subgingival plaque, Surgical intervention
INTRODUCTION

Acute dental abscess is a common and frequently underrated disease of the oral cavity. The acute dental abscess often happens due to caries, trauma, or failed dental treatment. After the pulp chamber is exposed, colonization of the root canals occurs by different species of anaerobic bacteria, which colonize the borders of the necrotic root canals forming a special mixed anaerobic biofilm. Asymptomatic necrosis commonly occurs, however the abscess formation happens due to these bacteria lead by their toxic products breaching into the periapical tissues through the apical foramen and cause acute inflammation as well as pus formation. The primary signs and symptoms of the acute dental abscess (Also known as a periapical abscess or infection) are pain, swelling, erythema, and suppuration generally localized to the affected tooth, even if the abscess can eventually spread causing a severe odontogenic infection which is characterized by local and systemic involvement culminating in sepsis syndrome. The vast majority of dental abscesses respond positively to antibiotic treatment as well as some patients may show indication for surgical management of the infection. In the present work, a retrospective analysis of the patients with dental abscess presenting to ICU and then admitted to Maxillofacial Surgery of the Lietuvos Sveikatos Medicinos Universiteto Ligonine Kauno Klinikos, LSMUL KK, of Kaunas, Lithuania from 2013 to 2016 has been performed. The patients were selectively selected from the record books of admissions at Intensive Care Unit, and then full patient files collected from the hospital archives for further investigation. The results show the most effective therapy for these patients was surgical incision and drainage in the Maxillofacial Surgery department and prescribed Penicillin and Metronidazole.
AIM AND OBJECTIVES OF THE THESIS

The aim in this research was to perform a retrospective study of thirty-two cases of patients who admitted with dental abscess to ICU between 2013 and 2016. Moreover our objective here was to:

- To observe the course of disease in patients with dental abscess.
- Learn the methods for managing this pathology, understand therapy methods for treating dental abscess
- Analyzing the outcome and observing prognosis for patients with dental abscess
LITRETURE REVIEW

Odontogenic infections, consisting mainly of dental caries and periodontal diseases (gingivitis and periodontitis), are frequent and have local (e.g., tooth loss) and sometimes also systemic implications. In the United States, it is estimated that twenty-five percent of adults over the age of sixty have lost all their teeth (edentulism), approximately one-half from periodontal disease and the other one-half from dental caries [1].

In addition to causing pain and discomfort, odontogenic infections could extend beyond natural barriers and result in potentially life-threatening complications, such as infections of the deep fascial spaces of the head and neck. Periodontal infection can be also associated with a number of systemic disorders. These would include fever of unknown origin, bacteremic seeding of heart valves and prosthetic devices, preterm birth of low birth weight children, and an increased risk for coronary heart disease and cerebrovascular events. A thorough understanding of the anatomic considerations and salient clinical features is essential for early recognition and effective treatment of these infections together with their complications. The epidemiology, pathogenesis, and clinical manifestations of odontogenic infections will be elaborated in further detail below. [2]

ANATOMIC EXPLAINATION

Humans possess two sets of teeth, the deciduous teeth and permanent teeth. The twenty deciduous teeth erupt at approximately between six months and two years of age and are shed between the ages of six and twelve. Gradually thirty-two permanent teeth will take their place and replace them, each half jaw consisting of two incisors, one canine, two premolars, and, in adults, three molars. [2]

PATHOGENESIS

Odontogenic infections commonly emerge from plaque composed of bacteria that colonize the surfaces of the tooth. The kind of infection varies with the location of the plaques. Plaques located on tooth surfaces above the gingival margin (supragingival plaque) lead to dental caries that may invade the pulp (pulpitis or endodontic infection), and eventually perforate the alveolar bone (periapical abscess). Plaques located on tooth surfaces beneath the gingival margin (subgingival plaque) lead to periodontal infections (e.g., periodontal abscess)
Soft tissue infections of odontogenic origin tend to spread along planes of least resistance from the supporting structures of the affected tooth to various potential spaces in the vicinity. Accumulated pus must perforate bone, in general at the site where it is thinnest and weakest, before extending through the periapical areas or within deeper fascial spaces. In the mandible, for example, the two points where the bone is weakest and where perforation commonly occurs are on the lingual aspect in the region of the molar teeth, and anteriorly on the buccal aspect [3,4]. In the maxilla, the bone is weakest on the buccal aspect throughout, and is relatively thicker on the palatal aspect. [2]

