

Medical emergencies in Dentistry: Practical tips in Implementation

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KEYWORDS

Medical emergencies; Dentistry; Dental clinic; Management

ABSTRACT

In a rapidly aging society, many patients will have multiple medical co-morbidities and on polypharmacy. Dental patients rarely have medical emergencies during their treatment and it is because of this rarity, that the odd emergency that presents can overwhelm the dentist's ability to cope despite their theoretical knowledge. The authors discuss how to adapt the clinic facilities for managing an emergency and provide an overview of management of common emergencies that dentists may encounter.

INTRODUCTION

It is not uncommon to see a dentist practising in a solo or small group dental office. Many of these offices are not within the vicinity of a hospital. In the event of an unexpected medical emergency, the dental practitioner will be the first line of care of the patient. These emergencies are not common, and it may be precisely why it can be problematic.

In a survey of Australian Dentists, it is estimated that 1 in 7 dentists will experience a patient collapse requiring resuscitation in their practice lifetime [1]. In the Great Britain, an emergency event was reported, on average, for every 4.5 practice years in England and Wales, and 3.6 years in Scotland [2]. Similarly, it was reported by New Zealand's dentists that only 2 medical emergencies occurred per 10,000 patients treated under local anaesthesia [3].

A review of present literature suggests that there is a wide range of medical emergencies which may occur in a dental clinic setting (Table 1). While broadly described as medical emergencies, some conditions require prompt pharmacologic intervention, resuscitation or activation of emergency services as compared to others.

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Vasovagal syncope is the most common medical emergency described in many cross-sectional studies. However, it is typically not life threatening and usually does not have negative sequelae. The management is mostly supportive in nature. In comparison, other emergencies such as acute myocardial infarction, anaphylaxis or foreign body ingestion require intervention as soon as possible to ensure the survival of the patient.

The low frequency of the emergency events in a dental office may result in dental schools putting less focus of it in their syllabus and also means that dental practitioners may not be well-prepared and current with management of emergencies. More than half the respondents in a New Zealand survey expressed dissatisfaction with the training they had received for medical emergencies as undergraduate students, and 14.1% continued to feel inadequately prepared for an emergency in practice [3]. While 75% of the respondents in the survey conducted in the Great Britain received relevant training as undergraduates, only 30% considered themselves 'well' or 'fairly well' prepared to manage emergencies. This is also reflected in surveys conducted in India, Nigeria, Saudi Arabia and Poland [10-13].

Theoretical knowledge derived from lectures, tutorials and exams may not adequately prepare the dental practitioner. Simulation training with hands on involvement may better facilitate memory

retention and is commonly reported to be the preferred modality of education [3, 8, 10, 13, 14].

Table 1. Incidences of specific medical emergencies reported in prevalence studies (Vasovagal syncope and unspecified emergencies are not included)

Authors		Country	CVE	CVA	Anap	Asthma	Seizure	DE	FBA/I
Sooch S [4]	N= Y=	UK	13	2	6	3	14	10	0
Alhamad M [5]	N=198 Y= 3	Saudi Arabia	12	NR	NR	16	24	65	8
Arsati F [6]	N = 498 Y = 1	Brazil	26	4	2	NR	31	28	11
Anders PL [7]	N = 1160 Y = 8	USA	15	NR	NR	NR	2	9	NR
Muller MP [8]	N = 2998 Y = 1	Germany	2	4	9	26	46	33	NR
Girdler NM [9]	N =302 Y = 1	UK	56	NR	NR	14	42	NR	NR
Atherton GJ [2]	N = 1029 Y = 40	UK	299	18	180	286	699	NR	NR
Chap man PJ [1]	N = 125 Y = 40	Australia	271	12	8	88	381	NR	NR

N = Number of respondents; Y = Time period (Years), CVE = Cardiovascular Events; CVA = Cerebrovascular Events; Anap = Anaphylaxis, DE = Diabetic Emergencies; FBA/I = Foreign Body aspiration or ingestion; UK = United Kingdom, USA= United States of America; NR = Not Reported

We have taught a hands-on course on medical emergencies management to dental students in the National University of Singapore for the past 6 years and the experience overwhelmingly favours the hands-on experience in terms of memory retention, student experience and confidence level in management. This consists of using resuscitation mannequins and standardized patients (actors) acting out realistic scenarios which the students have to role play and act out, including setting simulated intravenous lines, chest compressions, using automated defibrillators and calling emergency services.

