

## 23. Medical Emergencies

The management of medical emergencies and resuscitation is considered very important by the General Dental Council (GDC) and all NHS hospital trusts. You will almost certainly be required to undertake continuing training in these subjects during your time in the hospital for which you are likely to be given a written certificate to prove that you have received it. Make sure that you keep this as it will be necessary for proving that you have undertaken Continuing Professional Development to the GDC; it will also be necessary for your appraisals and in the future revalidation with the GDC.

A medical emergency is a sudden or unexpected event which is potentially life threatening.

You are most likely to have to deal with a medical emergency in the outpatient clinic, possibly when you are carrying out minor surgery using local anaesthetic. Although the chance of this happening is low, it is still higher than when working in dental practice because many patients will be referred to the hospital for minor oral surgery as they have co-existing medical problems. The fact that the situations to be described are either unusual or rare makes it all the more important that you should be up to date with the procedures necessary to recognise and deal with them. You should also know how adverse events might be minimized.

You should be familiar with the recommendations of the Resuscitation Council who provide a document on their web site on the practice and training for cardiopulmonary resuscitation in primary dental care. These guidelines are reviewed regularly and updated according to available evidence; they should be your bible for resuscitation throughout your career and should be memorized for postgraduate examinations as well as for practice. However these recommendations are for a dental surgery and assume no familiarity with gaining intra-venous access. In the hospital IV access will be second nature and there should be a 'medical emergency team' who can be called in all cases where a patient is in danger. They have replaced the concept of the 'cardiac arrest' team who were called when a patient arrested. The medical emergency team are there to act before the patient is in extremis and prevent cardiac arrest as well as managing it wherever possible.

All the equipment needed for dealing with these emergencies should be in the resuscitation trolley, there should be one available in each clinical area including the wards and outpatient departments. This will include drugs, airways and IV access equipment.

### **Vaso-vagal syncope**

In itself vaso-vagal syncope is unlikely to be life threatening but it has to be considered here because it is the most common cause of loss of consciousness in the surgery. It is therefore the first consideration when a patient undergoing a procedure loses consciousness. The diagnosis is easy because it is usually preceded by characteristic prodromal symptoms of light-headedness, feeling hot, sweating and restlessness, often involving rubbing of the face. Recovery is rapid once the patient is tipped back in the chair so that their legs are higher than their head; this can be accelerated by lifting their legs up. In practice we find that loss of consciousness is usually prevented by tipping the patient in response to the prodromal signs.

If the patient actually loses consciousness because the prodromal signs have been missed they may start convulsing; this quickly ceases when consciousness recovers and should not be considered as an epileptic fit.

The process occurs as a result of vagus activity causing a slowing of the heart accompanied by vasodilation producing a decrease in cerebral blood flow. In the oral surgery setting this is most likely to occur when minor oral surgery is performed on a patient who has not eaten for some time and is very apprehensive about the surgery. The reaction is likely



*Your first action should be to tip the chair or operating table down so that the patient's legs are raised.*

to be triggered by pain, prolonged operating time and the negative emotion of loss of confidence in the surgeon's ability to achieve adequate analgesia. An apprehensive patient may react to the tactile pressure of exodontia as if in pain, even if optimal anaesthesia has been obtained; this may be exacerbated by repeatedly poking the area and asking if they can feel it. An inexperienced or bad nurse assistant can almost talk a patient into passing out by repeatedly asking after their welfare during the operation.

Recovery can be helped by providing oxygen through a face mask. Once consciousness is regained treatment can then be finished with the patient in a slightly reclined or horizontal position.

Other relatively benign causes of loss of consciousness are postural hypotension and hyperventilation. Postural hypotension usually occurs as a result of standing up rapidly, usually pre-disposed to by anti-hypertensive medication. Hyperventilation resulting from anxiety can cause light headedness but rarely loss of consciousness.

### **Anaphylaxis**

Anaphylaxis is a severe allergic reaction resulting in IgE mediated de-granulation of mast cells with the release of histamine. The histamine causes vasodilatation of arterioles and bronchospasm leading to decrease in blood pressure and respiratory distress. The decrease in blood pressure may proceed to collapse and cardiac arrest. The bronchospasm may proceed to respiratory arrest and be followed by cardiac arrest.

Anaphylaxis may result from allergy to a medication or its additives. It may result from systemic or topical administration or even to latex gloves.

The patient may (or may not) have a flushed



*Oxygen should be available on the wall of all the surgeries you use.*



### **Adrenaline. 1:1000 for anaphylaxis**

appearance, urticaria, angioedema, vomiting, wheezing, stridor, hoarse voice and loss of consciousness. The reaction may vary from mild producing little more than a flushed appearance, to cardiopulmonary arrest and death.

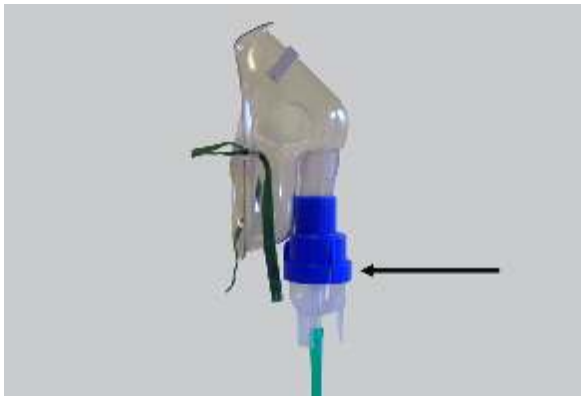
In severe cases the patient should be reclined, given oxygen at 15 L/min. and 0.5 mls. of 1:1000 adrenaline intramuscularly into the antero-lateral thigh. The medical emergency team should be called. The adrenaline may be repeated after five minutes if blood pressure or adequate respiration are not maintained. An intravenous line should be put in quickly, and Hartmann's solution or 0.9% saline given to restore blood pressure. Antihistamines and steroids may be given initially in milder cases or after resuscitation in more severe cases. Immediate resuscitation according to the ABCDE approach (see next chapter) will be needed if there is loss of consciousness or breathing stops.