Both the host and microbial factors influence the formation of plaque and its ability to cause dental caries or periodontal disease. Oral hygiene, diet, and genetic predisposition are determinants of risk. [5]

PATHOGENESIS OF DENTAL CARIES

Dental caries leads to the localized destruction of dental hard tissues by plaque bacteria that are acidogenic (acid-producing) and aciduric (able to grow at low pH). In particular *Streptococcus mutans* and *Lactobacillus spp*, which also colonize the tooth surface [6].

Teeth have at least three intrinsic mechanisms which protects itself against carious decay:

- A constant flow of saliva, which is at a neutral pH, it bathes the tooth, buffers and washes away bacterial acids and supplies calcium and phosphate to remineralize and repair damaged tooth surfaces. In addition, saliva and its various constituents, such as lactoferrin, lysozyme, lactoperoxidase, beta-lysin, and immunoglobulins, contain essential antimicrobial activity against plaque-associated bacteria.
- The cleansing action of the tongue and buccal membranes, which remove food particles from the proximity of the tooth.
- The acquisition by the tooth of an acellular structureless bacteria-free coating known as the acquired pellicle, which is of salivary origin and acts as a surface barrier to most dietary and bacterial acids

Furthermore the oral cavity possesses an innate immune response that is characterized by the secretion of various antimicrobial peptides (defensins) by oral epithelial tissues in response to bacterial stimuli or inflammation [7,8]. Commensal and pathogenic bacteria use various pathways in the induction of defensin, and epithelial cells from different body locations seem to have common signaling mechanisms to differentiate commensal from pathogenic bacteria [9].
PATHOGENESIS OF PERIODONTAL DISEASE

Periodontal diseases are primarily caused by microorganisms within the subgingival dental plaque, which penetrate the gingival epithelium, cause an inflammatory response for the host, and result in the destruction of the periodontium. [5,10]. This tissue destruction results in apical migration of gingival tissues (gingival recession), loss of periodontal attachment, and an increase in the depth of the gingival crevice (periodontal pockets).

Predisposing factors for periodontal disease include:

- Inadequate oral hygiene and increasing age, which are the two major risk factors
- Hormonal effects, with exacerbation of disease activity during puberty, menstruation, and pregnancy
- Certain underlying diseases, such as diabetes mellitus, various genetic disorders that impair neutrophil function, and rheumatoid arthritis [11-14].

In the healthy oral cavity, *Streptococcus*, *Peptostreptococcus*, *Veillonella*, and diphtheroids account for more than 80 percent of the total cultivable flora [3]. Quantitative studies show that obligate anaerobes could be as many as eight times those of facultative bacteria in certain locations. Many clinically significant oral anaerobic gram-negative bacilli previously included under the "oral Bacteroides" group, are now reclassified as *Porphyromonas* or *Prevotella* species [15]. Facultative gram-negative bacilli are uncommon in the healthy host, but may be more prominent in seriously ill and hospitalized patients [16].

After infection, an acute inflammatory reaction leads to a rapid build-up of pressure within this rigid and unyielding space, causing the compression of blood vessels that enter the pulp cavity through the apical foramen, and leading to ischemia and necrosis of the pulp tissue. Pus may egress out of a cavity in the crown if one exists; it may extrude apically into the surrounding periodontal tissue, resulting in acute periapical periodontitis; or it may erode out of the apical foramen, resulting in periapical or alveolar abscess.

Periodontal abscess could be focal or diffuse and presents as a red, fluctuant swelling of the gingiva, which is extremely tender to palpation. The abscesses always communicate with a periodontal pocket from which pus can be readily expressed after probing. [2]
PATHOGENESIS OF ODONTOGENIC INFECTION

The oral cavity should not be considered as a single uniform environment. Although representative species of microorganisms can be isolated from most areas of the mouth, specific organisms tend to colonize certain sites. For example, *Streptococcus salivarius* and *Veillonella spp* have a predilection for the tongue and buccal mucosa and predominate before the eruption of teeth [3]. Alternatively *Streptococcus sanguinis*, *Streptococcus mutans*, and *Actinomyces viscosus* preferably colonize the surface of the tooth. *Fusobacterium*, pigmented *Prevotella*, and anaerobic spirochetes seem to be concentrated in the gingival crevice.

