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REVIEW ARTICLE

CONSIDERATIONS IN MANAGEMENT OF CARDIOVASCULAR EMERGENCIES IN DENTAL PRACTICE: A SYSTEMATIC REVIEW

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ABSTRACT

An emergency is a medical condition that demands immediate attention and successful management. These are the life-threatening situations of which every practitioner must be aware of so that needless morbidity can be avoided. Medical emergencies in dental practice are those adverse medical events that may present in the course of dental treatment. The three vital parameters which constitute the criteria on which emergency medicine is based are consciousness, respiration and circulation. One must be familiar with the treatable medical problems that are likely to occur, know how to recognize them and be able to provide treatment. A decision must be made for every patient about activating the emergency medical services system and whether the patient should be transferred to the emergency department. This review article deals with management of commonly occurring cardiovascular emergencies in dental clinic.

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INTRODUCTION

An emergency is a medical condition that demands immediate attention and successful management. These are the life-threatening situations of which every practitioner must be aware of so that needless morbidity can be avoided. Medical emergencies in dental practice arethose adverse medical events that may present in the course of dental treatment (Joseph Uyamadu, 2012), any dental professional can encounter an emergency during the course of their treatment. Cardiovascular disease remains the major cause of death, this concern is not entirely unfounded. The almost universal presence of signs of cardiovascular disease in adults means that we all are potential victims of one or more of its clinical manifestations. If we add to this the stresses frequently involved in dental treatment, it becomes evident that many medically compromised patients represent an increased risk during their treatment. Recognition of these potentially high-risk patients and incorporation of specific treatment modifications go far to diminish the chances of life- threatening situations developing. This review article deals with management of commonly occurring cardiovascular emergencies in dental clinic.

Angina pectoris: Angina is characterized by substernal thoracic pain, precipitated chiefly by exercise, emotion or a heavy meal, which is relieved by vasodilator drugs and a few minutes rest.

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Angina is clinically important to the dental practitioner because it is usually a sign of significant coronary artery disease. The primary goal in the management of the acute anginal episode is to eliminate myocardial ischemia by either decreasing the myocardial oxygen requirement or increasing o2 delivery to the heart (Stanley Malamed, 2015).

The steps involved in management are

- Termination of the dental procedure and activation of office emergency team.
- Position - allow patients to position themselves in the most comfortable manner. Commonly this will be sitting or standing upright. The supine position is rarely preferred by patients with chest "pain"
- C→A→B(circulation-airway- breathing), basic life support (bls), as needed.
- Administration of vasodilator and oxygen. A member of the emergency team should immediately get the emergency kit and o2. As soon as possible (even before o2 is available), give nitroglycerin sublingually.
- Administration of additional vasodilators, if necessary. If the patient's nitroglycerin tablets are ineffective in relieving anginal pain within 5 minutes, administer a second dose from the patient's drug supply or, preferably, from the dental office emergency kit, which will be "fresher" than the patient's. Nitroglycerin tablets

lose potency unless stored in tightly sealed glass containers (Canto, 2007)
- Summoning of medical assistance, if necessary. If an episode of chest pain in a known anginal patient has not been terminated following administration of o2 and the suggested three doses of nitroglycerin, or if the anginal patient asks for medical assistance, do not hesitate—and seek medical assistance immediately
- Modification of future dental therapy. After termination of the anginal episode, determine what factor(s) might have caused it to occur. Consider modification of future dental treatment to prevent chest pain from recurring (Stanley Malamed, 2015)

Myocardial infarction: Myocardial infarction (mi) is a clinical syndrome caused by a deficient coronary arterial blood supply to a region of myocardium that results in cellular death and necrosis. The syndrome is usually characterized by severe and prolonged substernal pain similar to, but more intense and of longer duration than, that of angina pectoris (Brugada, 1992). Clinical management of acute mi is based on recognition of signs and symptoms and implementation of the required steps of basic life support.

The steps involved in the management are: Termination of the dental procedure; activation of office emergency team. With the onset of chest pain, immediately stop treatment and activate the dental office emergency team.

Diagnosis: Although, at the outset, it may prove difficult to distinguish between the pain of angina and acute mi, it is immediately apparent that the patient (victim) is in acute distress and must be treated accordingly.

Position: conscious patients experiencing chest pain can be positioned in any position comfortable for them. Upright is usually preferred.

