

Medical Emergencies in Dental Practice - An Alarming Situation

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ABSTRACT

Medical emergencies can occur in the dental clinic. Dental office environment is not used to such emergency situations .These situations are precipitated by increased stress that is present in patient's mind when he is present in dental office. So dental practitioner has a duty to make sure that an efficacious and guarded service is delivered to such patient during medical emergency situation.

Keywords:Medical emergencies , Dental practice , syncope, shock

Introduction

Inevitable medical crisis can be encountered by any medico but if apposite preparations are planned prior, they can be dealt proficiently. Commonly seen exigencies in dental practice include hypoglycemic episodes, vasovagal syncope, seizures, choking, asthmatic attack, angina, and anaphylaxis. The reported incidence of these adverse medical events, apart from syncope is about once every three to four years per dentist.¹ A comprehensive patient history can bring attention to probable medical emergencies that a dental practitioner could come across.² Having knowledge about a patient's known allergies and adverse drug reactions can be of utmost importance in preventing such situations. Two dental procedures concomitant with potentially victim anxiety including pulp extirpation and tooth extraction are linked with the greatest percentage of emergencies.³ As per many studies it is essential to improve coaching of dentists to handle medical crisis by participating in BLS courses and various specialized programs, also emphasizing on Advanced Life Support/Advanced Cardiovascular Life Support (ALS/ACLS) courses.⁴ Thus supporting the knowledge and ability to deal with medical emergencies is an important feature of dental practice. The aim of this article is to dispense a survey of basic emergency drugs that should be readily available in dental practices to assist in safe and timely management of dental medical emergencies.

Medical Emergencies in Dental practice

Various medical crisis can be faced by dentists at one time or another. These situations can be alarming to any clinician. Thorough patient case history taken prior to the treatment can draw the physician attention to potential medical crisis that can be faced.^{5,6,7,8}

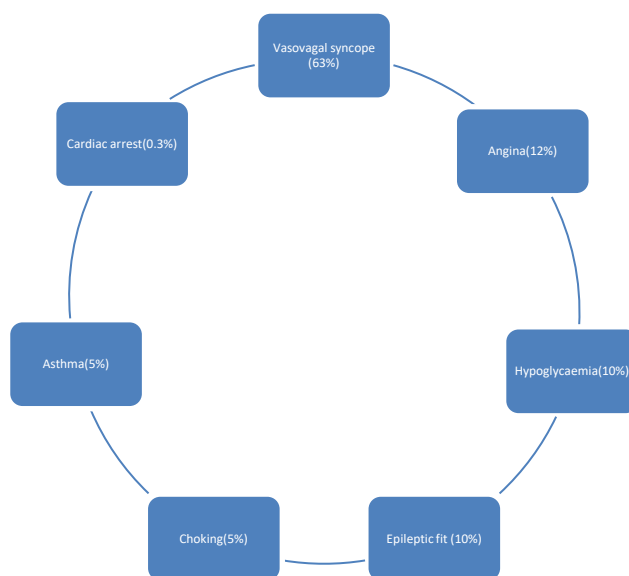
MEDICAL EMERGENCIES IN DENTAL OFFICE

Medical emergencies	Signs & symptoms	Treatment Plan
Hypoglycemia	<ul style="list-style-type: none"> Sweating and whiteness Slurred speech Tiredness and lethargy Shaking/trembling Confusion/aggression Vagueness Unconsciousness 	<ul style="list-style-type: none"> Provide fast acting glucose(15-20g) Airway Breathing Circulation Disability Exposure In impaired consciousness; Glucagon 1mg I/M(for Pediatrics<8 years or <25 kg : 0.5mg I/M) recommended, offer oral glucose once consciousness returns If able measure blood glucose level Call 999 if condition goes adverse
Adrenal crisis	<ul style="list-style-type: none"> Cold and sweaty skin Pallor Low BP and Vertigo Spewed and diarrhoea Collapse 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Lie flat Provide oxygen 15litres/min Call for emergency
Syncope	<ul style="list-style-type: none"> Pallor Dizziness, light headed Sweating Low pulse, hypotension Sickness, vomiting Collapse 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Lie , loosen tight clothes, elevate legs Examine oxygen (not mandatory) If non responsive, check for indications of life Offer glucose , after consciousness is regained
Epileptic seizures	<ul style="list-style-type: none"> Jerky movements Tongue biting Rigidity and cyanosis Noisy breathing Frothing at mouth Sudden collapse and unconsciousness 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Don't put anything into mouth and don't restrain Oxygen 15litres/min Note fits timing On recovery clear the airway. <p>Lengthen seizures(≥ 5min) or replicate seizures(3 or more in one hour): Midazolam or mucosal solution given through buccal route as single dose of 10mg in adults .</p> <p>Depending upon response call for emergency</p> <p>Pediatric dose: 1-5 years-5mg 5-10years-7.5mg >10years-10mg</p>