PART A: PREPARING THE DENTAL OFFICE FOR EMERGENCIES

A.1. FACILITIES AND LICENSING REQUIREMENTS

In most countries, for a dental office to be licensed, it must be capable of instituting essential life saving measures and implementing emergency procedures on patients requiring such treatment or services (Private Healthcare Facilities and Services Act 1998 Section 38. Emergency Treatment and Services Malaysia).

The clinic should have resuscitation facilities for emergencies and adverse reactions to any form of treatment provided e.g. Adrenaline, Hydrocortisone, Phenergan or their equivalent. Clinics should also have the means to set up an intravenous infusion and to maintain a clear airway in the patient. This includes having intravenous drip sets, intravenous cannula, intravenous infusion solutions, air-viva and airways of various sizes (Figures 1-3). All drugs must be checked to ensure that they have not exceeded expiry dates. Regulations are more stringent if the clinic performs procedures under sedation. Further requirements such as an Advanced Cardiac Life Support (ACLS) trained sedationist, proper anaesthetic charts, non-invasive blood pressure monitor, oxygen supply, pulse oximeter and reversal drugs are essential.

A.2. PREPARING THE DENTAL TEAM FOR EMERGENCIES

A.2.1. PROTOCOLS AND CODE BLUE DRILLS

Protocols must be set in place with regards to workflow for common emergencies, and the roles and responsibilities of each member of the dental team identified. All members should be trained

adequately for their part. It will be best for flowcharts and protocols (Table 2) to be made easily available for everyone to access and refer to as in an emergency, the dentist may not be able to recall exactly what is needed [15, 16].



Figure 1. Air-viva



Figure 2. Emergency trolley



Figure 3. Hands-on teaching on using an Air Viva/Ambu-Bag.

In most situations, the dental practitioner will be performing the resuscitation while the dental assistant or receptionist will activate the emergency medical services (EMS). Upon recognition of an emergency, the dental practitioner should immediately discontinue treatment and shout to activate other office personnel present. The dental operatory chair should be adjusted to position the patient comfortably. Standard basic cardiac life

support protocol of assessing airway, breathing and circulation should begin promptly. This is a standard initial management for any emergency. While waiting for the medical emergency services, the vital signs of the patient should be monitored [17, 18]. The dental team should know how to perform simple measures to maintain the airway with the jaw thrust procedure, insertion of oral airway and use of an Ambu-bag or Air-Viva to reduce the need for mouth-to-mouth rescue breathing.

A.2.II. CALLING FOR HELP AND CONVEYING THE MESSAGE

The Situation Background Assessment Recommendation (SBAR) acronym should be used as an efficient and standardised method of conveying message to the EMS [19, 20].

Situation: The caller should provide a short introduction of him or herself, followed by a brief description of the situation and the patient's status. For example, *"I am Peter, a dental assistant calling from ABC Dental clinic. We have a patient who collapsed during dental treatment."*

Background: The caller will then provide information on the patient's medical history and condition. Information such as signs, symptoms, vital signs, laboratory investigations, current medications and drug allergies should also be provided. For example, *"Our patient is a 70 year old Chinese gentleman with history of myocardial infarction 6 months ago. He has no known drug allergies and is currently on Aspirin and Plavix. He became unconscious during a dental extraction and his vitals are..."*

Assessment: At this point, the caller will suggest the cause of the current status. For example, *"We suspect he may be having an acute myocardial infarction."*

Recommendation: The final part will be to suggest appropriate care for the patient. For example, *"We have administered sublingual Nitroglycerin (GTN). We will need the EMS to transport the patient to the hospital. Meanwhile, we will continue to..."*

It will be preferable for most staff to be trained in basic resuscitation techniques such as Cardio-Pulmonary Resuscitation (CPR). The clinic should also conduct regular drills to make sure all staff are current with their roles. If available, it would also be advised for the private dental clinic to be paired with a medical clinic in the vicinity.

Table 2. This table can be printed and made available next to the emergency trolley.

