World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(REVIEW ARTICLE)

Check for updates

Common medical emergencies in dentistry: A review

Sathish Abraham, Manish Badgujar *, Pradnya Nagmode and Nitin Lokhande

Department of Conservative Dentistry and Endodontics, SMBT Dental College & Hospital, Sangamner, India.

World Journal of Advanced Research and Reviews, 2022, 15(03), 443–449

Publication history: Received on 14 August 2022; revised on 22 September 2022; accepted on 24 September 2022

Article DOI: https://doi.org/10.30574/wjarr.2022.15.3.0929

Abstract

A medical emergency, no matter where it happens, demands immediate treatment. When it occurs in a dental set-up, it is expected of Dentist and his/her staff to have the basic knowledge to recognize, assess and manage a potentially life-threatening situation until the patient can be transported to a medical facility. For that, the staff in the clinic should be well trained to act accordingly in different types of medical emergencies that can occur at any given time. This review article deals with different kinds of medical emergencies that can occur in a dental set-up and how that can be recognized and managed.

Keywords: Dental procedure; Syncope; Medical emergency; Hypertension; Anaphylaxis

1. Introduction

The management of medical emergencies is widely considered a requisite skill for all dentists. Timely intervention of an emergency can significantly alter the outcome for a patient's morbidity and possible mortality. Although medical emergencies do not occur commonly in dental practice, their incidence is not insignificant and dental practitioners are expected to be adept in their initial management [1]. When presented with an emergency, it is not uncommon for a first responder to be affected by panic or indecision, potentially delaying the response time for critical care, and thereby resulting in increased morbidity or mortality for the patient [2]. Should such a situation arise in their clinic, dental practitioners and their teams need to be confident and up to date with their medical emergency management skills in order to provide quality initial treatment of an emergency.

Medical emergencies can be alarming to any clinician but these situations are less alarming if proper preparation has been made. It is particularly important in the history to enquire about known allergies or adverse reactions to medication so that these can be avoided [3]. Good methods of practice can prevent many emergencies, for example prompt treatment of a diabetic patient at a predictable time thereby avoiding hypoglycaemia.

Dental procedures themselves can jeopardize the airway, which must therefore be adequately protected. Patients with pre-existing medical conditions, such as asthma or angina, will usually be taking prescription medications [4]and the practitioner should always check that these are readily available and have been taken on the day of treatment [5]. Patients who have an asthma attack and who have not brought their normal medication will not be helped significantly by oxygen alone (because of the bronchoconstriction). It is therefore vital that patients with asthma bring their inhalers with them or that they are available in the emergency drug box.

The common emergencies that may occur in dental practice will be discussed in turn and refer to adult patients. In all these situations the basic principles of resuscitation should be remembered, i.e., attention to the Airway, Breathing, and Circulation [6]. Key points in the management of medical emergencies in practice are given in Table below.

* Corresponding author: Manish Badgujar
Department of Conservative Dentistry and Endodontincs, SMBT Dental College & Hospital, Sangamner , India.

1.1. Contents of the emergency drug box

- Adrenaline (epinephrine) 1 in 1,000
- Aspirin 300 mg
- Chlorphenamine (10–20 mg)
- Diazepam (5 mg / ml)
- Glucagon (1 mg)
- Glucose intravenous infusion (20% / 50%)
- Glyceryl trinitrate tablets / spray
- Hydrocortisone injection (100 mg)
- Oxygen
- Salbutamol
- (Flumazenil)

1.2. Some of the common medical emergencies are listed below

- Syncope
- Hypertension
- Anaphylaxis
- Epilepsy
- Local anesthetic emergencies
- Hypoglycemia
- Hyperglycemia
- Asthma
- Chest pain
- Cardiac arrest

2. Loss of consciousness

A visit to the dentist is a highly stressful event for many people. Emotions that accompany dental treatment often lead to loss of consciousness. About 2% of all patients undergoing dental procedures suffer from syncope. Pain and fear are most often the causative factor. When the cause of syncope is trivial, the patient returns to full health after a temporary loss of consciousness, and the procedure can be continued.

2.1. Fainting (vasovagal syncope)

Syncope is a commonly encountered and challenging problem in medical practice. Presentations are variable, and the causal mechanism often remains elusive even after extensive (and often expensive) evaluation. Clinical practice guidelines have been developed to help guide the multidisciplinary approach necessary to diagnose and manage the broad spectrum of patients presenting with syncope.