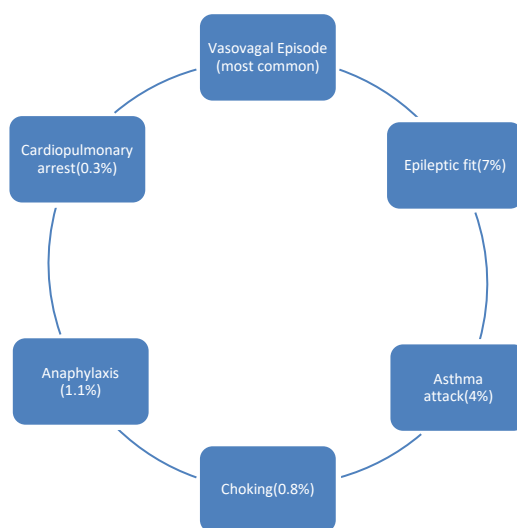
Asthma	<p>Breathlessness and expiratory wheeze</p> <p>Severe: In adults- RR>25/min,HR>110/min</p> <p>In child- RR>30-40/min,HR>125-140/min</p> <p>Life threatening: poor RR, fall in HR, cyanosis, exhaustion, altered consciousness</p>	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Sit upright Short acting beta agonist inhaler- 2puffs(100micrograms/puff) eg: salbutamol Spacer device is used to provide dose properly in case of inability to take dose properly Unsatisfactory response, call for emergency and provide oxygen 15 litre/min along with giving 10 activations of inhaler repeated every 10 mins. Reassure patient
Stroke	<ul style="list-style-type: none"> Facial weakness: inability to smile and drooping of eye Arm weakness: unable to raise both arms Speech problems 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Oxygen should be given 15 liters/min Call for ambulance
Cardiac Emergency	<ul style="list-style-type: none"> Pallor, sweating Breathlessness Tightness in chest Pain radiating to neck, shoulders, jaw, shoulders, back and left arm Nausea 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Sitting up Aspirin 300mg through oral route for persons who are non-allergic to aspirin GTN spray 2 activations sublingually Ensure automated external defibrillator is immediately accessible Call for medical help
Anaphylaxis	<ul style="list-style-type: none"> Flushing Pallor Wheeze or hoarseness Respiratory distress Low BP Tachycardia Urticaria, angioedema Skin or mucosal changes Sudden onset and rapid development of symptoms. Threatening to life 	<ul style="list-style-type: none"> Airway Breathing Circulation Disability Exposure Lie, elevate legs Oxygen 15litres/min Adrenaline 500 micrograms by IM route(0.5ml of 1:1000) If no improvement, repeat dose of adrenaline after an interval of 5 min. Call for emergency <p>Pediatrics dose: <6years-150 micrograms(0.15ml of 1:1000) 6-12years-300 micrograms(0.3ml of 1:1000) >12years-500micrograms(0.5ml of 1:1000)</p>

Incidence of medical emergencies⁹

Girdler N et al surveyed in England over 12 month period had encountered following medical emergencies



P .Jevon et al in Germany has found over 12 months dentist has encountered following



Emergency Kit should include the following¹⁰

Essential Emergency Drugs

Oxygen It is recommended for every emergency. Oxygen is used for the administration of a medical crisis in patients with chronic obstructive lung disease. It should be portable, preferably cylinder should be E size holding above 600 liters. The oxygen is delivered with a run rate of 6 to 10 liters per minute.

Nitroglycerin This is a drug of choice for myocardial infarction or acute angina . It has quick onset of action. Available as sublingual spray or as sublingual tablets. Sublingually administration of drug in form of one tablet or spray (0.3 or 0.4 after signs of angina).

