

MANAGEMENT OF ANAPHYLACTIC SHOCK IN THE DENTAL OFFICE

If a systemic complication occurs in dental practice, a dentist is obligated to make a prompt diagnosis and provide emergency treatment as soon as possible. Therefore, a dentist must be fully aware of medical complications that may occur in dental practice. Emergencies during dental treatment can be classified by etiology into two major groups: complications associated with an underlying disorder and those independent of pre-existing disease. This article reviews the causes, pathophysiology, symptoms, signs, and emergency treatment of complications unrelated to underlying disease such as life-threatening allergic reaction - *anaphylactic shock*.

Such emergencies are, fortunately, a rare occurrence, but it is important to recognize that a medical emergency could happen at any time and that all members of the dental team need to know their role in the event of a medical emergency.

Accordance to the **WAO** (*World Allergy Organization*) and **EAACI** (*European Academy of Allergology and Clinical Immunology*) *allergy is a hypersensitivity reaction mediated by immunological mechanisms*.

Anaphylactic shock

A precise definition of anaphylaxis is not important for the emergency treatment of an anaphylactic reaction. There is no universally agreed definition. The European Academy of Allergology and Clinical Immunology Nomenclature Committee proposed the following broad definition: *Anaphylaxis is a severe, life-threatening, generalized or systemic hypersensitivity reaction*. It is characterized by rapidly developing life-threatening airway and/or breathing and/or circulation problems usually associated with skin and mucosal changes.

Anaphylactic reactions in general dental practice may follow the administration of a drug or contact with substances such as latex in surgical gloves. In general, the more rapid the onset of the reaction, the more serious it will be. Symptoms can develop within minutes and early, effective treatment may be life saving.

Anaphylactic reactions may also be associated with additives and excipients in medicines. It is wise, therefore, to check the full formulation of preparations which may contain allergenic fats or oils (including those for topical application, particularly if they are intended for use in the mouth).

Symptoms and signs

The lack of any consistent clinical manifestation and a wide range of possible presentations can cause diagnostic difficulty. Clinical assessment helps make the diagnosis.

Signs and symptoms may include:

- ✓ Urticaria, erythema, rhinitis, conjunctivitis;
- ✓ Abdominal pain, vomiting, diarrhoea and a sense of impending doom;
- ✓ Flushing is common, but pallor may also occur;
- ✓ Marked upper airway (laryngeal) oedema and bronchospasm may develop, causing stridor, wheezing and/or a hoarse voice;
- ✓ Vasodilation causes relative hypovolemia leading to low blood pressure and collapse. This can cause cardiac arrest;
- ✓ Respiratory arrest leading to cardiac arrest.

It is important to know that a single set of criteria will not identify all anaphylactic reactions. There is a range of signs and symptoms, none of which are entirely specific for an anaphylactic reaction. However, certain combinations of signs make the diagnosis of an anaphylactic reaction more likely.

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

- ✓ **Sudden onset and rapid progression of symptoms**
 - The patient will feel and look unwell.
 - Most reactions occur over several minutes. Rarely, reactions may be slower in onset.
 - The time of onset of an anaphylactic reaction depends on the type of trigger.
 - An intravenous trigger will cause a more rapid onset of reaction than stings which, in turn, tend to cause a more rapid onset than orally ingested triggers.
 - The patient is usually anxious and can experience a “sense of impending doom.”
- ✓ **Life-threatening Airway and/or Breathing and/or Circulation problems**
 - Airway problems:**
 - Airway swelling, e.g., throat and tongue swelling (pharyngeal/laryngeal oedema). The patient has difficulty in breathing and swallowing and feels that the throat is closing up.
 - Hoarse voice.
 - Stridor – this is a high-pitched inspiratory noise caused by upper airway obstruction.
 - Breathing problems:**
 - Shortness of breath – increased respiratory rate.
 - Wheeze.
 - Patient becoming tired.
 - Confusion caused by hypoxia.
 - Cyanosis (appears blue) – this is usually a late sign.
 - Respiratory arrest.
 - Circulation problems:**
 - Signs of shock – pale, clammy.
 - Increased pulse rate (tachycardia).
 - Low blood pressure (hypotension) – feeling faint (dizziness), collapse.

