

The Importance of Risk Factors and the Chemistry of Anesthetics in the Occurrence of Medical Emergencies in Dental Surgery

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In the dental practice or in the ambulatory of oral and maxillo-facial surgery, there may be real medical emergencies, emergencies in which the speed of effective measures is essential. A good knowledge of the things to be done in the practice, as first representatives of the medical shield in defence against the inexorable secures the winning of precious seconds. Medical care in dentistry and dentoalveolar surgery involves two seemingly different aspects: a well-defined technical one, of strict specialty, and another less well defined, which practically includes all the particularities of the patient coming to the dental practice. However precise the dental technique and the practitioner's skill are, if the specific conditions of each patient are not taken into account, the medical benefit cannot rise to a high level, and the final result may be compromised by complications with unforeseen risks. The study included 7,996 patients resolved in the Oral and Maxillo-facial Surgery Clinic (Ambulatory), in the period from 1.02.2014 to 31.12.2018. The superficiality of a seemingly healthy patient approach may lead to the disregard of some important aspects with a predictive role in the triggering of a medical emergency, as an informational history must be more than an orderly list of symptoms. You always gain something by listening to patients and observing the way they talk about their symptoms. The crossed statistical deductions on the explored data revealed, based on the majority percentages obtained on each studied index, that the following have an extremely important aspect for the dental practice and dentoalveolar surgery: the dental anxiety level as well as the patient's general status are the landmarks that require the greatest attention from the practitioner for the purpose of preventing medical emergencies.

Keywords: dentoalveolar surgery, diagnosis, clinical examination, dental therapy

In the current international context, where in medicine the emphasis is mainly on the prophylaxis of pathological diseases as well as on the reduction of incidents, accidents and complications of surgical techniques, we will try to contribute to the reduction of risks in dental therapy and dentoalveolar surgery.

Dentoalveolar ambulatory surgery is a problem that involves a lot of responsibility from the practitioner, moral, professional responsibility, and, last but not least, forensic responsibility, which involves approaching it from the following points of view: material endowment, general investigation of the patient and the limits of these interventions in the ordinary activity of the practice.

An extremely important stage in the prophylactic algorithm of medical emergencies in the dental practice is the detailed investigation of the patient's general status, the preoperative balance (anaesthetic + surgical) and the choice with discernment of the place and the moment where the dental work will be carried out.

Any medical-surgical act involves assuming certain risks, but these can be greatly diminished by a proper patient examination, by observing the working technique and by establishing the correct therapy in the event of an emergency.

Medical emergency is a complex clinical situation requiring prompt, rapid and direct intervention by establishing the etiological factors and the diagnosis in order to act targeted as soon as possible.

In order to deal with an emergency, it is essential for the doctor to act quickly, as every second is precious. Decisions taken can tilt the balance in favour of restoring the patient's condition or, on the contrary, may aggravate the situation. The clarity and safety of the practitioner's actions are indispensable for resolving medical emergencies.

The medical-surgical anamnesis, the general apparatus examination, the paraclinical investigations, the general biological examinations are meant to detect some deficiencies or functional or organic insufficiencies, latent or sometimes manifested but always to be taken into account.

The factors that give the body the morpho-functional and biochemical qualities that condition the reactivity and the efficiency of adaptation are represented by all the elements that have collaborated in the development and the evolution of the patient up to that moment: genetic factors, sex, age, nutrition, pre-existing and current pathology, constitutional, immuno-biological, biochemical, endocrine, nervous particularities, homeostasis lability, social factors.

In the dental practice patients come frequently for routine dental care, oral surgery interventions with *apparently good* general condition but sometimes either a general condition has not yet manifested in a loud manner or the patient deliberately conceals the disease. For these reasons, a careful and competent clinical medical examination of the symptoms and signs of the main

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apparatus is required for a more objective assessment of their functionality.

Complementary examinations are always guided by the data collected by the medical and surgical history. Paraclinical laboratory examinations complete the general clinical examination.

Any dental care has a traumatic character even for a patient considered to be healthy before, even more so if it is the case of a patient with the field under particular physiological conditions or bodies with chronic disorders.

Operational trauma disturbs the patient's overall neuro-hormonal balance, directly related to the intensity of aggression (anaesthetic-surgical), but also to the reactive capacity of the tissue subject to dental care.

The importance of the anaesthetic-surgical act must not exceed the functional reserves of the body because the disequilibrium of these three factors results in the endangering of the patient - the so-called *surgical risk*.

Depending on the general, psychological and organic state, on the importance of surgical act (reflexogenic areas, vascular and nervous tractions, predictable duration of anaesthesia), the practitioner's judgment is addressed to patients who come for surgery.

Emergency in dentistry occurs as an unpredictable pathological condition, unexpected in terms of manifestations and duration, susceptible in some cases to compromise the vital and functional prognosis of the patient.

In assessing the emergency, the three vital functions are taken into account: consciousness, breathing and movement; consideration should be given to the interdependence of the vital functions, a deficiency that leads to a vicious circle, to a decompensation of the other functions which, if not quickly controlled and balanced, may result in the death of the patient.

