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MEDICAL EMERGENCIES IN DENTAL PRACTICE.

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Abstract

Introduction: Although most dental procedures are considered relatively safe, some unfortunate medical emergencies do arise in the dental office. A dentist is likely to encounter at least a few medical emergencies during their entire career. As a healthcare provider, a dentist must be trained in assessing and managing common medical emergencies. This review briefly discusses a few medical emergencies encountered in a dental clinic.

Aim of the study: This article briefly discusses the common medical emergencies encountered in dental practice and their management.

Methodology: The study is a comprehensive research of PUBMED since the year 2006 to 2022.

Conclusion: Medical emergencies arising in dental clinics are rare but can prove catastrophic if not managed promptly. Basic understanding and training in managing those emergencies until emergency health services arrive is a must for every dentist. This review has briefly described common medical emergencies encountered by dental practitioners.

Keywords: Medical emergencies, Dental emergencies, Syncope, Angina, Epilepsy, Adrenal insufficiency, choking, BLS

Introduction

Dental treatments usually carry relatively few medical risks when proper preventional guidelines are followed. Despite the best preventive measures, it is estimated that every 3 out of 4 dental practitioners will experience some medical emergencies in their practices. [1] Laurent et al 2014 reported an incidence of 2.1 episodes of emergencies per dental practitioner per annum with 0.003 life-threatening cardiac arrests per annum per practitioner. They also reported the lack of basic medical equipment such as oxygen cylinders and defibrillators, not to mention a significant number of dentists never received any training for managing medical emergencies. Commonly presented medical emergencies

are syncope, allergies, hyperventilation, cardiovascular events, seizures, and diabetic emergencies. This review will discuss common medical emergencies in dental practice, their assessment, and management techniques. [2]

Assessment of risk

A thorough medical & drug history, assessment of vital signs, taking precautionary measures, and keeping the physician in the loop whenever required will likely prevent most medical emergencies. Anticipation of an emergency during a dental procedure is also an important skill that may prevent a full-blown emergency. Following the latest guidelines such as on National Institute for Clinical Excellence's (NICE's) 'Medical Emergencies in Dental Practice is also of utmost importance. [3]

Emergency equipment & drugs

Oxygen

Apart from hyperventilation, oxygen is indicated in all medical emergencies encountered in a dental practice. An E-sized portable oxygen cylinder holding approximately 600 liters should be available at every dental office. Moreover, a complete face mask along with a bag valve mask device should also be present in cases of apnea. A breathing conscious/unconscious should be provided 6-10 L/minute of oxygen while an unconscious apneic patient should be provided 10-15 L/minute of oxygen. Oropharyngeal airway devices may also be needed to keep the airway patent. [4]

Epinephrine

Another critical drug in dental offices is pre-loaded epinephrine. It is considered the drug of choice in cases of anaphylaxis and severe asthma when salbutamol becomes ineffective. It is preloaded in a 1: 1000 formulation containing 1mg/mL concentration. Autoinjectors are also available in the market containing 0.3 mL (1:1000) containing 0.3 mg for one adult dose or 0.3 mL (1:2000) containing 0.15 mg for one pediatric dose. In a dental office, these drugs are administered intramuscularly and multiple pre-loaded doses should be present in every dental clinic. [4]

Nitroglycerin

In cases of angina and or myocardial infarction, 0.3 mg of nitroglycerin as either a sublingual tablet or spray becomes the drug of choice. The short shelf life of an opened tablet box should be kept in mind. It is best to use a new tablet box or a spray to avoid having them being ineffective during an emergency. [4]

Antihistamine

Since allergic reactions are a probable medical emergency in a dental clinic, having an injectable diphenhydramine or chlorpheniramine is warranted. They are indicated either with anaphylaxis or any other allergic reactions such as urticaria or allergic swellings. 25-50 mg of diphenhydramine or 10-20 mg of chlorpheniramine is usually administered intramuscularly for adults. [4]

Salbutamol

Salbutamol is a beta-2 agonist and is the first choice of drug for asthmatic bronchospasms. It is usually taken as an inhaler with 2 puffs for adults and 1 for a child. Asthmatic patients are also recommended to carry their own salbutamol sprays to the dental office. [4]

Hydrocortisone

Patients who are on long-term steroids or with Addison's disease are at risk of developing adrenal insufficiency during dental surgery. A 100 mg parenteral dose of hydrocortisone is a lifesaver. [5]