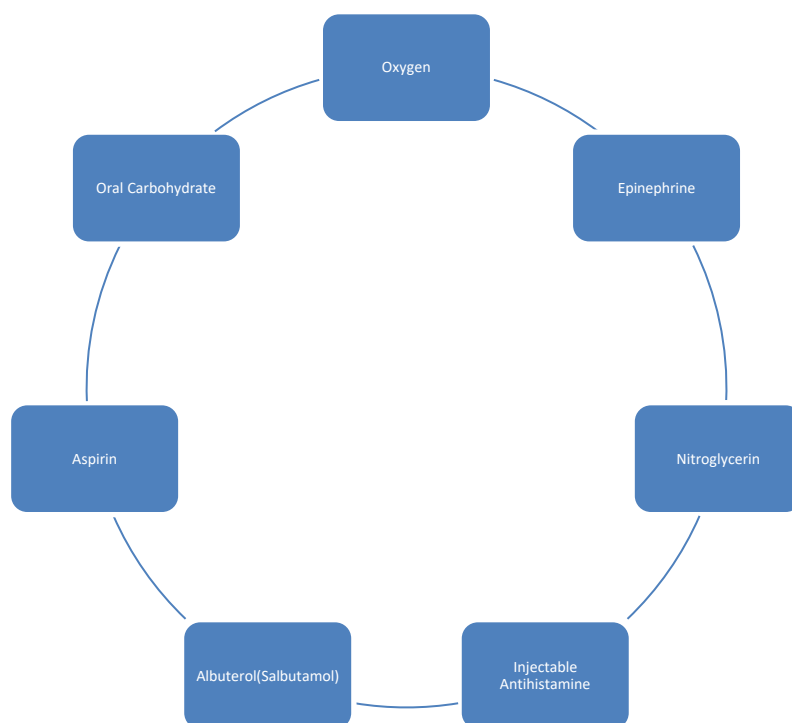
Epinephrine It is a drug of first choice, for the treatment of asthma and anaphylaxis . It is also administered for the care of cardiac arrest. It usually takes 5 to 10 minutes when given intravenously. For intravenous injection available as 1 : 10,000, which is equivalent to 1 mg per 10 mL. It is produced as 1 : 1,000, which is equivalent to 1 mg per ml for intramuscular and intralingual injections. The dose in the case of a cardiac arrest is 1 mg.

Albuterol (Salbutamol) This is used for the management of bronchospasm, it acts as a selective beta-2 agonist. After inhalation it dispenses selective bronchodilation leaving minimum cardiovascular effects.

Injectable Antihistamine Allergic reactions can be managed by an antihistamine diphenhydramine or chlorpheniramine, it may be considered as part of injectable agents.

Aspirin It is named as (acetylsalicylic acid) is used to reduce general mortality from myocardial infarction. This drug prevents development of cardiac ischemia to injury to infarction.

Oral Carbohydrate Fruit juices or non diet soft drinks are an oral carbohydrate. The drink should be kept in the emergency kit which will be appreciated for faster access rather than in a refrigerator. Indicated in the handling of hypoglycemia in conscious patients.



Additional Drugs

Flumazenil The benzodiazepine antagonist flumazenil can be used where oral or parenteral sedation is concerned. Required dose is 0.1 to 0.2 mg intravenously, incrementally.

Morphine It is suggested for handling of severe pain that occurs with a myocardial infarction. The dose involves balancing in 1 - 3 mg increments intravenously .

Naloxone This should also be present for the emergency handling of inadvertent overdose if morphine is included in the emergency kit.

Nitrous Oxide After morphine this is second option is not available for pain management from a myocardial infarction. It is administered with oxygen estimating 35% or titrated to effect.

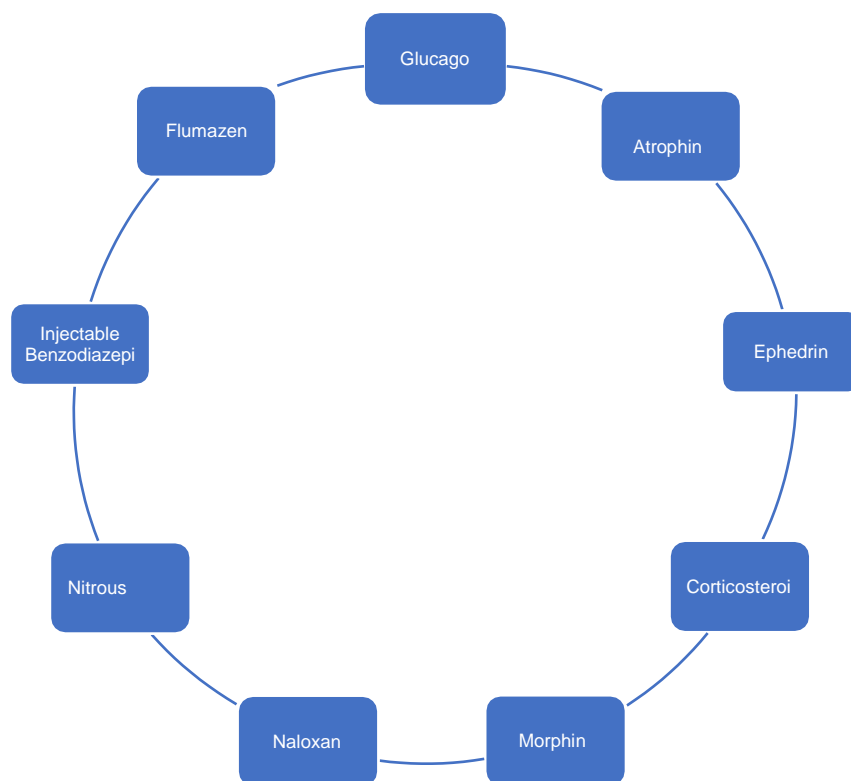
Glucagon Intramuscular handling of hypoglycemia in an unconscious patient can be healed by this drug. Generally intravenous 50% of dextrose is administered. Glucagon is available as 1 mg formulation.