The clinical translation of an emergency situation, namely of sufferance of vital functions, must be searched, investigated accurately and early at neurological, ventilatory and cardiovascular level, since the medical gestures to be instituted are of utmost importance, in fact of immediate survival.

For the recognition of medical emergency, the dentist must appreciate skilfully and quickly: brain injury, breathing difficulties, cardio-circulatory problems.

The success of therapy in acute cases depends on rapid and accurate recognition of the emergency situation and the first resuscitation measures applied.

Most emergencies consist of combining disturbances in the state of consciousness, in respiratory functions and/or in the cardio-circulatory apparatus. Disturbances of these vital functions must be quickly identified within 30 seconds, and therefore we cannot afford a detailed diagnosis.

The struggle for survival is counted in minutes, in stopping breathing (respiratory arrest) and in seconds in cardio-circulatory arrest (cardiac arrest).

If the patient resumes spontaneous breathing, the heart shows signs of recovery, the pupils become reactive, with the fastest means of transport at our disposal, we should ensure the patient's transfer to an intensive care service.

The patient who presented a medical emergency in the dental practice will be supervised with the utmost care and responsibility by the practitioner until the admission to a specialized clinic.

Early diagnosis of emergency *respiratory disturbances* is done by the dentist with great certainty on the basis of the senses: *he sees, hears and touches*. If the patient is aware, it is very important if we can get some data from

his/her medical history if they have not been taken before the emergency.

The IRA symptom is impressive, complex and variable. It depends on etiopathogenesis and severity, on the predominance of hypoxia and / or hypercapnia, as well as on the reactivity of ischemic organs and systems.

Dyspnoea is usually the first and most important clinical sign. It first manifests itself through polypnea, then by disturbance in the breathing rate and in severe forms by bradypnea and apnea. In over acute and severe forms, apnea can suddenly be installed from the onset.

Signs and warning symptoms in the IRA are: cyanosis, orthopnea, hyperpnea, hypopnea (amplitude and position disturbances); bradypnea, tachypnoea (respiratory rate disorders), pathological respiratory sounds, pathological respiratory types.

IRA alarm signs are: draught, pathological whistling; blocking of breathing, apnea; reverse, jerky breathing; heavy dyspnea with pathological whistling, stridor. Accompanying symptoms: restlessness, agitation; fear; disturbances of consciousness.

Diseases that can trigger acute respiratory failure are: intoxications with loco-regional anaesthetic substances, acute allergic reactions, aspiration of foreign bodies in the airways (canal needles, saliva, blood, dental fragments, compresses, and prosthetic works).

For patients with cardiovascular problems under dental treatment in a private practice, in outpatient facilities or oral and maxillo-facial surgery clinics, the mere recording of medical history is not sufficient to detect a series of manifestations that characterize certain cardiovascular conditions, especially when patients are not aware of the presence of a cardiovascular disease.

The risk of surgery in patients with coronary artery disease is borne by the risk of an occurrence of an angina pectoris crisis and more severely, of a myocardial infarction.

High blood pressure is one of the most common medical problems. Most patients suffer from average, moderate and severe hypertension. The risk of complications occurs more frequently in patients whose blood pressure is not known or the values of which are poorly adjusted by inappropriate medical treatment. The clinical evolution of hypertension-induced accidents has shown that a small but sudden increase in blood pressure is often more dangerous than a higher increase in blood pressure, but prolonged in time.

Surgical risk is variable, especially depending on the blood pressure influence on the different vascular areas.

Accidents and complications related to the surgical act can occur both by the increase as well as by the excessive lowering of the blood pressure. Hypertensive variations can be caused by fear, emotion, accentuated and prolonged pain, therapeutic errors.

The major emergencies that can occur after a hypertension crisis are: stroke; acute pulmonary oedema; angina pectoris crises; myocardial infarction. In patients with hypertension diagnosed or unfortunately undiagnosed, a dangerous increase in blood pressure may occur, which requires urgent treatment. The crisis of hypertension is generally carried out suddenly, with sometimes dramatic consequences.

In everyday practice, the frequently encountered picture of accidents in the dental practice is that of vasovagal syncope-fainting, passive faintness, and rarely peripheral vascular collapse.

The determining factor in faintness and syncope is the anoxia occurred in the case of anaemia and the volume of low circulating fluid; increased levels of CO₂ in the blood; acute or chronic hypoxia.

Patients stigmatized as vegetative have a strong vasodilatation, frequent especially in young people, boys and girls during puberty, asthenia, vasodilation of sometimes minor factors. They are the ones who suffer from the majority of faintness disorders. Vertigo (dizziness) is the prodrome of vasovagal syncope. The syncope produced by the central nervous mechanism can be: cardiac syncope (white), respiratory syncope (blue) and total syncope. Whatever the beginning, the untreated syncope can quickly become total, because vital functions, breathing and circulation cannot persist for long independently, one without the other.

