

MINIREVIEW

PREOPERATIVE ASSESSMENT OF PATIENTS WITH INFLAMMATORY PROCESSES IN THE MAXILLO-FACIAL REGION: A MINIREVIEW

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ABSTRACT

The statistical data show the continuously increasing number of patients with chronic diseases and this fact has a significant impact on the workload of all clinicians, including maxillofacial surgeons. On the other hand, inflammatory processes in the maxillofacial region are an important problem for maxillofacial surgeons due to the high number of patients who present with this diagnosis, but also because of the life-threatening complications that may occur. Besides the usual complications, a maxillofacial surgeon has to be aware of other comorbidities of the patients diagnosed with inflammatory processes, falling into the category of medically complex patients. The preoperative assessment main purpose is to identify those patients for whom the perioperative period may present an increased risk of morbidity and mortality, aside from the known complications already associated with inflammatory processes. This article aims to emphasize the importance of performing a complete and meticulous preoperative assessment of every single patient, even the apparently healthy ones, since the patient himself may be unaware of a comorbidity he might have. In order to facilitate this process, the use of standardized questionnaires for different groups of patients is encouraged for the prompt assessment of the patient's condition.

RÉSUMÉ

Préparations préopératoires des patients avec des processus inflammatoires dans la région maxillo-faciale: courte revue

Les données statistiques montrent l'augmentation du nombre de patients souffrant de maladies chroniques et ce fait a un impact significatif sur la charge de travail de tous les cliniciens, y compris les chirurgiens maxillo-faciaux. D'autre part, les processus inflammatoires dans la région maxillo-faciale sont un problème important pour le chirurgien maxillo-facial, en raison du nombre élevé de patients qui se présentent avec ce diagnostic, mais aussi à cause de complications graves qui peuvent survenir. Outre les complications habituelles, un chirurgien doit être au courant des autres comorbidités des patients diagnostiqués avec des processus inflammatoires, entrant dans la catégorie des patients médicaux complexes. Le but principal de l'évaluation pré-opératoire est d'identifier les patients pour lesquels la période périopératoire peut présenter un risque accru de morbidité et de mortalité, à part des complications déjà connues associées aux processus inflammatoires. Cet article vise à souligner l'importance de l'exécution d'une évaluation pré-opératoire minutieuse de chaque patient, même des personnes en bonne

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Another suggestion is the use of standardized protocols for emergency situations that may occur with these patients, including the use of tables with possible drug interactions between the medication used for the management of their chronic disease with the medication administered in the maxillofacial surgery unit.

Keywords: inflammatory processes, comorbidities, preoperative assessment, electronic health records.

Abbreviations:

BP = blood pressure
MET = metabolic equivalent levels
EHR = electronic health record
MI = myocardial infarction
CVA = cerebrovascular accident
TIA = transient ischemic attack
CAD = coronary artery disease
ESRD = end stage renal disease
AHA = American Heart Association
ASA = American Society of Anaesthesiologists
NSAIDs = non-steroid anti-inflammatory drugs
CBC = complete blood count
PT = prothrombin time
PTT = partial thromboplastin time
INR = International Normalized Ratio

INTRODUCTION

The stressful environments have lead to a continuously increasing prevalence of chronic diseases in Moldova and in the neighbouring countries. In the past ten years, the rate of chronic disease prevalence has significantly increased. Based on public health yearbooks, in 2007 this rate was about 34% of the country's population and in 2016 it was already 47.5%¹.

Local statistics also confirm the high incidence of inflammatory processes in the maxillofacial region – 80% of the conditions for which patients seek an oral surgeon in an ambulatory setting and 50% of the conditions for which patients are hospitalized in the maxillofacial surgery department of the Emergency Medicine Institute in Chişinău, Moldova².

Inflammatory processes of the maxillofacial region require urgent intervention and the surgeon may feel like he doesn't have time to fully examine the patient aside from the head and neck region, checking for other comorbidities and performing laboratory tests.