Infection of the pulp (pulpitis) can occur in one of three ways:

- Through a defect in the enamel and dentin that results from extension of a carious lesion, traumatic fracture, or a dental procedure
- Through the apical foramen or lateral canals (eg, from a periodontal pocket or an adjacent tooth with a periapical abscess)
- Through hematogenous seeding of the pulp that has been irritated mechanically.

COMPLICATIONS

Osteomyelitis of the jaw — Odontogenic infections can spread contiguously to cause osteomyelitis of the jaw. The mandible is much more susceptible to osteomyelitis than the maxilla, primarily because the cortical plates of the former are thin and vascular supply to the medullary tissues is relatively poor. However osteomyelitis following odontogenic infection is relatively uncommon. When it occurs it is usually due to a predisposing condition, such as compound fracture, irradiation, diabetes mellitus, or steroid therapy [17]. With initiation of infection, the intramedullary pressure markedly increases, further compromising blood supply and followed by bone necrosis. Pus travels through the haversian and perforating canals, accumulates beneath the periosteum, and elevates it from the cortex. If pus continues to accumulate, the periosteum is eventually penetrated, and mucosal or cutaneous abscesses and fistulae can develop. Areas at greatest risk of perforation in the mandible are the lingual aspect in the region of molar teeth and anteriorly on the buccal aspect [18].
SURGICAL THERAPY

The main therapeutic modality for pyogenic odontogenic infections is surgical drainage and removal of necrotic tissue. Needle aspiration by the extraoral route is particularly helpful in microbiologic sampling and for evacuation of pus. There is a high necessity for definitive restoration or extraction of the infected tooth, which is the primary source of infection. Deep periodontal scaling and endodontic treatments with root filling is needed in most instances. [19]

ANTIBIOTIC THERAPY

Antibiotic therapy can stop the local spread of infection and prevent hematogenous dissemination. Antimicrobial agents are generally indicated when fever and regional lymphadenopathy are present, or alternatively if infection perforated through bony cortex and spread into surrounding soft tissue. Severely immune compromised patients are particularly at risk for spreading orofacial infections, and empiric broad spectrum antimicrobial therapy is needed in these patients. [20] The choice of narrow spectrum antibiotics for the treatment of odontogenic infections is based more on the knowledge of the indigenous organisms that colonize the teeth, gums, and mucous membranes, and also specific cariogenic and periodontopathic pathogens associated with clinical disease, rather than upon the results of culture and susceptibility testing [21,22]. Beta-lactamase production throughout the group of oral anaerobes, particularly pigmented Prevotella spp and Fusobacterium spp, is increasingly recognized, and failure of treatment by solely using penicillin is common [23]. Therefore, penicillin monotherapy is no longer recommended. For patients with pyogenic odontogenic infections, initial parenteral therapy is recommended. Ampicillin-sulbactam (3 g IV every six hours) provides extended coverage against oral anaerobes, In addition to those that produce beta-lactamases, and thus is the treatment of choice. Alternatively is penicillin G (2 to 4 million units IV every four to six hours) together with metronidazole (500 mg IV or orally every eight hours). Although metronidazole is highly effective against anaerobic gram-negative bacilli and spirochetes, it is only moderately effective against anaerobic cocci and is ineffective against aerobes, including streptococci. As a result, it should not be used as a single agent in odontogenic infections. [19]

PREVENTION

The most cost-efficient measure for reducing dental caries is fluoridation of public water supplies [24]. Fluoride forms a complex with the apatite crystals in dentin by replacing the hydroxyl group,
thereby giving strength to the entire structure [24]. Fluoride also promotes remineralization of carious lesions and exhibits a bacteriostatic effect. In addition to fluoridated water, brushing two to three times daily with a fluoridated toothpaste (1000 ppm of fluoride, usually as sodium fluoride 1.1 percent or stannous fluoride 0.4 percent) effectively delivers fluoride to the tooth-plaque surface [25]. In high-risk individuals, additional fluoride therapy in the form of fluoride varnishes (22,600 ppm fluoride as five percent sodium fluoride, professionally applied three or four times a year) has been effective in the prevention of caries [6]. Mainly the prevention and control of dental caries and advanced periodontitis is the active promotion of oral hygiene.