### **Asthma and COPD**

You will have to see a large number of patients who suffer from asthma or Chronic Obstructive Pulmonary Disease (COPD). Most patients will be very knowledgeable about the pattern and severity of their disease. In the unlikely circumstance that a patient suffers an acute exacerbation of their asthma



*Salbutamol inhaler attached to a spacer which improves the efficiency of drug delivery to the airways.*



***Salbutamol, placed in a nebuliser (arrow) attached to a standard face mask and air supply, is the most efficient way to dilate the airways in severe asthma.***

in the clinic or during minor surgery they will usually respond to salbutamol delivered through their own inhaler. If they are very short of breath they may not be able to inhale an adequate dose from an inhaler alone, in which case it may be necessary to use a spacer to deliver the salbutamol.

If the asthma is severe as indicated by the patient's inability to speak a sentence in one breath or they have a respiratory rate increased to 25 per minute or more, or a tachycardia of more than 110 per minute, they will need salbutamol and oxygen through a nebuliser. By this stage you should have called the medical emergency team.

You will occasionally see patients with COPD which is so severe that they use regular home nebulisers or oxygen. In these circumstances their minor surgery or dental extractions are best done under local anaesthetic in the operating theatre, under the supervision of an anaesthetist with oxygen administered with nasal cannulae, heart monitoring, an IV line and possibly some light sedation.

### **Epilepsy**

You would normally be aware of a patient with epilepsy from taking their previous medical history. Most are very well controlled but you should still be aware of what to do if a patient should have a grand-mal seizure. This should be fairly easy to recognise. Before becoming unconscious the patient may have a brief 'aura' which is followed by rigidity and possibly cyanosis, after which there will be jerking movements of the limbs and possible urinary incontinence. The attack may last for a few minutes

and be followed by floppiness. Eventually they become conscious again but possibly confused.

The patient should be given oxygen at 15 L/min. while fitting, and attempts should be made to avoid them injuring themselves. However they should not be physically restrained and nothing should be put into their mouth, not even an oral airway. If fitting continues for longer than five minutes buccal midazolam should be administered and IV access established. If the patient needs such medication to control the fit they will need hospital admission and a review by the medical team. If the fitting continues the medical emergency team should be called, they would normally give IV lorazepam as the next line in management. Occasionally a fit may be triggered by hypoglycaemia so the blood sugar should be checked and if below 3 mmols./ L glucose or glucagon should be given as described below.

Should a patient remain unresponsive after the fit and has no sign of breathing or pulse, Cardio Pulmonary Resuscitation should be started according to the ABCDE principle (described in next chapter).

### **Hypoglycaemia**

Diabetic patients will normally be able to recognise the symptoms of hypoglycaemia. They will feel a general uneasiness and malaise with fatigue and nervousness. This can normally be reversed quickly by taking a drink containing glucose; milk with three teaspoons of sugar added will be very suitable or a sweet (not low calorie) drink or snack. If the symptoms are not recognised it may progress to trembling, headache, tachycardia, aggression, confusion, convulsions and coma. A blood glucose estimation will confirm a level of below 3 mmols. per litre. However, as soon as these signs are seen in a diabetic patient, they should be given a glucose drink if they can swallow.



***Glucagon pre-loaded in syringe for emergency injection***



### ***Glucose injection***

If the patient should become unconscious they should be given either glucagon, 1 mg. intramuscularly, or 50 mls. of intravenous glucose through a large bore needle. Glucagon is preferable as the glucose solution is highly irritant if any of it is inadvertently injected outside of the vein. This will be needed very rarely as most cases will respond to a glucose drink and the emergency team will not be needed.

### ***Acute Coronary Syndromes***

Many patients will be referred into hospital for routine dental extraction simply because they have a history of ischaemic heart disease. A patient with angina will probably carry their own glyceryl trinitrate (GTN) sublingual spray and should they feel any chest pain may well be able to use it to get relief. If this is not unusual for them they can continue with their treatment. In any case where the pain is prolonged the patient should be given oxygen through a face mask and transferred to the Accident and Emergency department or Medical Admissions Unit for an ECG and assessment by a physician.

Patients who have stable angina or a history of a previous myocardial infarct may be treated under local anaesthetic quite satisfactorily in the outpatient facility. However, where there is unstable angina, a history of a very recent infarction or severe heart failure, treatment should be carried out in the operating theatre using local anaesthetic with an anaesthetist supervising their cardiac status with an ECG and giving oxygen with a nasal cannula. Remember that a diabetic or someone elderly may experience only limited pain with a myocardial infarction, or even none at all; your threshold for referral for a medical opinion must be low. In every case of chest pain you should keep an eye on their pulse and respiratory rate. A pulse rate over 100 should be regarded with suspicion, and

a respiratory rate of over 15 per minute should start your alarm bells.

Myocardial Infarction is a diagnosis made by ECG and cardiac enzyme (Troponin T) estimation. Clinically however the pain will be like angina but more severe, more crushing in nature and more prolonged. The pain will occur in the centre of the chest and radiate across to the shoulders and down the arms. The patient may become short of breath, cold and clammy, nauseous and have a weak pulse and blood pressure may fall.

The medical emergency team should be called immediately and GTN should be given followed by 300 mgs. aspirin crushed or chewed. Oxygen should be given at 15L/min and if consciousness is lost resuscitation as the ABCDE approach should be started.



### ***Glyceryl Trinitrate***