The preoperative assessment main purpose is to identify those patients for whom the perioperative period may present an increased risk of morbidity and

santé, étant donné que le patient lui-même peut ne pas être au courant d'une comorbidité qu'il pourrait avoir. Afin de faciliter ce processus, l'utilisation de questionnaires standardisés pour différents groupes de patients est encouragée pour évaluer l'état général du patient. Une autre suggestion est l'utilisation de protocoles standardisés pour les situations d'urgence qui peuvent se produire avec ces patients, y compris l'utilisation de tableaux avec les interactions médicamenteuses possibles entre les médicaments utilisés pour la gestion de leur maladie chronique avec les médicaments administrés dans l'unité de chirurgie maxillo-faciale.

Mots-clés: processus inflammatoires, comorbidités, évaluation pré-opératoire, dossiers de santé électroniques.

mortality, aside from the known complications already associated with inflammatory processes. Further, the results obtained from this assessment should be of help in the design of operative strategies that would diminish additional peri- and postoperative risks³.

The maxillofacial surgeon needs to assess potential risk factors and understand their effect on treatment. Changes in heart rate, rhythm, blood pressure, preload, afterload and inotropism may occur during surgery and these can have deleterious effects, especially in patients with comorbidities. The risks of complications are greater in patients who are already medically compromised. Many significant untoward events can be prevented by careful preoperative assessment along with attentive intraoperative monitoring and support⁴.

Every patient should be checked for conditions that might interfere with anesthesia and surgery. Among these conditions there are cardiovascular disease, coagulation disorders, anaemia, renal disease, endocrinological disease – notably diabetes mellitus, respiratory disease, allergies, obesity, patients with alcohol and drug addictions, as well as elderly and pregnant patients⁵.

The statistics confirm that the number 1 cause of death in the Republic of Moldova is cardiovascular

disease, the number of cardiac sufferers only increasing. Cardiovascular disease prevalence has risen from 16.58% in 2007 to 21.4% in 2016 out of all chronic disease sufferers, an about 1.5 times increase in the past 10 years¹. Hypertension prevalence has also risen among the population, comparing 12.88% in 2007 to 17.85% in 2016¹.

As a consequence of the Chernobyl disaster in 1986, endocrine disorders have also increased in prevalence: in 2007 there were 4.3%, in 2016 already 8.1% (the number has doubled). Among endocrine disorders, diabetes mellitus is the most frequent, with 2.06% in 2007 and a rise to 3.1% in 2016¹.

All healthcare specialists should take into consideration that we will have, for at least the next 10 years, a progressively sicker population, the percentage of medically compromised patients being a significant one.

A special attention to this problem should be given by emergency hospital departments, where patients present with conditions that require immediate intervention and the preoperative assessment time is very limited.

The international experience on this subject has proven that the best solution to this problem would be the implementation of a digital database that would compile all the medical files of every patient, starting with the files from his primary care provider and the files from all his hospitalizations. In this way, every healthcare provider of the patient, including the surgeon from the emergency department can find out about the patient's medical conditions, allergies, medication that he was prescribed, laboratory results, conclusions of specialists' consults.

There is a 2004 government program in the Republic of Moldova titled the Integrated Medical Information System that aims to create a modular, multidimensional information system, that would comprise multiple information subsystems (based on shared databases technologies, e-clouding and BigData)^{6,7}. The final purpose of the system being the development of a unique, secure informational system that would provide access to all the healthcare public institutions in the country⁸. Unfortunately, it is a project that hasn't been completed yet and the progress is very slow, surgeons still facing the problem of time-consuming preoperative assessment of patients that is also a financial burden for the medical insurance company or, in many cases, for the patient himself.

