Core Subject: Cardiac Medical Emergencies: Angina, stroke and cardiac arrest, including Cardiopulmonary Resuscitation and the use of an Automated External Defibrillator

Aims: To give an overview on the symptoms and treatment of angina, stroke and cardiac arrest.

Objectives: On completion of this verifiable CPD article the participant will be able to demonstrate, through the completion of a questionnaire, the ability to:

- Be able to identify the Resuscitation Primary Dental Care Quality Standards relating to cardiopulmonary resuscitation practice and training.
- Be able to identify the causes and symptoms of angina, stroke and cardiac arrest.
- Be able to identify the drugs required from the emergency drugs kit for angina, stroke and cardiac arrest.
- Know how to administer Cardiopulmonary Resuscitation (CPR) and use an Automated External Defibrillator (AED).

Introduction

Although cardiac arrest is rare in primary dental practice, there is a public expectation that dental staff should be competent in dealing with such an eventuality. The General Dental Council state that “A patient could collapse on any premises at any time, whether they have received treatment or not. It is therefore essential that all registrants are trained in dealing with medical emergencies, including resuscitation, and possess up to date evidence of capability.”

This article will explain the expected primary dental care quality standards for cardiac medical emergencies and also describe causes, symptoms and treatment of angina, stroke and cardiac arrest. Diabetes, anaphylaxis, epilepsy, fainting and asthma will be dealt with in the next medical emergencies article.

Primary Dental Care Standards

The Resuscitation Council have set the following standards that should be followed by dental practices:

- All primary care dental facilities should have a process for medical risk-assessment of their patients.
Specific resuscitation equipment should be available immediately in all primary care dental premises. This equipment list should be standardised throughout the UK. (The minimum equipment list for cardiopulmonary resuscitation in primary dental care can be accessed from the non verifiable CPD section of the website.)

- All clinical areas should have immediate access to an Automated External Defibrillator (AED).
- Primary dental care providers, general dental practitioners and all other dental healthcare professionals should undergo training in cardiopulmonary resuscitation (CPR) including basic airway management and the use of an AED.
- Each primary dental care facility should have a plan for summoning assistance in the event of a cardio respiratory arrest. For most practices this will mean calling 999 immediately.
- There should be regular practice and teaching using simulation-based cardio respiratory arrest scenarios.
- Dental staff's knowledge and skills in resuscitation should be updated at least annually.

**Coronary Heart Disease**

Coronary Heart Disease refers to the hearts inability to provide sufficient circulation to surrounding tissues and the cardiac muscle.

Coronary Heart Disease is responsible for over 73,000 deaths in the UK each year. Approximately 1 in 6 men and 1 in 10 women die from Coronary Heart Disease.³

![Atherosclerosis Diagram]

Coronary Heart Disease can include numerous problems. Although it can be attributed to other causes, many are related to atherosclerosis. Atherosclerosis can occur over a period of time when the arteries naturally begin to harden and get...
narrower. This process can be accelerated by plaque buildup (cholesterol, fatty substances) in the inner linings of artery (fig 1.).

In time, the arteries may become so narrow that they cannot deliver enough oxygen-rich blood to the heart. This can cause angina.

If a piece of the atheroma in the arteries breaks away it may cause a blood clot to form. If the blood clot blocks the coronary artery and cuts off the supply of oxygen-rich blood to the heart muscle, the heart muscle may become permanently damaged. This is known as a heart attack (myocardial infarction).

Carotid artery disease occurs if plaque builds up in the arteries on each side of the neck (carotid arteries). These arteries supply oxygen rich blood to the brain. If blood flow to the brain is reduced or blocked, it can cut off the blood supply to part of the brain. This is called a stroke.

**Angina**

**Overview**

If there is a history of angina the patient will probably carry Glyceryl Trinitrate spray (GTN spray) or tablets (or isosorbide dinitrate tablets) and should be allowed to use them. Hospital admission is not necessary if symptoms are mild and resolve rapidly with the patient’s own medication.