Ephedrine It is vasopressor in nature. It is used to manage significant hypotension . This drug is has a prolonged duration of action and is less potent . It is ideally dispensed in 5 mg increments intravenously.

Atrophine It is anti-muscarinic and anti-cholinergic drug. Specified for the management of hypotension accompanied by bradycardia. The dose is administered as 0.5 mg initially followed by additions till maximum dose of 3 mg is attained.

Corticosteroid Various corticosteroids such as hydrocortisone may be designated for the avoidance of recurrent anaphylaxis. It also plays a role in the management of an adrenal crisis.

Injectable Benzodiazepine Seizures which are extended or periodic , also known as status epilepticus are managed by benzodiazepine. Lorazepam has been announced as the drug of choice for status epilepticus and can be delivered intramuscularly. Midazolam is another alternative used for treating seizures.



Resuscitation The process of correcting physiological disorders (such as lack of breathing or heartbeat) in an acutely ill patient.

Resuscitation Algorithms⁹

The new algorithms from the 2010 Resuscitation guidelines (basic life support and automated external defibrillation) is as follows.

Oxygen

Easily portable with delivery of an ample flow rate of oxygen i.e . 15 litres per minute cylinder should be available. Once pulse oximetry is started the patient's oxygen levels can be accordingly titrated.

Pulse oximetry Dental clinicians will have a pulse oximeter (general ones that delivers IV sedation). Targeted oxygen level is 94-98%.



Automated External defibrillator Dental clinics should have prompt access to an automated external defibrillator (AED) which is acceptable for adults and children over eight years of age.



Medications

An emergency drug storage container should contain all drugs.

Buccal midazolam

The Resuscitation Council (UK) has recapitulate the importance of dispensing buccal midazolam for prolonged seizures lasting for five minutes or longer recurring in quick succession.

Midazolam is being reclassified

A prescription is essential

Drug should not be kept in locked cupboard.

No need to be assigned on a controlled drug register.

Reviews

Smereka J et al 2019¹¹ assessed the generality preparedness and attitudes of medical emergencies in dental office on the concluding prevalence of medical emergencies and found large number of dentists were not qualified tackle medical emergencies.

Gupta T et al 2008¹² conducted a study to assess the awareness for handling of medical emergencies by the dentists in the cities of Udupi and Mangalore in India. The study concluded that awareness for handling of medical emergencies was found to be inadequate .

Alshiekhly U et al 2015¹³ conducted a study to asses that social media should be probable part of the formal education of health professionals and proved that Facebook is very useful in teaching medical emergencies procedures .

Atherton, GJ et al 1999¹⁴ supervised a study to ascertain the emergency drugs and equipment owed by general dental practitioners (GDPs). The study found most respondents owed drugs and equipment necessary to manage a medical emergency.

Ito S et al 2015¹⁵ investigated methods for stabilizing the dental chair. Hence the placement of a round stool as a stabilizer under the backrest of a dental chair increased the effectiveness of chest compressions.

Summary

Medical crisis in dental practice can be alarming. Although life threatening crisis and cardiac arrest are rare but they do occur, as such dental practitioners should be able to handle them productively. In order to reduce the chances of medical crisis good knowledge should be acquired by dental practitioners for handling these situations.

Acknowledgement

This paper would not have been possible without the extraordinary support of my family and my co-authors. Their zeal, mastery, and hard attention to detail have been an inspiration and kept my work on track.

I would also like to show my gratitude to my wonderful parents, brothers, family, friends and especially Kimiko Mori-Chhapyan.

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