Medical Emergencies: Recognition and Treatment of Anaphylaxis

Core Subject

Aims: To provide the dental nurse with information on the cause, signs, symptoms and treatment of anaphylaxis.

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

- Identify potential causes of anaphylaxis
- Identify signs and symptoms of anaphylaxis
- Identify medical conditions that may present in a similar way to anaphylaxis
- Know the intramuscular adrenaline doses for the treatment of anaphylaxis

Introduction

Anaphylaxis is defined as “a severe, life-threatening, generalised or systemic hypersensitivity reaction. It is characterised by rapidly developing life-threatening problems involving: the airway (pharyngeal or laryngeal oedema) and/or breathing (bronchospasm with tachypnoea) and/or circulation (hypotension and/or tachycardia). In most cases there are associated skin and mucosal changes.”¹

Recent National Institute of Clinical Excellence guidance reports that “there is no overall figure for the frequency of anaphylaxis from all causes in the UK. Because anaphylaxis presents mainly in accident and emergency departments and outpatient settings, few estimates of prevalence are available from NHS sources. Anaphylaxis may not be recorded, or may be misdiagnosed as something else, for example, asthma. It may also be recorded by cause, such as food allergy, rather than as an anaphylactic reaction.” However, it is estimated that approximately 1 in 1333 of the UK population has experienced anaphylaxis during their life.¹ The UK incidence of anaphylaxis is reported to be increasing.²

Causes of Anaphylaxis

Anaphylaxis is caused by the sudden release of chemical substances, including histamine, from cells in the blood and tissues where they are stored. This release is triggered by the reaction between the allergic antibody (IgE) and the substance (allergen) causing the anaphylactic reaction. Histamine is a chemical that plays a major role in many allergic reactions, dilating blood vessels and making the vessel walls abnormally permeable.
Common causes of anaphylaxis include foods such as peanuts, tree nuts (e.g. almonds, walnuts, cashews, and Brazil nuts), sesame, fish, shellfish, dairy products and eggs.

Non-food causes include wasp or bee stings, natural latex (rubber), penicillin or any other drug or injection.

In some people, exercise can trigger a severe reaction - either on its own or in combination with other factors such as food or drugs (e.g. aspirin).³

It is important to ensure that a patient's medical history is kept up to date so that the dental team are aware of any allergies a patient may have.

When anaphylaxis is fatal, death usually occurs very soon after contact with the trigger. The chart below shows how quickly a fatal collapse can happen (figure 1). In a series of test cases, death never occurred more than six hours after contact with the trigger. Intravenous medication caused the quickest reaction, followed by insect stings and then food reactions.²

![Figure 1. Time to cardiac arrest following exposure to triggering agent](image-url)


**Signs and Symptoms of anaphylaxis**

- **Airway**
  - Swelling of the face, throat or tongue
  - A feeling that the throat is closing up
  - Hoarse voice
  - Stridor
  - Difficulty swallowing (dysphagia)

- **Breathing**
  - Shortness of breath (dyspnoea)
  - Increased respiratory rate
  - Wheezing
  - Respiratory arrest

- **Circulation**
  - Signs of shock
  - Increased heart rate (tachycardia)
  - Feeling faint
  - Collapse
  - Myocardial ischaemia / angina (bradycardia is usually a late sign, often preceding cardiac arrest)
  - Low blood pressure (the person may be fine when supine, but may go into cardiac arrest if sat up or stood up - blood pools in the legs)
  - Cardiac arrest

- **Disability (neurological problems – decreased brain perfusion)**
  - A sense of impending doom
  - Tiredness, Weakness
  - Reduced level of consciousness
  - Confusion

- **Exposure (skin and/or mucosal changes)**
  - Skin changes are often the first feature, and are present in over 80% of anaphylactic reactions
  - Skin changes can be subtle or dramatic
  - There may be erythema (a patchy or generalised red rash)
  - Urticaria (also known as hives, nettle rash, weals or welts)
  - Angioedema (similar to urticaria but involves swelling of the deeper tissues such as the eyelids, lips, mouth or throat)
  - Cyanosis – a late sign
The Resuscitation Council Guidelines state the following:

“Anaphylaxis is likely when all of the following 3 criteria are met:

- Sudden onset and rapid progression of symptoms
- Life-threatening Airway and/or Breathing and/or Circulation problems
- Skin and/or mucosal changes (flushing, urticaria, angioedema)” (remember though that skin and/or mucosal changes may be absent in up to 20% of cases).²

Treatment

- Intramuscular adrenaline (table1 provides information on intramuscular adrenaline dosage)
- Oxygen (highest flow rate with a non-rebreather mask and reservoir)
- 999/112 and say "anaphylaxis" (The patient must go to hospital, even if apparently recovered)

<table>
<thead>
<tr>
<th>INTRAMUSCULAR ADRENALINE (IM doses of 1 :1000 Adrenaline)</th>
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<tbody>
<tr>
<td>Adult</td>
</tr>
<tr>
<td>Child over 12 years</td>
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<tr>
<td>Child 6-12 years</td>
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<td>Child under 6 year</td>
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The dose should be repeated if there is no improvement in the patient’s condition. Further doses can be given at about 5 minute intervals according to the patient’s response.²

Table 1: Intramuscular adrenaline dosage
Patient Positioning

All patients should be placed in a comfortable position. The Resuscitation Council guidance suggests that the following factors should be considered:

- “Patients with Airway and Breathing problems may prefer to sit up as this will make breathing easier.
- Lying flat with or without leg elevation is helpful for patients with a low blood pressure (Circulation problem). If the patient feels faint, **do not sit or stand them up - this can cause cardiac arrest**.
- Patients who are breathing and unconscious should be placed on their side (recovery position).
- Pregnant patients should lie on their left side to prevent caval compression.”

Auto-injectors

Auto-injectors are for self-use by patients and carers and patients or carers should have been trained in the use of the device (their use is not intuitive). Anyone who has an auto injector should also have a training device for practise. It has been reported that only 30% of patients know how and when to use their injector, have one that is in date, and carry it all the time.

Some auto-injectors have an expiry alert service by email or text messaging.

Differential Diagnosis

Other medical conditions may give a similar presentation to anaphylaxis:

- Severe asthma – can present with similar signs and symptoms to anaphylaxis, particularly in children. Asthma and anaphylaxis compound each other. *If in doubt - treat as anaphylaxis*.
- Septic shock – hypotension with a petechial or purperic rash (tiny red or purple spots caused by an extravasation of blood into the skin).
• Petechial rash (sometimes referred to as a purperic rash)

• Fainting – a vaso-vagal episode

• Panic attack – victims of previous anaphylaxis may be particularly prone to panic attacks if they think they have been re-exposed to the allergen.

  **If in doubt - treat as anaphylaxis**

• Breath holding in children

• Idiopathic (i.e. without a known cause) (non-allergic) urticaria or angioedema

**Follow-up**

It is important that the dental team make detailed notes following treatment for suspected anaphylaxis. It is recommended that the circumstances immediately before the onset of the reaction are recorded in order to help identify the potential trigger.

The Nice guidelines recommend that after hospital treatment for suspected anaphylaxis, patients (or, as appropriate, their parent and/or carer) should be offered an appropriate adrenaline injector as an interim measure before the specialist allergy service appointment.

Further information on anaphylaxis is available from the non verifiable section of the website:

• Resuscitation Council (UK)
• The Anaphylaxis Campaign
• National Institute for Health and Clinical Excellence

Don't forget to update your non verifiable CPD log.


## Biography

**Jon Andersen of ST4 Training**

Jon was an ambulance service paramedic for seventeen years and his profession incorporated the roles of aircrew paramedic, paramedic team leader, and operational station officer.

The major part of Jon’s work is teaching and facilitating courses in First Aid, Basic Life Support (BLS), Defibrillation and Medical Emergencies to, for example, General Practitioners, Orthodontists, Dentists, other healthcare professionals, volunteers, and the general public.

Jon is a Health and Safety Executive (HSE) approved First Aid at Work Instructor and Assessor, and holds a City and Guilds 7303 teaching qualification. Jon is also a CPD Registered Presenter with The CPD Certification Service.

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