Oral carbohydrates

Hypoglycemia in a conscious patient can be promptly managed by taking any beverage high in sugar such as fruit juice. [4]

Glucagon
If hypoglycemia arises in an unconscious patient, intramuscular glucagon 1 mg may be administered. The ideal management of such a patient is intravenous administration of 50% dextrose if dental practitioners are trained in establishing an IV line. [4]

Aspirin
Low-dose aspirin 162mg to 325 mg can be given to patients suspected of having a myocardial infarction. [4]

Benzodiazepines
4mg Lorazepam of 5mg midazolam may be administered intramuscularly to patients in prolonged or repeated seizures. Lorazepam is the drug of choice for status epilepticus. [4]

Defibrillator
Access to an automated external defibrillator (AED) is recommended in every dental office. Moreover, dental staff should be trained in basic life support skills. AEDs are used to deliver defibrillatory shocks to an individual suffering from cardiac arrest. AED box contains pads that are applied to the bare chest to analyze ECG, and then appropriately deliver a shock. [6]

Figure1: Automated external defibrillator [6]

Emergency Drugs in Dental Office

Drug	Indication	Dose (Adult)
Oxygen	All except hyperventilation	100% @ 6-15 L/min inhalational
Adrenaline	Anaphylaxis/Asthma	0.3 mg IM
Nitroglycerin	Angina	0.3 mg sublingual
Antihistamine (Diphenhydramine)	Allergy	25-50 mg IM
Salbutamol	Asthma with bronchospasm	2 inhalational puffs
Aspirin	Myocardial Infarction	162-325 mg
Glucagon	Hypoglycemia	1 mg IM
Benzodiazepines (Midazolam)	Recurrent or uncontrolled Epileptic attack	5 mg IM
Hydrocortisone	Adrenal insufficiency, bronchospasm	100 mg IM

Table 1: Emergency Drugs in Dental Office [4]

Approach to Medical Emergencies
Early recognition of an impending medical emergency is key to preventing and managing it. A dental practitioner must always perform procedures where the immediate environment is safe and emergency

drugs/ devices are easily available. Establishing communication throughout the procedure via verbal or eye contact is essential. Assessment and reassessment of vitals if required should be promptly made. [7]

Airway

Maintaining a patent airway is usually the starting point of emergency management in both dental and medical settings. Inability to speak, dyspnea, stridor, wheezing, and central cyanosis can often present as airway obstruction. Clearing the airway of foreign objects, blood, and vomitus should be done immediately using forceps and suction. If ineffective, a Heimlich maneuver has to be followed. A head tilt and chin lift maneuver can improve the airway, and oropharyngeal devices such as Guedels airway can be placed to secure the airway temporarily. Oxygen can effectively be administered once the airway is secure. [7]

Choking

Foreign body airway obstruction (FBAO) could prove to be a fatal emergency if not managed immediately. Most choking incidences occur in healthcare facilities, therefore, dental practitioners must be prepared to manage such an emergency. Old people, neurologically impaired, and sedated individuals are at higher risk of choking. It is recommended to use dental dams, and throat shields, and work diligently while working with dental instruments and objects during a procedure. [8]

When FBAO arises in a dental office, it may present as coughing, difficulty speaking/breathing, cyanosis, and reaching for the throat (classical sign). A dental practitioner must assess for severity, where the patient can cough effectively. In such a case, the patient is asked to sit upright and cough effectively. In cases of severe obstruction, the patient's chest is supported with one hand while the other hand is used to deliver 5 back blows. If ineffective, abdominal thrusts are given using clenched fists on the umbilicus and xiphisternum while standing behind the patient. If the patient falls unconscious and unresponsive, initiate BLS protocol and call for emergency services. It is important to note that these maneuvers and techniques require regular physical training. [8]

Resuscitation

An unresponsive patient with difficulty or no breathing can indicate a cardiac arrest. It should take no longer than 10 seconds to assess the carotid pulse. If cardiac arrest is confirmed, the dental practitioner should immediately ask staff to alert the medical emergency and procure an automated AED while he/she proceeds with chest compressions without wasting vital time. 30 chest compressions followed by 2 rescue breaths are recommended. Chest compressions should be hard and fast such that they reach a depth of 5-6 cm and a rate of 100-120/ minute. Once AED arrives, expose the chest of the patient, and follow instructions given by the device. [9]

Figure: A stabilizing tool is placed under the dental chair [10]