The components of such a regimen include:

- Regular brushing with a fluoridated toothpaste and dental flossing after each meal
- Dietary counseling to reduce the ingestion of sugar-rich foods or beverages
- Use of topical fluorides and oral antimicrobial rinses, such as chlorhexidine for high-risk patients
- Modification of risk factors, such as smoking cessation
- Overcoming the reluctance for regular visits to dental professionals
RESEARCH METHODOLOGY AND METHODS

The planning of research was done with head of department of Intensive Care Unit. They provided the record books that held information for all patients admitting to ICU, and from those books dated 2013 till 2016 thirty-two patients were collected to represent the population under investigation in this research. The patients selected were then put on a separate list and with the permission of supervisor and head of department; their case histories were collected from the LSMUL KK archives and all necessary information was then recorded into Microsoft Excel for analysis.

The collected data was then divided into two groups; Group A comprising of patients who have been admitted to ICU for longer than 3 days and Group B which consisted of patients who stayed in ICU department shorter than 3 days. Amongst data collected and analyzed was the residence of patients and whether or not they presented with comorbidities.
RESULTS

The total sample size was fifty-four patients, thirty-two of whom were males and twenty-two were females. The data collected was inputted in Microsoft excel and divided into two groups; Group A consisting of patients who stayed in ICU department longer than three days and Group B consisting of patients who stayed less than three days. This data was analyzed.

![Figure 1: Sample demographic]

![Figure 2: Table summary of Group A and B]

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>10</td>
</tr>
</tbody>
</table>

P value <0.05

[Figure 2: Table summary of Group A and B]
The figure above represents the demographic of the data collected. Figure illustrates the percentage of males to females in both groups A and B. Group A consisted of twenty-eight patients whilst group B consisted of twenty-six patients. Fifty-nine percent of collected sample were males and the females were forty-one percent. The P value was calculated at 0.81, meaning it is higher than P critical of 0.05 thus accepting the null hypothesis, therefore there is no statistically significant difference in gender amongst both Group A and B.

![Ages of Patients](image)

[Figure 3: Ages of Patients]

The average age in both groups was relatively quite similar; 53 with a standard deviation of 13 in Group A, and an average age of 54 with a standard deviation of 8 in group B. Group A had an average stay of 8.9 days with standard deviation of 7 days while in Group B all patients only had 1 day total duration in ICU department. The range of age in group A was 38 to 78, whilst in group B it was 40 to 65.
In our sample there did not appear to be a clear relationship between age and length of stay however the patient and this is probably due to our small sample size. Furthermore we can however observe that all patients above sixty-five years of age ended up being part of the group with longer length of stay.

The figure 3 above illustrates the statistical analysis throughout both groups as well as in comparison to the entire sample. The hypothesis presented in table was whether there is statistical significance between LOS and comorbidities which all P values measured were much below the P critical of 0.05, showing there null hypothesis was rejected and proving that there is a significant difference.
The results showed a positive correlation between having comorbidities and the duration of stay in ICU department as this can be clearly illustrated in figure 4 above. 93% of patients in Group A presenting with comorbidities, while only 8% of Group B had comorbidities. The Pearson’s correlation coefficient obtained was 0.54 and P value calculated was 0.0005, which is less than p critical of 0.05, therefore rejecting the null hypothesis. This means there is a statistically significant relationship between having comorbidities and longer stay in ICU department.

Furthermore it was observed that amongst the Group A patients, 79% of the group reside in villages whilst in Group B 69% of patients came from a city. This may illustrate a relationship between socio-economic status of patients and prevalence of dental abscess. This may be as a result of poorer dental hygiene and inadequate oral health education in people who live in villages as compared to those who live in city. This could also be due to infrequent dental check ups as well as less readily accept to schedule a visit to dental clinic.
DISCUSSION

The outcome for patients admitting to intensive care unit with dental abscess, through this research it was observed that this could be affected by a number of factors. Amongst them was age, presence of comorbidities, socioeconomic status. These factors played a role in their length of stay (LOS) in Intensive Care Unit of their hospital. In regards to gender however, there appeared to be no clear relation. The percentage of males and females in the sample under study in this research was fairly close to enough other; fifty-nine percent and forty-one percent respectively.