- Decreased conscious level or loss of consciousness.
- Anaphylaxis can cause myocardial ischemia and electrocardiograph (ECG) changes even in individuals with normal coronary arteries.
- Cardiac arrest.

The above Airway, Breathing and Circulation problems can all alter the patient's neurological status (Disability problems) because of decreased brain perfusion. There may be confusion, agitation and loss of consciousness.

Patients can also have gastro-intestinal symptoms (abdominal pain, incontinence, vomiting).

✓ **Skin and/or mucosal changes (flushing, urticaria, angioedema)**

- They are often the first feature and present in over 80% of anaphylactic reactions.
- They can be subtle or dramatic.
- There may be just skin, just mucosal, or both skin and mucosal changes.
- There may be erythema – a patchy, or generalised, red rash.
- There may be urticaria (also called hives, nettle rash, weals or welts), which can appear anywhere on the body. The weals may be pale, pink or red, and may look like nettle stings. They can be different shapes and sizes, and are often surrounded by a red flare. They are usually itchy.

Differential diagnosis

Life-threatening conditions:

- Sometimes an anaphylactic reaction can present with symptoms and signs that are very similar to life-threatening asthma – this is commonest in children.
- A low blood pressure (or normal in children) with a petechial or purpuric rash can be a sign of septic shock.

Non life-threatening conditions:

- Faint (vasovagal episode).
- Panic attack.
- Breath-holding episode in child.
- Idiopathic (non-allergic) urticaria or angioedema.

Treatment

As the diagnosis of anaphylaxis is not always obvious, all those who treat anaphylaxis must have a systematic approach to the sick patient. In general, the clinical signs of critical illness are similar whatever the underlying process because they reflect failing respiratory, cardiovascular, and neurological systems, i.e., **A B C** problems. Use an **A B C** approach to recognize and treat an anaphylactic reaction. Treat life-threatening problems as you find them. The basic principles of treatment are the same for all age groups.

General principles:

1. Follow the **Airway, Breathing, Circulation** approach (**A B C**) to assess and treat the patient.
2. Treat life-threatening problems as they are identified before moving to the next part of the assessment.

3. Continually re-assess starting with Airway if there is further deterioration.
4. Assess the effects of any treatment given.
5. Recognize when you need extra help and call for help early. This may mean dialing 112 or 033 for an ambulance.
6. Use all members of your dental team. This will allow you to do several things at once, e.g., collect emergency drugs and equipment, dial 033, 112.
7. Organize your team and communicate effectively.
8. The aims of initial treatment are to keep the patient alive, achieve some clinical improvement and buy time for further treatment whilst waiting for help.
9. Remember - it can take a few minutes for treatment to work.

First steps

- In an emergency, stay calm. Ensure that you and your staff are safe.
- Look at the patient generally to see if they 'look unwell'.
- Ask the patient being in conscious "How are you?" If the patient is unresponsive, shake him and ask, "Are you all right?" If they respond normally, they have a clear airway, are breathing and have brain perfusion.
- If they speak only in short sentences, they may have breathing problems. Failure of the patient to respond suggests that they are unwell. If they are not breathing and have no pulse or signs of life, start CPR according to current resuscitation guidelines.
- All patients should be placed in a comfortable position. 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.

Anaphylactic Reaction – Treatment Algorithm

(A statement from The Resuscitation Council UK,

FOR DENTAL PRACTITIONERS AND DENTAL CARE PROFESSIONALS IN GENERAL
DENTAL PRACTICE,
revised february 2012).

- Assessment of Airway, Breathing, Circulation problems.
- **Diagnosis** - look for:
 - Acute onset of illness
 - Life-threatening Airway and/or Breathing and/or Circulation problems 1
 - And usually skin changes
- Call for help
- Lie patient flat
- Raise patient's legs (if breathing not impaired)
- Intramuscular Adrenaline

When skills and equipment available:

- High flow oxygen (*15 liters per minute*);
- Corticosteroids - IV or IM;
- [Antihistamine](#) - IV or IM;
- IV fluid challenge;
- Establish airway.

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