Condition	Diagnostic Features	Initial Management
Acute Chest Pain (Angina)	<ol style="list-style-type: none"> 1. Severe retrosternal pain 2. Breathlessness 3. Vomiting 	<ol style="list-style-type: none"> 1. Give Glyceryl Trinitrate 0.5 mg sublingually 2. Summon help if no relief after 3 minutes
Anaphylaxis	<ol style="list-style-type: none"> 1. Facial flushing, itching, peripheral paraesthesia 2. Facial edema 3. Pallor going cyanosis 4. Wheezing 	<ol style="list-style-type: none"> 1. Give IV adrenaline 1: 10,000 3-5 mL (dilute 1 ml adrenaline 1:1000 with 9 mL of water) 2. Give IM/IV hydrocortisone 200 mg 3. Give IM promethazine 50 mg/2 mL 1-2 mL
Asthmatic Attack	<ol style="list-style-type: none"> 1. Breathlessness 2. Wheezing 	<ol style="list-style-type: none"> 1. Give patient's bronchodilator e.g. ventolin inhaler 2. If no response in 3 min, give IV Aminophylline 250 mg slowly over 15 minutes (5 mg/kg) 3. Give IM/IV hydrocortisone 200 mg if no response
Cardiac Arrest	<ol style="list-style-type: none"> 1. Loss of consciousness 2. Absence of pulses 3. No breathing 4. No measurable BP 	<ol style="list-style-type: none"> 1. Start CPR 2. Set up infusion drip 3. If CPR not successful, give IV adrenaline 1:10000 10 mL
Diabetic Collapse	<ol style="list-style-type: none"> 1. Drowsiness 2. Disorientation 	<ol style="list-style-type: none"> 1. If conscious, give oral glucose 2. If unconscious, give IV glucose 50% 20 mL
Epileptic Fit (Grand Mal Seizure)	<ol style="list-style-type: none"> 1. Jerking movements 2. Rigid body 3. Incontinence (Sometimes) 	<ol style="list-style-type: none"> 1. Place patient in recovery position 2. Give IM/IV diazepam 1-2 mL

A.2.III. DETERMINE SETTING FOR RESUSCITATIVE MEASURES

The team should have already pre-determined the setting for instituting resuscitative measures.

Patient Transfer

In clinics with a large floor area, it may be feasible to move the patient from the dental chair to the floor provided there are enough manpower to move the patient safely. If this is the case, the team should practice transferring patients and have already a stout canvas cloth or blanket or a patient transfer device.

Adapting the dental chair for chest compression

Many clinics do not have space, facility or staff available to be able to transfer the patient safely to the floor. If this is the case, if chest compression is needed, the dental chair should be buttressed from underneath with another chair to prevent too much rocking during the performance of chest compression (Figure 4-5).

Pathway for emergency services

A pathway wide enough for emergency services to bring in their equipment and trolley should be determined. If the clinic's location is inaccessible, e.g. up a stairway, the emergency services should be informed beforehand.

Part B: 9 COMMON MEDICAL EMERGENCIES IN DENTISTRY

B.1. ACUTE MYOCARDIAL INFARCTION (AMI)

Brief Introduction:

The WHO estimates that 17.9 million die each year from cardiovascular diseases (CVD), which is an estimated 31% of all deaths worldwide (*World Health Organisation (WHO): 17 May 2017*). Of all the CVDs, heart attack and stroke were most likely to result in mortality.

Ischaemic Heart Disease is a spectrum of disease which results from an imbalance between myocardial metabolic demands and coronary blood supply. Myocardial infarction (MI) describes the occurrence of irreversible cell death of the heart muscle. MI typically occurs secondary to an acute coronary artery occlusion. This includes disruption of

an atheromatous plaque, embolic obstructions, shock and vascular dissections. In these vents, the cessation of myocyte aerobic glycolysis leads to simultaneous reduction in Adenosine Triphosphate (ATP) and accumulation of metabolic waste products. Loss of heart contractility gradually ensues, leading to the symptoms of AMI [21].

Recognising an Emergency

Myocardial infarction presents as a severe prolonged pain, classically in the retrosternal region. The pain may also radiate to the left upper limbs, neck, jaw or the epigastrium. The patient is also likely to present with other symptoms including: Dyspnoea diaphoresis, light-headedness, nausea, vomiting, palpitations or even loss of consciousness. Their skin is commonly cold and clammy [21].