In a retrospective study done in the Faculty of Dentistry, Ondokuz Mayis University, Samsun, by Mustafa Erhan Sari, showed that men had a slight higher percentage of admission due to non-traumatic dental condition: Female 37.6%, Male 63.4%. [28] In the previously mentioned study it was concluded that one of the reasons behind higher admission in men was due to men having more work hours than females thus attend dental visits less routinely leading to higher prevalence in nontraumatic dental emergencies, and these emergency visits occur outside of work hours.

Furthermore another factor that was investigated in this research was the patient’s residence, this was evaluated by whether the patient resides in a major city or village. In this research the percentage of patients whom resided in villages was forty-four percent, however the majority of those patients were part of the group with a longer length of stay (LOS); sixty-nine percent of patients who had a LOS longer than three days were patients who live in villages. This relationship can also be seen in other studies even in different departments when admitting to emergency department. In a study by Laval University, Quebec, Moore Lynne concluded that people who suffer from high social or material deprivation have longer acute care length of stay. In Moore Lynne’s study it was found that people in the highest quintile of social deprivation had a mean of 2.6 days LOS longer than the people in the lowest quintile of social/material deprivation. [29]

Age on one hand did not show a clear relationship in our study since we had people with advanced age whom stay was similar to those with much younger age. This trend was also observed in a study by Sophia E de Rooij, published on Critical Care 2005 9:R307, in which they stated it was not age per se but associated factors, such as severity of illness and premorbid functional status, that appear to be responsible for the poorer prognosis. [30] This can also be observed in the sample under investigation in this research, the associating factor in longer LOS was more related with comorbidities than age itself however all patients over the age of seventy ended up being part of the group A, which was the group with longer LOS.
Comorbidity, defined as the total burden of illness unrelated to a patient's principal diagnosis, contributes to clinical outcomes (e.g. mortality, surgical results, complication rates, functional status and length of stay) was a strong attributing factor in prolonging patient length of stay in Intensive Care unit. It is clear that there is a positive relationship between having comorbidities and longer LOS. The patients were grouped into two categories, based on whether they have co-morbidity or not. In this research, most of patients treated at intensive care unit with comorbidity were about twenty-eight patients (twenty-six of whom were in group A, and two in group B) and the rest were without co-morbidity. Therefore it can be concluded that most of the patients treated in intensive care unit with prolonged LOS were patients with multi-pathology. In a study by Nanange Sugiarto and Ede Surya Darmawan they observed that the correlation test between the having of comorbidities and length of stay had a positive relationship (P < 0.05). Patients having more diseases or comorbidities treated in ICU will need more treatment and more medicines therefore this will prolong their LOS in the ICU room. This finding was also in line with the research of Santoso [32]. Moreover WHO mentioned that the presence of other diseases like for example TB (tuberculosis), diabetes and malnutrition will led to longer length of stay. The recommendation is that a multidisciplinary team having a single management as a team leader and to apply semi-closed system in the ICU should treat the patients. [31]
CONCLUSION

We conclude that the outcome and length of stay for patients in Intensive care unit of hospital can be related to whether or not the patient has any present comorbidity and also their residence. Having comorbidities showed a positive relationship with increasing patient’s LOS. Moreover the patients who came to intensive care unit from villages were amongst patient group with longer LOS. The outcome for patients was better amongst the patients who had no comorbidities and were residents of the city.
RECOMMENDATION

Preventative measures could be taken to decrease the occurrence and prevalence of dental abscess in the community, these include: improving dental hygiene technique, better oral education and routine visits to dental clinic. The outcome for patients was better amongst the patients who were young, possessed no comorbidities and residents of the city.
LITERATURE LIST


13. Stashenko P, Van Dyke T, Tully P, et al. Inflammation and genetic risk indicators for early...


28. Mustafa Erhan S, Alp K, Bilal O, A retrospective study of nontraumatic dental condition-related visits to dental hospital emergency service, Ondokuz Mayis University 2014 Nov 28;02:91


DĖL PRITARIMO TYRIMUI

LSMU Bioetikos centras, įvertinės (MA) vientisų studijų programos – MEDICINA

Bioetikos centro vadovas

[Signature]

dr. Elmantas Pečius