THE AIM OF OUR MINIREVIEW is to emphasize the importance of performing a complete and meticulous preoperative assessment of every single patient, even the apparently healthy ones, since the patient

himself may be unaware of a comorbidity he might have. In order to facilitate this process, the use of standardized questionnaires for different groups of patients is encouraged for the prompt assessment of the patient's condition. Another suggestion is the use of standardized protocols for emergency situations that may occur with these patients, including the use of tables with possible drug interactions between the medication used for the management of their chronic disease with the medication administered in the maxillofacial surgery unit.

Medical history

A well-taken medical history is the first and most important step in the preoperative assessment. The two basic techniques used to obtain a medical history consist of the interview, in which the interviewer questions the patient and then records the patient's verbal responses on a blank sheet, the second method being a printed questionnaire that the patient fills in. The use of standardized questionnaires is very time-efficient but follow-up questions should be asked so that the clinician can gain additional information about the positive responses given by the patient, to determine their significance and effects on the surgical procedure⁹.

In patients with *cardiac disease*, the questions presented below may be used:

- When were you diagnosed with cardiac disease?
- Were you ever hospitalized because of your cardiac condition?
- Were you ever prescribed antibiotic prophylaxis before undergoing a dental treatment?

Questions for hypertensive patients:

- What is your normal blood pressure?
- How much does your blood pressure rise?
- What BP rate do you achieve after taking antihypertensive medication?
- Did you ever have any side effects to antihypertensive drugs?
- Did you suffer episodes when you couldn't manage to control your BP rate?
- Did you take your antihypertensive medication today?

Questions for patients with arrhythmia:

- What type of arrhythmia do you have?
- What are the factors that influence your arrhythmic episodes?
- Do you take any medicine to keep your arrhythmia in control? If so, specify what drug, in what dosage and if you took it today.

Questions for patients with ischemic heart disease:

- Do you experience chest pain and shortness of breath while performing physical activities?

- How much physical activity can you manage before feeling the need to rest?
- Do you take any medication for your ischemic cardiomyopathy? If so, did you take it today?

Patients who take anticoagulants or have bleeding problems should be asked the following questions:

- How long have you had a bleeding problem or, how long have you been on anticoagulant medication?
- If you have a bleeding problem, please describe it in detail
- What is the cause of your bleeding problem or why are you on anticoagulants?
- Are your bleeding problems due to low platelets number?
- Please present your most recent laboratory tests relative to your bleeding status.

For patients with bleeding problems secondary to liver disease are relevant PT – prothrombin time, PTT – partial thromboplastin time and INR – international normalized ratio.

For patients who take aspirin or other NSAIDs – bleeding time.

For patients who take warfarin – PT and INR.

For patients with thrombocytopenia – CBC with a differential (attention to platelet count) and bleeding time⁵.

Questionnaire for patients with **diabetes**:

- What type of diabetes do you have?
- At what age were you diagnosed?
- What medication do you take?
- If you administer insulin, at what time intervals and in what dosage?
- How often do you check your blood sugar levels?
- Is your diabetes well controlled?
- Have you been hospitalized this past year because of your diabetes?

The clinician should review the following lab results in diabetes patients⁵:

- 1) Fasting blood glucose (reflects current control, on that day).
- 2) Random plasma glucose with symptoms (polyuria, polydipsia, unexplained weight loss).
- 3) 2 hour plasma glucose following a 75g glucose load.
- 4) Fructosamine test (reflects average control over past 2-3 weeks).
- 5) Glycated hemoglobin (reflects average control over past 6-8 weeks).

Drug history

All of the drugs that a patient is taking, or is supposed to be taking, should be identified and investigated for actions, adverse effects, and potential

drug interactions. Medication listings may provide the only clues to a patient's medical disorder in some cases. Sometimes the patients may believe that mentioning a certain health problem is not important or may omit the information inadvertently. However, the patient may report taking medication typically prescribed for a disease.

Functional capacity

In addition to asking patients about specific diagnoses, it is also important to ask some screening questions regarding the ability of the patient to engage in normal physical activity. A patient's ability to perform common daily tasks can be expressed in metabolic equivalent levels (METs), which provide a way of quantifying a patient's general physical status⁵.