Responding to an Emergency

Standard initial management of an emergency should be initiated. Nitroglycerin (GTN) and supplementary oxygen should be administered in a patient with a known history of angina. Vasodilation of the coronary arteries increases blood flow to the myocardial muscles. At the same time, dilation of the coronary veins reduces myocardial preload and thus, the oxygen demand. Up to 3 doses of GTN can be safely administered sublingually. In elderly or patients with poor salivary flow, GTN spray may be preferred as the tablet form required adequate saliva to dissolve [21].

If the pain does not resolve, another staff should be delegated with the task to contact the medical emergency services. The dental practitioner should monitor the patient's vital signs and can consider administering aspirin (300mg). Even if the pain resolves, the patient should be advised to follow up with their physician.

The situation is graver when the patient has no prior history of angina. In such a situation, the patient should be managed with a provisional of an acute myocardial infarction. Emergency medical services should be activated immediately. Similarly, supplemental oxygen, GTN, aspirin and vitals monitoring should commence. Should the condition escalate and a cardiac arrest is suspected, the dental practitioner should perform cardiopulmonary resuscitation immediately (Figure 5). Early defibrillation produces the best survival rate. An Automatic Electronic Defibrillator (AED) will assist the user in identify shockable heart rhythms and guides the user in the steps to a successful defibrillation [18].



Figure 4. Buttressing the dental chair to prevent rocking during chest compression



Figure 5. Performing chest compressions in the dental chair on a resuscitation mannequin as part of role playing to reinforce concepts.

B.2. STROKE (CEREBRAL INFARCT)

Brief Introduction

A stroke is described as a clinical syndrome characterised by an acute loss of focal cerebral or monocular function with symptoms lasting more than 24 hours. It is a result of inadequate cerebral blood supply caused by either ischaemic or haemorrhagic event. An ischaemic stroke is caused a thrombotic or embolic obstruction of vessels of the brain. An haemorrhagic stroke involves a rupture of a vessel i.e from an aneurysm or from chronic damage due to from hypertension. The two types of stroke are poorly distinguishable by physical examinations, and thus a Computed Tomography of the brain is often indicated.

Recognising an Emergency:

There are typically four items for assessing possible stroke in a patient [22].

1. **Facial Droop:** The patient is asked to smile to show teeth. A normal response will be symmetrical movement of the corners of the

mouth. An abnormal response is when one side moves poorly or does not move at all.

2. **Arm Drift:** The patient is asked to close both eyes and extend both arms for 10s. Equal movement of both arms indicates a normal response. Whereas, when one arm does not move or drifts down compared to the other, indicates an abnormal response.
3. **Hand Grip:** Place a hand in each hand of the patient ask the patient to squeeze your hands. Both hands should grip equally. Stroke can be suspected when one hand is weaker or does not grip at all.
4. **Speech:** The patient is asked to repeat a sentence. Normal language and articulation is expected of a normal individual. A patient with or had a stroke will have slurred speech or is unable to speak clearly.

Responding to an Emergency

Standard initial management of an emergency should be initiated. Hypoxia frequently occurs after stroke and thus supplemental oxygen is beneficial. Blood pressure is elevated in 75% of acute stroke patients and is associated with poorer outcomes. Although data is limited, adjustment to a therapeutic position such as the Semi-Fowler position has been proposed to improve the oxygen saturation. Oxygen saturation should be monitored and supplemental oxygen should be administered in hypoxemic patients to maintain oxygen saturation >94% [23-25]. Early assessment and differentiation between ischaemic and haemorrhagic stroke by medical professionals is key in improving the outcome of these patients.

B.3. ANAPHYLAXIS

Brief Introduction

Anaphylaxis is a severe, potentially life-threatening allergic reaction in susceptible personnel. It is a serious outcome from a Type 1 Hypersensitivity reaction. In dentistry, the most common causative agents are penicillin, barbiturates, opioid analgesics, ester local anaesthetic and latex. When consumed or administered, the host's mast cells or basophils recognises the causative agents as antigen, upon which, it triggers a reaction involving major systems such as the cardiovascular system, respiratory tract and gastro-intestinal tract. Poorly managed anaphylaxis can lead to shock.

Recognising an Emergency

Anaphylaxis is highly suspected when any one of the following three criteria is fulfilled [26]:

1. Sudden onset of an illness, with involvement of skin, mucosa tissue or both. This includes hives, itching, flushing, oedema of the lips,

tongue or uvula. This criteria must be fulfilled with either sudden respiratory symptoms such as shortness of breath, sudden reduced blood pressure or symptoms of end-organ dysfunction.