The cardio-circulatory arrest is defined as a sudden and unexpected cessation of the cardio-circulatory function. It may appear as a syncope complication but also as a succession of a respiratory arrest, allergic accident or seizure. Accidental death by cardiac arrest, occurring in previously apparently healthy people, is the most emergent and worst case encountered by the dental practitioner and oral surgeon.

Cardiac arrest occurs unexpectedly. Alarm signs are rarely reported: sudden pallor or increased cyanosis; severe bradycardia; cardiac arrhythmias; severe tachycardia; severe hypotension; IRA. The cardiac arrest can also be installed without alarm signs and is characterized by: loss of patient's consciousness (coma), absence of pulse in the carotid artery; apnea; mydriasis; accentuated pallor, or cyanosis. The absence of the pulse at the carotid, but not accompanied by the absence of photomotor reflex, translates into a recent cardiac arrest.

Loco-regional anaesthetics can provide both immediate and late-type allergic accidents. Among the local anaesthetics, novocaine provides the highest number of allergic accidents.

The most important clinical manifestations of allergies are: anaphylactic shock- rare, but particularly severe; Quincke's edema, bronchial asthma crisis.

The onset of epileptic seizure is favoured by overwork, acute infections, alcohol ingestion, or abrupt withdrawal of anticonvulsant medication.

The medical emergency is a complex clinical situation requiring prompt, rapid and direct intervention by establishing etiological factors and of diagnosis to act targeted in the shortest possible time. In order to treat an emergency in the dental practice, the doctor should act quickly, as every second is precious. Decisions taken can tilt the balance in favour of restoring the patient's condition or, on the contrary, can aggravate the situation. The quality and safety of the practitioner's actions are indispensable for resolving medical emergencies.

Fortunately, in dental practice, emergency does not occur frequently in the dental practice, but if it occurs, the correct and prompt reaction of the doctor can and must save the patient's life.

In emergency cases, more than anywhere in medicine, "science and consciousness" must be used for saving the life of the patient who is between life and death.

Experimental part

Material and methods

The study includes 7,996 patients resolved in the Oral and Maxillofacial Surgery Clinic (Ambulatory), in the period from 01.02.2014 to 31.12.2018

Surgical work that ranked first in the top of the interventions was: dental extraction - 3031 patients (38.14%); incision, evacuation of peri-maxillary abscess drainage - 1822 patients (22.93%); apical resection - 1218 patients (15.32%); endodontic drainage - 855 patients

(10.76%); suture of face wounds - 477 patients (6%); alveolar ridge regularization - 358 patients (4.5%); gingivectomy 187 patients (2.35%).

Results and discussions

Of the total of 7,996 patients as the first stage of the study, we were interested in their distribution on the medical emergency variable.

87.10% that is 6,965 patients did not trigger medical emergencies during dentoalveolar surgery.

12.90% that is 1031 patients triggered medical emergencies during dentoalveolar surgery.

At the level of the 1031 patients who triggered medical emergencies during dentoalveolar surgery, we continued to focus in our study on the distribution of the type of medical emergency that they triggered: 38% triggered acute hypotonous failure (vasovagal syncope, orthostatic syncope, pregnancy syncope, carotid sinus syndrome), 35% triggered cardio-circulatory emergencies (rhythm disorders, blood pressure crises, angina pectoris); 11% triggered allergic accidents; 9% triggered neurological emergencies; 7% triggered other types of emergencies.

We believe that in this context, particular attention should be paid to the detailed knowledge of all clinical manifestations of medical emergencies, the role of the practitioner being crucial in setting up emergency therapy.

It has been concluded that both men and women have the potential to trigger a medical emergency but men are more exposed to trigger an unforeseen medical event during dental therapy or dentoalveolar surgery. The installation of a medical emergency is influenced by the patient's age, young people (21-30, 31-40 years) being more inclined to trigger an unexpected medical event.

During dental or dental-alveolar surgery, the installation of a medical emergency is influenced by the patient's condition. Although the highest percentage is held by *apparently healthy* patients, patients with pre-existing general conditions have also shown a clear predisposition to trigger an unexpected medical event.

The level of dental anxiety as well as the general status of the patient are the landmarks that require the greatest attention from the practitioner for the purpose of preventing medical emergencies.

In those patients who triggered medical emergencies, we performed dental works and dentoalveolar surgery. Surgery was ranked first in the top of interventions: dental extraction-48%, incision, evacuation and drainage of peri-maxillary abscess-22%; suture of facial wounds - 18%; apical resection-12%.

During dental therapy or dentoalveolar surgery, the installation of a medical emergency is strongly influenced by the type of intervention the patient undergoes.

The installation of a medical emergency is strongly influenced by the lack of premedication used to perform the dental or surgical intervention to which the patient is subjected to.

Conclusions

Patient-specific predictive risk factors (gender, age, history, dental anxiety score) as evidenced by our research are unlikely to separately define the risk potential for the occurrence of medical emergencies.

The simple act of the medical-surgical history gives the physician the opportunity to establish or accentuate the special link, which is the basis of the doctor-patient relationship.

Whatever the patient's attitude, the physician should investigate, specify, and take into account the terrain on which a pathological condition occurs.

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