2.2. Classification of syncope

- Neurally mediated
- Orthostatic hypotension
- Cardiac arrythmias
- Cardiopulmonary disease
- Cerebrovascular

2.3. Causes of syncope

- Neurally mediated
  - Vasovagal syncope
    - Classical
    - Non-classical
    - Carotid sinus syncope
    - Situational syncope
    - Acute hemorrage

  - Post exercise
  - Post prandial

- Orthostatic hypotension
  - Drug and alcohol induced
  - Diarrhoea
  - Addison's Disease

- Cardiac arrtyhmias
  - Sinus node dysfunction
  - Atrioventricular conduction system disease

- Cardiopulmonary disease
  - Acute Myocardial Infarction
  - Pulmonary hypertension
  - Atrial Myxoma

- Cerebrovascular
  - Vascular Steal Syndrome

2.4. Management

Before the patient loses consciousness, the possibility of hypoglycemia should be borne in mind and a glucose drink may be helpful. The patient should be laid flat, so that the legs are higher than the head (heart) and any tight clothing around the neck should be loosened.

- Lie the patient flat and raise their legs
- Maintain the airway and administer oxygen
- If no pulse is palpable – cardiac arrest – institute cardiopulmonary resuscitation
- If a pulse is palpable assume hypoglycemia and treat by oral or intravenous glucose (depending on the level of consciousness)
- Give 200 mg of hydrocortisone sodium succinate intravenously
- Get help

3. Hypertension

Hypertension is high blood pressure. Blood pressure is the force of blood pushing against the wall of arteries as it flows through them.

Table 1 Classification of hypertension according to the jnc6 and jnc7 [9, 10]

Stages of hypertension	Range for systolic and diastolic blood pressure
Normal blood pressure	Systolic <120 mmhg and diastolic <80 mmhg
Prehypertension	Systolic 120 – 139 mmhg and diastolic 80 -89 mmhg
Stage 1 hypertension	Systolic 140 – 159 mmhg and diastolic 90 -99 mmhg
Stage 2 hypertension	Systolic > 160 mmhg and diastolic > 100 mmhg
Hypertensive emergency	Severe hypertension; no end organ damage
Hypertensive emergency ''white coat'' hypertension	Severe hypertension; end organ damage

Dental practitioners can often be on the frontlines of prevention of hypertension by evaluating preoperative blood pressure readings, performing risk assessments, and knowing when to consider medical consultation of a hypertensive patient in a dental setting.

Hypertension is divided into two main categories: essential/primary hypertension and secondary hypertension.[7] Lack of identifiable causative factors for elevated blood pressure is known as essential or primary hypertension, making up ~90%–95% of all hypertensive cases. Secondary hypertension, for which there is an identifiable cause, affects 5%–10% of US adults who are diagnosed with hypertension.[8]

3.1. Risk factors for primary hypertension

- Age
- Contraceptive use
- Menopause
- Obesity
- Family history
- Race
- Reduced nephron number
- Diabetes
- High-sodium diet
- Excessive alcohol consumption

3.2. Treatment

Changing your lifestyle can help control and manage high blood pressure. Your doctor may recommend that you make lifestyle changes including:

- Eating a heart-healthy diet with less salt
- Getting regular physical activity
- Maintaining a healthy weight or losing weight if you're overweight or obese
- Limiting the amount of alcohol you drink

Medications used to treat high blood pressure include:

- Diuretics
- Angiotensin-converting enzyme (ACE) inhibitors
- Angiotensin II receptor blockers (ARBs)
- Calcium channel blockers
- Alpha blockers
- Alpha-beta blockers
- Beta blockers
- Aldosterone antagonists
- Vasodilators

4. Anaphylaxis

Anaphylaxis is a systemic, life-threatening disorder triggered by mediators released by mast cells and basophils activated via allergic (IgE-mediated) or nonallergic (non-IgE-mediated) mechanisms. It is a rapidly evolving, multisystem process involving the integumentary, pulmonary, gastrointestinal, and cardiovascular systems.

4.1. Risk factors for anaphylaxis

- Age: Male <15 y and Females >15 y of age[11]
- Route of allergen introduction Parenteral > ingested
- Interruption of medication Example: insulin interruption after desensitization
- Atopic history Example: latex anaphylaxis, RCM, EIA, and IA
- Prior exposure Example: protamine/zinc insulin (NPH) use and reaction to protamine used for heparin reversal
- Asthma More severe asthma increases risk for anaphylaxis
- Geography Higher incidence in Northern latitudes 8. Sex Latex, aspirin, and certain medication reactions more common in women. Venom reactions more common in men.