- C → A → B(circulation-airway- breathing). Basic life support (bls), as needed.
- Increase myocardial o2 supply through supplemental inhaled o2 and thrombolytic therapy, which restores coronary blood flow.
- Use βadrenergic blockade to decrease the force of myocardial contraction and therefore oxygen demand.
- Increase metabolic substrate availability to the myocardium through nitroglycerin, morphine, thrombolytic agents, and percutaneous transluminal coronary angioplasty (PTCA).
- Protect injured myocardial cell function by decreasing inflammation or toxic injury through anti-inflammatory drugs and perfluorochemicals.
- Prevent Reocclusion of the coronary artery through inhibition of platelet aggregation and thrombus formation through the use of antiplatelet agents such as aspirin and antithrombins, including heparin.
- Prehospital management of the suspected mi victim previously adhered to the mona acronym: morphine, oxygen, nitroglycerin, and aspirin.
- Summoning of medical assistance. Where there is strong suspicion that chest pain is not of anginal origin but is more likely to be ami, or in the instance of a first episode of chest pain, the ems system should be activated as soon as possible.
- Administration of oxygen. Administer oxygen as soon as it is available in suspected mi.
- Administration of nitroglycerin. If the victim has a history of angina, nitroglycerin, which should always be available, is used at this time unless contraindications to its administration exist.
- Antiplatelet therapy. Platelets play a major role in thrombus formation following rupture of coronary artery plaque and are integrally involved in the pathophysiology of acute mi therefore, unless the patient has a known aspirin allergy or active gastrointestinal hemorrhage, nonenteric coated aspirin should be given as soon as possible to all patients with suspected acs.
- Monitor vital signs
- Relief of pain. Prolonged pain during acute mi is potentially life threatening. Where nitroglycerin fails to alleviate the discomfort associated with acute mi, administration of an analgesic such as morphine sulfate is appropriate.
- Preparation to manage acute complications. The major complications of mi likely to develop while awaiting the arrival of emergency medical assistance are ventricular dysrhythmias, heart failure, and cardiac arrest. Management of ventricular dysrhythmias requires iv administration of various drugs. In addition, the presence of an ecg and training to interpret the electrocardiogram are essential. Drugs that may be administered in the management of dysrhythmias include lidocaine and atropine.
- Transportation of patient to hospital. After stabilization of the victim (i.e., iv access, relief of pain, ecg monitoring, and stabilization of heart rhythm and blood pressure), the patient will be transported to a primary care facility (e.g., emergency department of a hospital) (Haro, 2002).

Heart failure: Heart failure is generally described as the inability of the heart to supply sufficient oxygenated blood for the body's metabolic needs. Fluid accumulates in the pulmonary circulation, systemic circulation, or both. Heart failure is a principal complication of virtually all forms of heart disease (O'brien, 2010).

The steps involved in management are

- Termination of the dental procedure. Treatment should cease as soon as the patient begins to exhibit signs and symptoms of respiratory distress
- Position the patient comfortably, which in most cases will be an upright position. This position allows excess fluid within the alveolar sacs to concentrate at the bases of the lungs, permitting a greater exchange of o2. If at any time the patient loses consciousness, that individual must be placed in the supine position.
- Removal of dental materials. All dental materials or instruments should be removed from the patient's mouth immediately.
- Activate office emergency team and summons emergency medical services
- Calming of the patient. Dental personnel must reassure the patient that they are making every effort to manage the problem and that they have summoned emergency personnel.

- C → A → B(circulation-airway-breathing), basic life support as needed
- Administration of o2. O2 should be administered to all patients who demonstrate signs of severe heart failure.
- Vital signs, including blood pressure, heart rate and rhythm, and respiratory rate, should be monitored and recorded every 5 minutes.
- Alleviation of symptoms. The immediate goal in the management is to alleviate the patient's breathing difficulties. Proper positioning (per patient wishes, but usually upright) is extremely important. If respiratory distress is still evident, however, additional steps may be required.
- Bloodless phlebotomy- bloodless phlebotomy can temporarily remove approximately 12% of circulating blood volume, or 700 of 6000 ml in the average man, permitting the heart to function more effectively and dyspnea to be alleviated. Tourniquets or blood pressure cuffs are applied to three extremities, using wide, soft, rubber tubing for the tourniquets every 5 to 10 minutes, one of the tourniquets is released and applied to the free extremity
- Administration of a vasodilator. The administration of vasodilators in the management of heart failure has gained popularity. Venodilators, such as nitroglycerin, reduce the preload (the filling pressure) but not the systemic pressure.
- Alleviate apprehension. Most patients suffering acute pulmonary edema are extremely apprehensive, bordering on panic. Increased apprehension leads to increases in cardiac and respiratory workloads, both of which are absolutely contraindicated in these patients. For this reason, dental personnel must take special care to eliminate patient anxiety. However, in the presence of continued respiratory distress and anxiety, drug therapy should be considered, but only in situations in which the doctor is trained in these procedures. Administration of an opioid agonist, such as morphine (2 to 4 mg intravenously, subcutaneously, or intramuscularly, repeated every 15 minutes as needed), is a possibility
- Discharge. The patient suffering heart failure requires hospitalization for additional management (Hunt Sa, 2001).

Summary and Conclusion

Medical emergencies can, and do happen in the practice of dentistry. The three vitalparameters which constitute the criteria on which emergency medicine is based are consciousness, respiration and circulation. The seriousness of the emergency is assessed by rapid evaluation of cerebral distress, respiratory difficulties and cardio-circulatory problem. The role of the dentist in an office emergency is an important one. He or she must be-able to slip in to "emergency mode" and out aggressively when necessary preparations include learning and practicing the standard resuscitation scheme, including the primary survey and secondary surveys. One must be familiar with the treatable medical problems that are likely to occur, know how to recognize them and be able to provide treatment. A course in basic life support should be taken. A decision must be made for every patient about activating the emergency medical services system and whether the patient should be transferred to the emergency department. The essential emergency drug kit and emergency equipment should be kept always in the dental office.

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