Adult BLS Algorithm

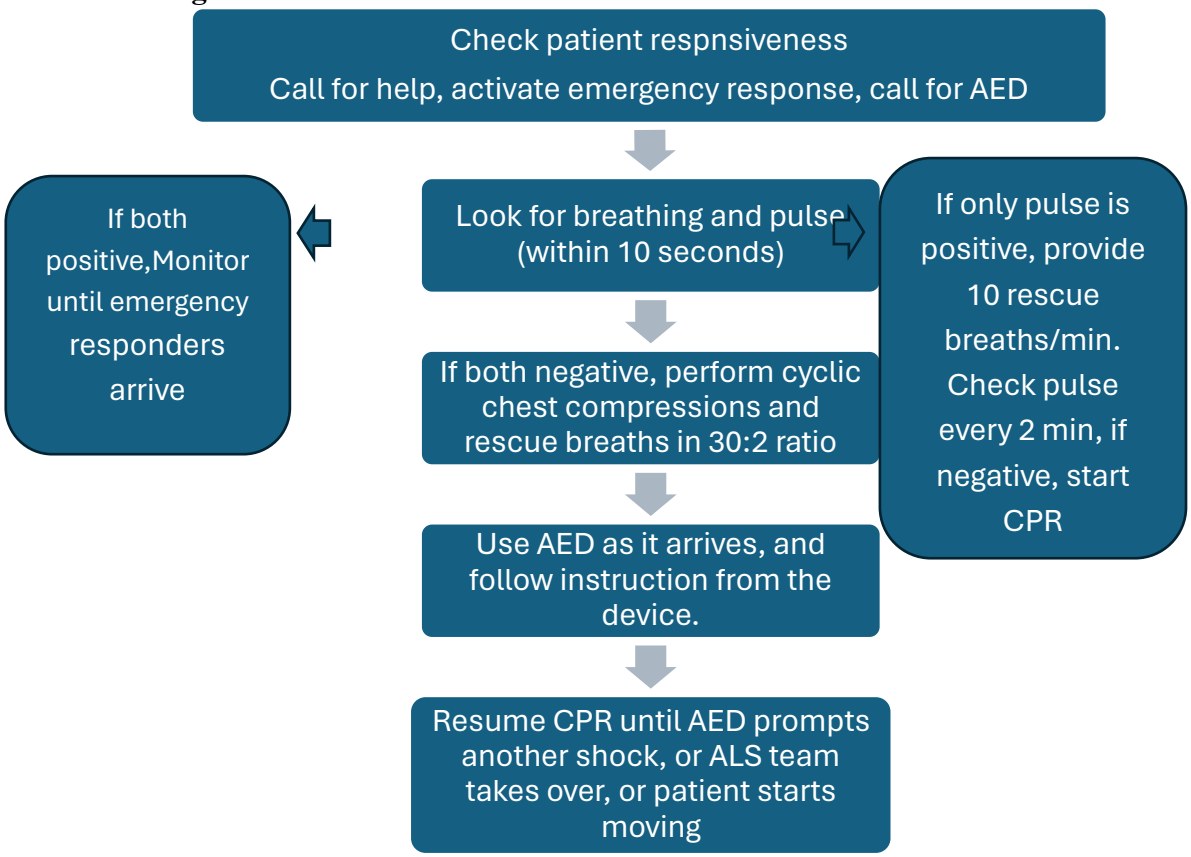

Figure: Adult BLS Algorithm [11]

Syncope

A transient loss of consciousness and postural tone is the most common emergency encountered by dentists. Vasodepressor syncope is frequently encountered when the patient is stressed during invasive procedures. The patient may display symptoms of presyncope such as warmness in the face, nausea, and tachycardia. Vasodepressor syncope occurs due to peripheral pooling of blood followed by reduced cerebral perfusion leading to loss of consciousness. Such syncope can be prevented by addressing the anxiety of the patient. Once syncope occurs, the dental procedure should be discontinued, and the patient placed in a supine position with legs elevated above the level of the head. This positioning improves cerebral perfusion. Pregnant patients are positioned in the left lateral supine position to prevent the uterus from compressing the aorta and vena cava. Ammonia under the nose can stimulate breathing, and O2 can also be administered. Vital signs have to be monitored until the patient is completely stable. [12]