4.2. Clinical presentation

4.2.1. Skin

- Urticarial eruption
- Angioedema
- Oropharyngeal
- Laryngeal

4.2.2. Bronchopulmonary

- Laryngeal oedema
- Wheeze; cough

4.2.3. Cardiac

- Myocardial vasoconstriction
- Myocardial depression

4.2.4. Gastrointestinal

- Nausea; vomiting
- Diarrhoea

4.2.5. Neurological

- Dizziness
- Confusion
- Headache

4.3. Management

Anaphylaxis is considered a medical emergency with its immediate onset (seconds to minutes) and rapid progression to cardiovascular and/or respiratory collapse resulting in death within minutes of inception.

4.3.1. Immediate measures (first- line treatment)

- The immediate administration of 0.3 to 0.5 mg of epinephrine (1:1,000) in the mid-outer aspect of the thigh (anterolateral vastus lateralis, mid-muscle belly [VLM]) is the most essential intervention. This may need to be repeated every 5 to 15 min. [12,13]
- Removal of the potential triggering antigen, placing the patient in a supine position, and quickly addressing circulation-airway-breathing are critical.
- In the event of respiratory distress, the patient should be placed in a position of comfort and restrictive clothing should be removed or loosened. A short-acting b2 agonist bronchodilator (albuterol) should be administered as 2.5 or 5 mg in 3 mL nebulized or two puffs of a metered dose inhaler every 2 to 4 h until symptomatic relief or patient reaches a higher level of care.[14]
- In rare cases in which rapid deterioration is occurring, epinephrine can be administered by bolus injection (0.5 to 1.0 mg or 5 to 10mL of a 1:10,000 dilution by slow IV/ IO push) or 1 mL of 1:1,000 IV/IO bolus in the event of impending or current cardiac arrest.

4.3.2. Adjunctive therapies

Antihistamines (antagonists H1 and H2) as well as corticosteroids are considered adjunctive treatments.

5. Local anaesthetic emergencies

Allergy to local anesthetic is rare but should be managed as for any other case of anaphylaxis. When taken in the context of the number of local anesthetics administered, complication rates are low, but complications can occur.

Fainting in association with the injection of local anesthetic is rather more common and can usually be avoided by administering the local anesthetic while the patient is supine.[15]

5.1. Potential problems with local analgesia Local anesthetic allergy

- Palpitations
- Myocardial infarction
- Hypotension
- Hypertension Facial palsy or diplopia Management of an intravascular local anesthetic injection
- Stop local anesthetic injection
- Lay the patient flat with legs raised
- Maintain the airway
- Reassure the patient that they should recover within 30 minutes

5.2. Management of a broken needle in a dental patient

- If tip is visible
  - Remove with artery forceps
- If tip is not visible
  - Inform the patient
  - Arrange immediate maxillofacial referral
  - Advise the patient against moving the mandible as much as possible
  - Ensure accurate records and inform Protection Societies

6. Facial palsy

Complications such as these arise from the local anesthetic agent tracking towards the facial nerve or the orbital contents. The patient should be reassured because the effects wear off as the effects of the local anesthetic diminish. If the temporal and zygomatic branches of the facial nerve are involved, it is important to protect the cornea and an eye patch is indicated as a temporary measure.[15]

6.1. Epilepsy

It is important that the practitioner is aware if a patient has epilepsy. The nature of the seizures, their frequency, and the degree of control, including the type of medication used, are important factors to be elicited. Epilepsy refers to a group of disorders characterized by chronic, recurrent, paroxysmal changes in neurologic function caused by abnormal electrical activity in the brain

6.1.1. Oral Manifestations

The most significant oral complication in epileptic patients is gingival overgrowth, which is mostly associated with phenytoin consumption. Traumatic injuries such as broken teeth, tongue lacerations, and lip scars also are common in patients who experience seizures [16].

6.1.2. Dental Management

- Take Patient's medical history and make sure to take a physician's consent before commencing any dental treatment.
- Seat such patients in a pose that doesn't lead to any episode of seizure.
- Possibility of bleeding tendency is there in patients taking valproic acid or carbamazepine as a result of platelet interference. Taking prior physician consent is a must in such cases as well.