2. At least two of systems involved that occur after exposure to a likely allergen or other triggering factors for that patient. The systems include sudden skin or mucosal symptoms and signs, sudden respiratory symptoms and signs, sudden reduced blood pressure or symptoms of end-organ dysfunction and, sudden gastro-intestinal symptoms.
3. Reduced blood pressure after exposure to a known allergen for that patient. This means a systolic blood pressure of less than 90 mm Hg in adults. In infants and children, the criteria for low systolic blood pressure should be age specific. Regardless of age group, a greater than 30% decrease from the patient's baseline will also fulfil the criteria.

Responding to an Emergency

Standard initial management of an emergency should be initiated. All possible triggers or allergens should be removed or discontinued immediately. Most dental operatory chairs should have a programmed position which lies the patient flat while elevating the lower extremities. Another staff should activate the medical emergency while the emergency management for the patient is provided continuously.

Epinephrine/Adrenaline has effects on alpha-1 alpha-2 and beta-2 receptors. It results in increased heart rate, increased heart contractility, vasoconstriction and bronchodilation. All of which counters the symptoms of an anaphylactic shock. Epinephrine/Adrenaline can be injected intramuscularly in the mid-anterolateral aspect of the thigh. The appropriate dose is 0.01 mg/kg of a 1mg/mL solution. The maximum dose is 0.5mg in adults and 0.3mg in children. The dose and time of administration should be recorded. Additional doses can be administered in 5-15 minutes interval. Supplemental oxygen and intravenous fluid are also recommended. Cardiopulmonary resuscitation should be performed if there are any suspicions of a cardiac arrest [26].

B.4. ASTHMATIC ATTACK

Brief Introduction

Asthma is a reversible airways obstruction in small airways due to bronchospasm and mucus plugging, resulting in functional obstruction.

An asthma attack can be triggered by extrinsic or intrinsic factors. Extrinsic factors are related to Type 1 hypersensitivity reactions as a result of immunoglobulin E antibodies response to allergens. Intrinsic factors are non-immune triggers. This includes exertion inhaled irritants or cold exposure.

Recognising an Emergency

Patients with an asthmatic attack can present with coughing, wheezing, breathlessness or chest tightness [27]. The patient may be unable to speak in complete sentences and become agitated. Respiratory rates are typically increased and use of accessory muscles may become apparent. While tachycardia and tachypnoea are suggestive of moderate-to-severe exacerbation, bradycardia might signal an imminent respiratory arrest. Additionally, the practitioner should also look out for drowsiness, confusion and cyanosis.

Responding to an Emergency

Standard initial management of an emergency should be initiated. The patient should be positioned in an upright comfortable position. Selective short acting beta 2-agonists (SABA) such as albuterol should be administered. The recommended adult dose is 2.5-5 mg every 20 minutes for 3 doses, then 2.5-10 mg every 1-4 hours as needed, or 10-15 mg/hour continuously. In children, 12 years old or younger, the dose should be 0.15 mg/kg every 20 minutes for 3 doses, then 0.15-0.3 mg/kg up to 10 mg every 1-4 hours as needed, or 0.5 mg/kg/hour by continuous nebulisation. For optimal delivery, the aerosols should be diluted to minimum of 3 mL at gas flow of 6-8 L/min. Supplemental oxygen should be given if the patient presents with signs and symptoms of hypoxia or hypercapnia. For patients not amenable to a nebuliser, an intra-muscular dose of 0.3-0.5 mL epinephrine can be administered every 20 minutes for 3 doses. Ipratropium bromide of dosage 0.25-0.5 mg every 20 minutes for 3 doses, may be given in addition to SABA [27].

B. 5. SEIZURE

Brief Introduction

Seizures are characterised by discrete episodes, which tend to be recurrent and often are unprovoked, in which movement, sensation, behaviour, perception, and consciousness are

disturbed. Seizures are required for diagnosis of epilepsy but not all seizures imply presence of epilepsy. Seizures can be classified into partial or generalised seizures and motor or non-motor onset seizures.

Recognising an Emergency

Amongst the different types of seizures, a Grand Mal seizure of most concern. Prior to the seizure, some patients report to have an aura – a perceptual disturbance before the seizure begins, often manifesting as the perception of a strange light, an unpleasant smell, or confusing thoughts or experiences [28]. The seizure typically begins with a tonic phase, whereby there is sustained muscular contractions. It will then progress to a clonic phase which involves intermittent muscular contractions and relaxation. This is followed by the “post-ictal” phase where respiratory depression may occur.