A MET is a unit of oxygen consumption; 1 MET = 3.5 mL/kg/min at rest¹⁰. It has been proven that the risk for occurrence of a serious perioperative complication (such as MI, heart failure) is increased in patients who are unable to meet a 4 MET demand during normal daily activity¹¹. Examples of daily activities requiring 4 METs are walking at 4 miles/hour or climbing a flight of stairs. Activities requiring > 10 METs include swimming and playing tennis. An exercise capacity of 13 METs indicates an excellent physical condition¹⁰.

Physical examination

After performing the above described steps, a thorough physical examination has to be performed. This should include assessment of general appearance, measurement of vital signs, and an examination of the head and neck.

Vital signs consist of blood pressure, pulse, respiratory rate, temperature, height and weight.

The establishment of baseline normal values ensures a standard of comparison in the event that a perioperative emergency occurs. A second benefit involves screening to identify abnormalities, either diagnosed or undiagnosed. If an abnormal finding is deemed significant, the patient should be referred to a physician for further evaluation.

Laboratory tests

Clinical laboratory evaluation is an important part of the assessment of a patient's health status. Whether the maxillofacial surgeon orders tests personally or refers the patient to a specialist for testing, the maxillofacial surgeon should be familiar with indications for clinical laboratory testing, what tests measure, and what abnormal results mean.

Some indications for clinical laboratory testing in maxillofacial surgery include⁹:

- 1) Detection of suspected diseases.

- 2) Screening high-risk patients for undetected disease.
- 3) Establishing normal baseline values before the surgical intervention (e.g. anticoagulant status, platelets, white blood cells, red blood cells).
- 4) Addressing medicolegal considerations (e.g. possible hepatitis B infection, bleeding disorders).

Specialist referral

Based on medical history, physical examination and laboratory screening, the maxillofacial surgeon may need to contact the patient's physician for consultation. It is the patient's physician responsibility to alter or stop his medication if it interferes with the maxillofacial intervention and offer advice to the surgeon on how to better manage the patient's comorbidity. However, the first responsibility lays on the maxillofacial surgeon, who should always ask for a specialist consult in complex cases.

Risk assessment

After all the patient's health data are collected, the data must be assessed to determine whether the patient can safely undergo the surgical intervention and what, if any, modifications in the pre-, peri-, and postoperative care are to be made.

One worldwide recognized method of expressing medical risk is the American Society of Anesthesiologists (ASA) Physical Classification System¹².

ASA I - a normal, healthy patient

ASA II - a patient with mild systemic disease, without substantive functional limitations. Examples include (but not limited to): current smoker, social alcohol drinker, pregnancy, obesity ($30 < \text{BMI} < 40$), well-controlled diabetes mellitus/hypertension, mild lung disease.

ASA III - a patient with severe systemic disease, with substantive functional limitations; one or more moderate to severe diseases. Examples include: poorly controlled diabetes mellitus/ hypertension, chronic obstructive pulmonary disorder, morbid obesity ($\text{BMI} > 40$), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, end stage renal disease undergoing regular dialysis, history (> 3 months) of myocardial infarction, cerebrovascular accident, transient ischemic attack, coronary artery disease/stents.

ASA IV - a patient with severe systemic disease that is a constant threat to life. Examples include: recent history (< 3 months) of MI, CVA, TIA, CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, disseminated intravascular coagulation, acute respiratory distress or ESRD not undergoing regularly scheduled dialysis.

ASA V - a moribund patient who is not expected to survive without the operation. Examples include: ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction.

ASA VI - a declared brain-dead patient whose organs are being removed for donor purposes

E - emergency surgery.

CONCLUSIONS

Maxillofacial surgeons and dental practitioners are becoming more aware of the impact of their patients' chronic diseases on the procedures they are performing in the head and neck region. In patients referred for surgery, the preanesthetic examination is extremely important, along with interdisciplinary consultations, for the correct evaluation of the perioperative risks, in order to decrease the perioperative morbi-mortality.