**Symptoms**

There are two types of angina- stable angina and unstable angina. Stable angina attacks usually occur during physical activity or emotional stress and the symptoms usually improve after a few minutes of rest. However, unstable angina is more unpredictable and can develop without any obvious triggers. Attacks of unstable angina may last longer than a few minutes and can even persist when resting. The signs and symptoms of Angina Pectoris may be similar to a heart attack.

- Pain in the chest or arms, back, throat and lower jaw
- Breathlessness
- Nausea
- Dizziness
- Restlessness
- Looking pale/grey/blue

**Treatment**

- Rest – ask the patient to sit down.
- GTN spray - administered under the tongue and the patient should then close his/her mouth to retain the spray. The initial dosage is 1 or 2 metered sprays (400 micrograms per dose spray) then the patient should be re-assessed after
5 minutes. This dosage can be repeated every 5 – 10 minutes as clinically indicated.

- Phone 999 or 112 if the patient’s condition deteriorates or does not improve (this may now be a heart attack).  

**Heart Attack (Myocardial Infarction)**

**Overview**

A heart attack occurs when one or more of the coronary arteries become blocked. A lack of blood to the heart may seriously damage the heart muscle and can be life-threatening.  

**Symptoms**

No two heart attacks are the same, and not everybody will present with all the signs and symptoms below:

- Pain in the chest. The chest can feel like it is being pressed or squeezed by a heavy object and pain can radiate from the chest to the jaw, neck, arms and back.
- Breathlessness.
- Feeling dizzy or sick.
- Feeling weak and/or light headed
- Looking pale / grey / blue.
- Overwhelming feeling of anxiety

**Treatment**

- Phone 999 or 112.
- Aspirin - 300 mg dispersible tablet to be chewed, or given crushed (not swallowed with water) unless contraindicated. (The aspirin helps to thin the blood and reduce the risk of a heart attack)
- Oxygen - 15 litres per minute with a non-rebreather mask and reservoir, but only if the person is cyanosed or has a reduced level of consciousness.
- GTN spray.  

**Stroke**

**Overview**

A stroke is a serious, life threatening medical condition that occurs when the blood supply to part of the brain is cut off. Strokes are a medical emergency and urgent treatment is essential because the sooner a person receives treatment for a stroke, the less damage is likely to happen.
Symptoms

The main symptoms of stroke can be remembered with the acronym **F.A.S.T.**

**Face** - The face may have dropped on one side, the person may not be able to smile or their mouth or eye may have dropped.

**Arms** - the person may not be able to lift both arms and keep them there.

**Speech** - Their speech may be slurred or garbled, or the person may not be able to talk at all.

**Time** - It is time to dial 999 immediately if you see any of these signs or symptoms.¹⁰

Treatment

- Call 999 for emergency help
- Lay the casualty down with their head and shoulders slightly raised
- Re-assure them but do not bombard them with questions that they may have difficulty in answering if they have a problem with their speech
- Monitor constantly
- If casualty is unconscious but breathing normally, place in recovery position¹²
Cardiac Arrest

The term cardiac arrest means that the heart has stopped pumping blood around the body. The heart may have stopped beating altogether (asystole) or be twitching in an irregular and ineffective way (ventricular fibrillation). In either case, there is no circulation of blood. Within seconds, the casualty will lose consciousness and, if the heart is not restarted, will die within a few minutes. This means that the dental team will need to act quickly and efficiently.12

CPR and the use of an AED

The resuscitation council state that “dental practitioners and other dental care professionals must be trained in cardiopulmonary resuscitation (CPR) so that in the event of cardio respiratory arrest occurring they can:

- Recognise cardio respiratory arrest;
- Summon help immediately (dial 999);
- Start CPR, using chest compressions and providing ventilation with a pocket mask or bag-mask device and supplemental oxygen. (Evidence suggests that chest compressions can be performed effectively in a fully reclined dental chair); and,
- Attempt defibrillation (if appropriate) within 3 minutes of collapse, using an AED.