6.2. Management of the seizure

- Clear the area
- Turn the patient to the side (to avoid aspiration)
- Do not attempt to use a padded tongue blade
- Passively restrain

After the seizure

- Examine for traumatic injuries

- Discontinue treatment, arrange for patient transport.[17]

Antiepileptic drugs such as Phenytoin, Phenobarbital, Carbamazepine, Lorazepam, Gabapentin can be administered.

7. Conclusion

Medical emergencies occurring in dental practice can be alarming. The keys to minimizing alarm are taking a thorough history so that possible emergencies can be, to some extent, anticipated, and having a good working knowledge of how to manage emergencies, should they arise. Serious medical emergencies in dental procedures are not common but a dental doctor must be equipped to handle such events. An effective management of an emergency condition in the dental clinic is ultimately the dentist's responsibility. All health care providers should be prepared to recognize and handle medical emergencies in the office.

Disclosure of conflict of interest

No conflict of interest to declared.

References

[1] Haas DA. Management of medical emergencies in the dental office: conditions in each country, the extent of treatment by the dentist. Anesthesia progress. 2006, 53(1):20-4.

[2] Lawson L. Medical emergency preparedness in dental practice. RDH. 2017, 37(6):47-59.

[3] Becker DE. Management of immediate allergic reactions. Dental Clinics of North America. 1995 Jul 1, 39(3):577-86.

[4] Pyle MA, Faddoul FF, Terezhalmy GT. Clinical implications of drugs taken by our patients. Dental Clinics of North America. 1993 Jan 1, 37(1):73-90.

[5] Chapman PJ. A case report of acute heart failure caused by a patient delaying taking his diuretic medication. Australian dental journal. 2002 Mar, 47(1):66-7.

[6] Bassi GS, Cousin GC, Lawrence C, Bali N, Lowry JC. Improved resuscitation training of senior house officers in oral and maxillofacial surgery. British Journal of Oral and Maxillofacial Surgery. 2002 Aug 1, 40(4):293-5.

[7] Whalen K. Lippincott® Illustrated Reviews: Pharmacology. Wolters kluwerindia Pvt Ltd; 2018 Oct 25.

[8] Hogan J, Radhakrishnan J. The assessment and importance of hypertension in the dental setting. Dental Clinics. 2012 Oct 1, 56(4):731-45.

[9] Chobanian AV. National heart, lung, and blood institute; national high blood pressure education program coordinating committee. seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension. 2003; 42:1206-52.

[10] Kaplan NM. The 6th joint national committee report (JNC-6): new guidelines for hypertension therapy from the USA. The Keio journal of medicine. 1998, 47(2):99-105.

[11] Zogaj D, Ibranji A, Hoxha M. Exercise–induced anaphylaxis: The role of cofactors. Materia socio-medica. 2014 Dec, 26(6):401.

[12] Cardona V, Ferre-Ybarz L, Guilarte M, Moreno-Pérez N, Gómez-Galán C, Alcoceba-Borras E, Delavalle MB, Garriga-Baraut T, AdreSCAIC Research Group. Safety of adrenaline use in anaphylaxis: a multicentre register. International Archives of Allergy and Immunology. 2017;173(3):171-7.

[13] Tanno LK, Calderon M, Demoly P. Supporting the validation of the new allergic and hypersensitivity conditions section of the World Health Organization International Classification of Diseases-11. Asia Pacific Allergy. 2016 Jul 1;6(3):149-56.

[14] Muraro A, Werfel T, Hoffmann-Sommergruber K, Roberts G, Beyer K, Bindslev-Jensen C, Cardona V, Dubois A, Dutoit G, Eigenmann P, Fernandez Rivas M. EAACI food allergy and anaphylaxis guidelines: diagnosis and management of food allergy. Allergy. 2014 Aug, 69(8):1008-25.

[15] Sharma A, Rawat P, Saxena A, Srishti SA. Medical Emergencies in Dental Office-A Review. J Dent Oral Sci. 2021, 3(3):1-6.

[16] Koerner KR, Taylor SE. Emergencies associated with local anesthetics. Dentistry today. 2000 Oct, 19(10):72-9.

[17] Sharma A, Rawat P, Saxena A, Srishti SA. Medical Emergencies in Dental Office-A Review. J Dent Oral Sci. 2021, 3(3):1-6.