Responding to an Emergency

Standard initial management of an emergency should be initiated. The patient should be adjusted to a lateral recovery position on the floor. The dental operatory chair should be lowered close to the ground if it is not possible to transfer the patient. All dangerous items including dental instruments should be kept away and the patient's arms and legs should be gently restrained.

Seizures (Status Epilepticus) lasting more than 5 minutes are more worrisome and administration of anti-convulsants should be considered. Benzodiazepines i.e. 2mg of Lorazepam are the first choice of agents. Should it be unsuccessful, fosphenytoin, phenobarbita, levetiracetam can be considered. Patients may also benefit from intravenous dextrose saline to help maintain blood sugar levels because the brain uses significant amount of glucose during the ictal phase [29].

B.6. HYPERGLYCAEMIC CRISIS

Brief Introduction

Diabetic Ketoacidosis (DKA) and Hyperglycaemic Hyperosmolar State (HHS) are dangerous hyperglycaemic emergencies which may occur in diabetic patients. DKA occurs in the presence of absolute or near absolute insulin deficiency. It can develop as quickly as within hours or up to 1-2 days. HHS occurs when there is severe relative insulin deficiency. It can take days to weeks to develop. Patients with HHS may present with plasma glucose level > 30 mmol/L, serum osmolality >320 mOsm/Kg and pH>7.30. Whereas in patient with DKA, the blood pH<7.30 and in addition, will have serum concentrations of ketones at 5 mEq/L or greater.

Recognising an Emergency

Both hyperglycaemic conditions can present with polydipsia, polyuria, hypothermia, tachycardia, and general weakness. In DKA, patients can also present with fruity acetone breath, Kussmaul breathing or even loss of consciousness. These are commonly the effects of ketosis and systemic acidosis [30].

Responding to an Emergency

Standard initial management of an emergency should be initiated. The dental office management of patients who are either ketoacidotic or hyperglycaemic is that of a supportive role. Intravenous infusion of normal saline can be instituted. If available, insulin may be administered with care. Subcutaneous doses of rapid-insulin analogues every 1-2 hours are effective alternatives to intravenous administrations. Patients can be treated with an initial bolus of 0.2-0.3 U/kg followed by 0.1-0.2 U/kg every 1-2 hours, respectively until the glucose is less than 250 mg/dl. The dose can then be reduced to 0.01 U/kg every hour or 0.01U /kg every 2 hours until the resolution of DKA. Regular blood tests must be performed to monitor the effects [31]. Early hospital medical interventions for the correction of insulin regime, electrolytes and blood glucose are beneficial for the outcome of these patients.

B.7. HYPOGLYCAEMIA

Brief Introduction

Hypoglycaemia in a healthy adults occurs after a period of fasting. Whereas in diabetic patients, it can occur due to overdose of insulin or failure to take food even though insulin was administered. Blood glucose levels are typically lesser than 2.8 mmol/L and 3.9 mmol/L in non-diabetic and diabetic patients, respectively.

Recognising an Emergency

In the dental office setting, severe hypoglycaemia may present with increased anxiety, bizarre behavioural changes, belligerence, uncooperativeness, pilo-erection, sweating and tachycardia. In late stages, it can result in unconsciousness, seizure, hypotension and hypothermia. The threshold for suspecting hypoglycaemia should be lowered in diabetic patients [32].

Responding to an Emergency

Oral carbohydrates should be given to patients who are still conscious. Patients who are responsive to the intervention should still be observed for another hour before discharging them. Parenteral administration should be considered for patients

who remains unresponsive to oral carbohydrates or are unable to ingest orally. 1mg of glucagon can be given intramuscularly or intravenous. Alternatively, 50ml of dextrose 50% can be administered intravenously over 2-3 minutes. It is also recommended to activate the EMS should such situation arise.

In the event of an unconscious hypoglycaemic patient, standard initial management of an emergency should be initiated. Parenteral drug administration in doses as previously mentioned should be initiated.