Syncope due to hypoglycemia is managed by giving oral carbohydrates to conscious patients only. Unconscious hypoglycemic patients are managed by IV 50% dextrose or IM glucagon 1 mg. Patients are also encouraged not to come for dental procedures empty stomach. Uncontrolled diabetics should have their blood sugar checked before a dental procedure. [12]

Allergy

The use of drugs and dental materials may trigger allergic reactions in certain individuals. It is always best to discuss allergies during history-taking, unfortunate allergic events still do happen nevertheless. Mild allergic symptoms may present as urticaria, pruritis, erythema, and angioedema. These are best managed by IM administration of diphenhydramine 50 mg. More dangerous symptoms of wheezing, and dyspnea leading to anaphylaxis are managed by IM administration of adrenaline 0.3 mg while administering 100% oxygen. Adrenaline can be repeated after 5 minutes if no improvement occurs.

Vital signs should be monitored, and preparation for BLS and cricothyroidotomy should be made if improvement doesn't occur. [7]

Asthma

Known asthmatic individuals should be asked to carry their inhalers to the dental appointment. Any particular trigger points should be discussed and avoided. Aspirin, NSAIDs, Penicillin, and anesthetics containing bisulfite should also be avoided. Anxiety, difficulty in breathing, and wheezing are signs of an asthmatic attack. The patient should be positioned upright while administering 2 puffs of inhalational salbutamol using a spacer. 100% O2 should follow. If symptoms don't improve, 0.3 mg IM adrenaline may be injected or 100 mg hydrocortisone IM. [7]

Angina

Patients encountered with chest pain usually have a history of cardiac disease, and it should be thoroughly discussed during history-taking. Elective dental treatments are avoided in patients with a history of myocardial infarction in the last 6 months. Emergency dental treatments are best done in a hospital setting with access to medical emergency facilities. Cardiac patients are discouraged from discontinuing any drugs (blood thinners) while undergoing dental surgeries without the consent of treating cardiologists. [7]

Despite precautions, if the incidence of chest pain radiating to the left arm or mandible arises, 0.3 mg of sublingual nitroglycerin tablet or spray should be administered. Repeat every 5 minutes while checking the blood pressure for a maximum of 3 times. If the blood pressure falls below 90mm of Hg or the pain continues for more than 2 minutes, Call for an emergency ambulance, administer chewable aspirin 300 mg, intramuscular 4-6 mg morphine, secure IV line with 5% DNS if possible, and shift the patient to a hospital. If the patient becomes unresponsive, start with a basic life support algorithm while emergency help arises. [7]

Adrenal insufficiency

Many people today chronically take exogenous steroids for various diseases, which results in adrenal insufficiency. Such patients are informed to take supplemental steroids before any dental surgery. Adrenal insufficiency clinically manifests as mental confusion, nausea, fatigue, vomiting, and hypotension, and if untreated, the patient may slip into a coma. It is managed by stopping all treatment, keeping the patient in a supine position with leg elevation, administering 100% O2, administering 100 mg of hydrocortisone IV or IM, and calling for medical assistance. [13]

Epileptic seizures

Seizures can manifest as absent ones where the patient is rigid and unresponsive to full-blown tonic-clonic fits or anywhere in between. An aura might present when a seizure is about to take place followed by a tonic phase where the patient might lose consciousness and go rigid. Then jerking of muscles happens in the clonic stage followed by post post-ictal phase where the patient appears confused, drowsy, or unresponsive. The dentist is supposed to discontinue the dental procedure, clear instruments away from the patient, and place them in a position on a chair or floor where they won't hurt themselves. If the patient appears cyanotic, call an emergency immediately. If seizures last longer than 5 minutes or happen multiple times, administer 5 mg of midazolam IM, and call emergency services. Administer oxygen in the meantime, and send the patient home once completely recovered. [14]

Hyperventilation

Anxiety among patients in a dental office is quite normal especially when an invasive procedure is involved. The dentist must address the anxiety of the patient as much as possible. It is characterized by increased breathing beyond the metabolic demand. It clinically presents as rapid breathing, tightness in the chest, and even carpopedal spasms. Management includes reassuring the patient and even rebreathing exhaled air using closed palms over the face. [7]

Conclusion

Although uncommon, medical emergencies are known to occur in dental clinics, and dental practitioners must be able to provide primary care until emergency services arrive. This review systematically discussed various medical emergencies in order of both severity and occurrence rates. It is recommended that dentists acquire proper physical training before commencing clinical practice.

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