In addition:

- Dental practitioners and other dental care professionals who work with children should learn the differences in CPR (from CPR in adults) for use in children and practise these on pediatric manikins.
- Dental practitioners and other dental healthcare staff should update their knowledge and skills in resuscitation at least annually.
- A system must be in place for identifying which equipment requires special training, (such as AEDs, bag-mask devices and oropharyngeal airway insertion) and for ensuring that such training takes place.
- All new members of dental staff should have resuscitation training as part of their induction programme.
- Training can be undertaken locally within the dental practice or within local or regional training centres. Qualified trainers in resuscitation from within the dental practice staff should be encouraged to deliver ‘cascade’ training to other staff members (e.g. in Basic Life Support). Training in more advanced techniques may require a more advanced trainer (e.g. Resuscitation Officer) or attendance at a designated course.
- For all staff, various methods to acquire, maintain and assess resuscitation skills and knowledge can be used for updates (e.g. life support courses, simulation training, mock-drills, ‘rolling refreshers’, e-learning, video-based training/self instruction). ‘Hands-on’ simulation training and assessment is recommended for clinical staff.
- All primary dental care providers should recognise the need for and make provision for dental staff to have sufficient time to train in resuscitation skills as part of their employment.
• All training should be recorded in a database.
• Training and retraining should be a mandatory requirement for Continuing Professional Development and maintenance on professional healthcare registers. It may be appropriate for some retraining to be undertaken using ‘e-learning’.  

The following Basic Life Support (BLS) and Automatic External Defibrillator sequence of steps for an unresponsive patient is taken from the Resuscitation Council Guidelines. More detailed information can be accessed from this document which is available from the non-verifiable CPD section of the website.

<table>
<thead>
<tr>
<th>SEQUENCE</th>
<th>Technical description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY</td>
<td>Make sure you, the victim and any bystanders are safe</td>
</tr>
<tr>
<td>RESPONSE</td>
<td>Check the victim for a response</td>
</tr>
<tr>
<td></td>
<td>• Gently shake his/her shoulders and ask loudly: “Are you all right?”</td>
</tr>
<tr>
<td></td>
<td>If he responds leave him/her in the position in which you find him, provided there is no further danger; try to find out what is wrong with him/her and get help if needed; reassess regularly</td>
</tr>
<tr>
<td>AIRWAY</td>
<td>Open the airway</td>
</tr>
<tr>
<td></td>
<td>• Turn the victim onto his back</td>
</tr>
<tr>
<td></td>
<td>• Place your hand on the forehead and gently tilt the head back; with your fingertips under the point of the victim’s chin, lift the chin to open the airway</td>
</tr>
<tr>
<td>BREATHING</td>
<td>Look, listen and feel for normal breathing for no more than 10 seconds</td>
</tr>
<tr>
<td></td>
<td>In the first few minutes after cardiac arrest, a victim may be barely breathing, or taking infrequent, slow and noisy gasps. Do not confuse this with normal breathing. If you have any doubt whether breathing is normal, act as if it is they are not breathing normally and prepare to start CPR</td>
</tr>
<tr>
<td>DIAL 999</td>
<td>Call an ambulance (999)</td>
</tr>
<tr>
<td></td>
<td>• Ask a helper to call if possible otherwise call them yourself</td>
</tr>
<tr>
<td></td>
<td>• Stay with the victim when making the call if possible</td>
</tr>
<tr>
<td></td>
<td>• Activate the speaker function on the phone to aid communication with the ambulance service</td>
</tr>
<tr>
<td>SEND FOR AED</td>
<td>Send someone to get an AED if available</td>
</tr>
<tr>
<td></td>
<td>If you are on your own, do not leave the victim, start CPR</td>
</tr>
<tr>
<td>CIRCULATION</td>
<td>Start chest compressions</td>
</tr>
</tbody>
</table>
- Kneel by the side of the victim
- Place the heel of one hand in the centre of the victim’s chest; (which is the lower half of the victim’s breastbone (sternum)
- Place the heel of your other hand on top of the first hand
- Interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs
- Keep your arms straight
- Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone)
- Position your shoulders vertically above the victim's chest and press down on the sternum to a depth of 5–6 cm
- After each compression, release all the pressure on the chest without losing contact between your hands and the sternum;
- Repeat at a rate of 100–120 per min