B.8. ACUTE ADRENAL INSUFFICIENCY

Brief Introduction

Adrenal insufficiency is a condition in which the adrenal glands do not produce adequate amount of steroid hormones, primarily cortisol; but may also include impaired production of aldosterone (a mineralocorticoid). In such patients, the normal vasomotor response to a stressful event is impaired. This is even so in patients with exogenous steroid replacement as their body is not able to produce additional steroid hormone when required.

Recognising an Emergency

The patient can present with pallor, confusion, weakness or even collapse. They may also present with hypoglycaemia, bradycardia and hypotension. Severe cases can lead to cardiac arrest.

Responding to an Emergency

Standard initial management of an emergency should be initiated. Lay the patient flat if possible and the legs elevated to help compensate for the hypotension. This is especially important for patients who are unconscious. Supplementary oxygen and intravenous fluid resuscitation should also be initiated. Bolus of 100mg of hydrocortisone can be administered intravenously or intramuscularly, as part of the emergency management [33].

B.9. ASPIRATION AND INGESTION OF FOREIGN BODY

Brief Introduction

Aspiration and ingestion of foreign bodies may occur in patients with reduced swallowing reflex (previous stroke patients, oropharyngeal cancers) e.g. during scaling, aspiration of food, blood. However, it can also occur in normal healthy adults. It was reported that a foreign body is more likely to settle in the gastrointestinal tract than the airway (Ratio of 12:1) after it has passed the tongue [34].

Foreign body aspiration commonly goes down the right main bronchus as it is wider, shorter and more vertical. Sudden blockage can cause atelectasis and lobar collapse. Aspiration can also cause aspiration pneumonia. Both of these scenarios are potentially fatal [35]. Although ingestion of foreign bodies are less likely to result in fatality, appropriate assessment and monitoring are necessary to catch complications early i.e. perforation of the oesophagus [36].

Recognising an Emergency

If the object disappears into the throat, do not assume it has gone down the oesophagus. If the patient chokes, it can lead to cessation of breathing and eventual cardiovascular collapse. Absence of choking does not mean it has not lodged in the tracheal tree.

Responding to an Emergency

When something disappears or flies into the throat, sit the patient upright and terminate procedure. Attempt to get the patient to cough it out. If despite attempts to cough it out, nothing appears, temporise the patient as quickly as you can and send the patient for an urgent chest and abdominal X-ray. In many places, it is appropriate to send the patient to the emergency department. If a foreign body is seen in the tracheal tree, it will need urgent bronchoscopic removal by the respiratory physicians and to be treated for prevention of pneumonia, atelectasis and lung consolidation after that.

If the foreign object is seen within the abdomen/stomach, the patient should be informed and told to monitor their faeces for passage of the object. A follow-up abdominal X-ray should be taken to document that the foreign object has passed out. Occasionally, a sharp foreign object can pierce the intestinal lining and cause perforation and further complications.

PART C: ADDITIONAL POINTS

C.1. Leading your team

It is important for the dentist as the team leader to project calmness and leadership so that the team can perform smoothly. A firm authoritative voice is much better than shouting and accentuates to the other team members that someone is in charge.

C.2. Showing empathy and following up after an emergency

Someone should follow the patient to the hospital emergency department or if not possible, for arrangements made to be able to follow up the patient later. The patient's family members should be contacted and informed with great care taken to reassure them and to show empathy. Showing empathy to the patient and family members and apologising or their experience does not mean an admission of guilt. The dentist should avoid implicating themselves. If patients feel the dentist has shown care, they are frequently less likely to complain and proceed with litigation.

C.3. Documentation

"If you didn't write it down, it didn't happen".

Treatment notes should be contemporaneous-it should be written at the same time of the incident or as close to the time as possible. The notes should be factual and avoid putting in opinions. Ideally, any treatment that is invasive should have a pre-operative informed consent form signed and witnessed.

C.4. Contact Malpractice Insurance

Ideally, the dentist should be covered by malpractice insurance e.g. Medical Protection Society. Any money spent on the insurance is money well spent for peace of mind. If in doubt, the dentist should contact the representative of the malpractice insurance they may have purchased who may link them with their panel of lawyers for a legal opinion.

CONCLUSION

Medical emergencies are rarely seen but the dentist should be well prepared. Time spent preparing by getting protocols ready is time well spent. If any emergencies occur and the dentist is not well prepared, that will reflect badly on the professional qualifications and the reputation of the dentist as well as potentially open the dentist to censure by the appropriate authorities.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible with the content of this article.

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