The key to successful management of a medically compromised patient is a thorough evaluation and assessment of risk to determine whether the patient can safely tolerate the surgical intervention. Risk assessment involves the evaluation of four components: (1) the nature, severity, and stability of the patient's medical condition; (2) the functional capacity of the patient; (3) the emotional status of the patient; and (4) the type and magnitude of the following surgical intervention.

The cornerstone of patient evaluation and risk assessment is the medical history, supplemented by physical examination, laboratory tests, and specialist consultation.

In order to ease the maxillofacial surgeon's work the implementation of the electronic health record^{13,14} of each patient should be encouraged but until this informational system will be available, the use of standardized questionnaires and protocols proves to be the most time-efficient way in a patient's preoperative assessment.

Compliance with Ethics Requirements:

„The authors declare no conflict of interest regarding this article“

„The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study“

REFERENCES

1. Medical Statistics Annuary of the Republic of Moldova, 2007 and 2016 editions, <http://www.cnms.md/ro/rapoarte/anuar-statistic-medical> (Accessed April 28, 2018)
2. Zănoagă O, Chele N, Dabija I, Goriuc N. Inflammatory processes in the maxillo-facial region. *Statistics. Medicina Stomatologică*, 2015, 36(3):20-24.
3. De Hert S, Imberger G, Carlisle J, the Task Force on Preoperative Evaluation of the Adult Noncardiac Surgery Patient of the European Society of Anaesthesiology. Preoperative evaluation of the adult patient undergoing non-cardiac surgery: guidelines from the European Society of Anaesthesiology. *European Journal of Anaesthesiology* (EJA), 2011, 28(10): 684-722.
4. Becker DE, Haas DA. Management of complications during moderate and deep sedation: respiratory and cardiovascular considerations. *Anesth Prog*, 2007, 54(2):54-59.
5. Jacobsen P. Protocols for the dental management of medical-complex patients, 2011, www.peterjacobsen.com/courses/healthHistory/HealthHistory.doc (Accessed 29.04.2018).
6. Republic of Moldova's Government decision nr. 1128 of 14.10.2004 on the Concept of the Integrated Medical Information System, <http://lex.justice.md/index.php?action=view&view=doc&id=297738> (Accessed April 27, 2018)
7. Strategy e-health 2020 of the Republic of Moldova, presented in 2013, <https://www.slideshare.net/alexandruosioru/ehealth-strategy-of-republic-of-moldova> (Accessed April 24, 2018)
8. Koncar M, Loncaric S. Concepts for integrated electronic health records management system, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.15.6829&rep=rep1&type=pdf> (Accessed April 27, 2018)
9. Little J, Falace D, Miller C, Rhodus N. Dental management of the medically compromised patient. 7th edition. Mosby, Elsevier, 200, pages 2-15.
10. Fletcher GF, Balady G, Froelicher VF, Hartley LH, Haskell WL, Pollock ML. Exercise standards: A statement for health-care professionals from the American Heart Association. *Circulation* 1995; 91:580-615
11. Eagle KA, Berger PB, Calkins H, et al. ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery - Executive summary: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1996 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). *Circulation* 2002; 105:1257-1267.
12. ASA Physical Status Classification System, <https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system> (Accessed January 26, 2018)
13. Mereuță I, Rotaru G, Lupacescu I. Medical services digitalization as a healthcare system reform, *Info-med*, 2011, 18(2). <http://www.ionmereuta.md/files/Info-18.pdf> (Accessed April 29, 2018)
14. The National Alliance for Health Information Technology Report to the Office of the National Coordinator for Health Information Technology on Defining Key Health Information Technology Terms, April 28, 2008. <http://www.hitechanswers.net/wp-content/uploads/2013/05/NAHIT-Definitions2008.pdf> (Accessed April 29, 2018)