**GIVE RESCUE BREATHS**

After 30 compressions open the airway again using head tilt and chin lift and give 2 rescue breaths

- Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead
- Allow the mouth to open, but maintain chin lift
- Take a normal breath and place your lips around the mouth, making sure that you have a good seal
- Blow steadily into the mouth while watching for the chest to rise, taking about 1 second as in normal breathing; this is an effective rescue breath
- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air comes out
- Take another normal breath and blow into the victim’s mouth once more to achieve a total of two effective rescue breaths. Do not interrupt compressions by more than 10 seconds to deliver two breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions

Continue with chest compressions and rescue breaths in a ratio of 30:2

If you are untrained or unable to do rescue breaths, give chest compression only CPR (i.e. continuous compressions at a rate of at least 100–120 per min)

**IF AN AED ARRIVES**

Switch on the AED

- Attach the electrode pads on the victim’s bare chest
- If more than one rescuer is present, CPR should be continued while electrode pads are being attached to the chest
- Follow the spoken/visual directions
- Ensure that nobody is touching the victim while the AED is analysing the rhythm

**If a shock is indicated, deliver shock**
- Ensure that nobody is touching the victim
- Push shock button as directed (fully automatic AEDs will deliver the shock automatically)
- Immediately restart CPR at a ratio of 30:2
- Continue as directed by the voice/visual prompts

**If no shock is indicated, continue CPR**
- Immediately resume CPR
- Continue as directed by the voice/visual prompts

---

<table>
<thead>
<tr>
<th>CONTINUE CPR</th>
<th>Do not interrupt resuscitation until:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- A health professional tells you to stop</td>
</tr>
<tr>
<td></td>
<td>- You become exhausted</td>
</tr>
<tr>
<td></td>
<td>- The victim is definitely waking up, moving, opening eyes and breathing normally</td>
</tr>
</tbody>
</table>

It is rare for CPR alone to restart the heart. Unless you are certain the person has recovered continue CPR

---

<table>
<thead>
<tr>
<th>RECOVERY POSITION</th>
<th>If you are certain the victim is breathing normally but is still unresponsive, place in the recovery position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Remove the victim’s glasses, if worn</td>
</tr>
<tr>
<td></td>
<td>- Kneel beside the victim and make sure that both his legs are straight</td>
</tr>
<tr>
<td></td>
<td>- Place the arm nearest to you out at right angles to his body, elbow bent with the hand palm-up</td>
</tr>
<tr>
<td></td>
<td>- Bring the far arm across the chest, and hold the back of the hand against the victim’s cheek nearest to you</td>
</tr>
<tr>
<td></td>
<td>- With your other hand, grasp the far leg just above the knee and pull it up, keeping the foot on the ground</td>
</tr>
<tr>
<td></td>
<td>- Keeping his hand pressed against his cheek, pull on the far leg to roll the victim towards you on to his side</td>
</tr>
<tr>
<td></td>
<td>- Adjust the upper leg so that both the hip and knee are bent at right angles</td>
</tr>
<tr>
<td></td>
<td>- Tilt the head back to make sure that the airway remains open</td>
</tr>
<tr>
<td></td>
<td>- If necessary, adjust the hand under the cheek to keep the head tilted and facing downwards to allow liquid material to drain from</td>
</tr>
</tbody>
</table>
Check breathing regularly

Be prepared to restart CPR immediately if the victim deteriorates or stops breathing normally

The Chain of Survival

The Chain of Survival shows four critical steps which, when delivered effectively and in sequence, optimise survival from out-of-hospital cardiac arrest.14

Chain of Survival

Conclusion

Although cardiac arrest is rare in primary dental practice, it is essential that all registrants are trained in dealing with medical emergencies, including resuscitation, and possess up to date evidence of capability.

Non-Verifiable CPD Tips

We recommend that you carry out non verifiable CPD related to this subject. New non-verifiable reading material has been added to the website. Please remember to update your non-verifiable record once you have completed it.

© Nicky Gough and Sue Bagnall 2017


8. Jon Anderson (2013) Common Medical Emergencies. CPD4DentalNurses.co.uk


