

## Anaphylaxis

### Definition of anaphylaxis:

- Life-threatening systemic type 1 hypersensitivity reaction leading to compromise of airway and/or breathing and/or circulation usually associated with skin or mucosal changes

### Epidemiology of anaphylaxis:

- Common: incidence is around 1 in 20,000 per year

### Causes of anaphylaxis:

- Food: peanuts
- Drugs: antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), radiological contrast media
- Venom: wasps, bee stings

### Risk factors for anaphylaxis:

- Allergic rhinitis
- Asthma
- Eczema

### Pathophysiology of anaphylaxis:

- Sensitisation phase
  - Immune system encounters allergen and makes immunoglobulin E (IgE) against it
  - No clinical features occur
- Effector phase
  - Allergen cross-links IgE on surface of mast cells
  - Causes widespread degranulation and release of histamine which mediates inflammatory bronchospasm, vasodilatation, increased capillary permeability, and tissue oedema

### Presentation of anaphylaxis:

- Acute onset: exact speed will depend on the trigger; IV medications will cause a more rapid onset than orally ingested triggers
- Airway
  - Stridor
  - Hoarse voice
  - Dysphagia
- Breathing
  - Respiratory distress
  - Dyspnoea
  - Wheeze
  - Cyanosis
- Circulation
  - Pale
  - Clammy
  - Light-headedness
  - Tachycardia
  - Hypotension

- Disability
  - Confusion
  - Agitation
  - Loss of consciousness
- Exposure
  - Urticaria
  - Angioedema

**Differential diagnosis of anaphylaxis:**

- Airway
  - Foreign body inhalation
  - Croup (children only)
  - Epiglottitis
  - Laryngospasm
- Breathing
  - Asthma
- Circulation
  - Syncope
  - Septic shock
  - Neurogenic shock
  - Hypovolaemic shock
  - Cardiogenic shock
  - Obstructive shock

**Investigation of anaphylaxis:**

- Arterial blood gas (ABG)
- Full blood count
- Urea & electrolytes
- Mast cell tryptase
  - Take three samples taken as soon as possible, after 1-2 hours and after 24 hours
  - Useful in making a retrospective diagnosis but the absence of a rise does not exclude anaphylaxis

**Initial management of anaphylaxis:**

- Shout for help
- Call an anaesthetist early and request the difficult airway trolley
- If necessary put out a cardiac arrest call
- Remove allergen if possible
- Lie patient flat and raise their legs
- Give adrenaline intramuscular (IM) and repeat after 5 min if no/minimal response to previous dose
  - Adult and child >12 years: 500 micrograms (0.5 ml of 1:1,000)
  - Child 6-12 years: 300 micrograms (0.3 ml of 1:1,000)
  - Child <6 years: 150 micrograms (0.15 ml of 1:1,000)
- Patients on beta blockers may exhibit an attenuated response to adrenaline so consider giving glucagon 1-2 mg IV or IM
- Assess patient from an ABCDE perspective
- Maintain a patent airway: use manoeuvres, adjuncts, supraglottic or definitive airways as indicated
- If evidence of impending airway compromise exists, give nebulised adrenaline as a temporising measure

- Deliver oxygen to maintain saturations ( $S_pO_2$ ) 94-98%
- Attach monitoring
  - Pulse oximetry
  - Non-invasive blood pressure
  - Three-lead cardiac monitoring
- Obtain IV access and take bloods
- Give IV fluid challenge and repeat as necessary; large volumes may be required
  - Adult: 500-1000 ml
  - Child: 20 ml/kg
- Give chlorphenamine IM or slow IV
  - Adult & child >12 years: 10 mg
  - Child 6-12 years: 5 mg
  - Child 6 months - 6 years: 2.5 mg
  - Child <6 months: 0.25 mg/kg
- Give hydrocortisone IM or slow IV
  - Adult & child >12 years: 200 mg
  - Child 6-12 years: 100 mg
  - Child 6 months - 6 years: 50 mg
  - Child <6 months: 25 mg
- Consider nebulised salbutamol 5 mg and/or ipratropium bromide 0.5 mg if evidence of wheeze on auscultation

**Further management of anaphylaxis:**

- Observe for at least six hours
- Beware biphasic reactions
- Advise patient to return immediately if symptoms reoccur
- Provide three day prescription of oral steroid and anti-histamine
- Consider an adrenaline auto-injector (EpiPen)
- Referral to allergy specialist

**Complications of anaphylaxis:**

- Shock
- Respiratory failure
- Cardiac arrest

**Prognosis of anaphylaxis:**

- Good if recognised promptly and managed swiftly

**Common questions concerning anaphylaxis:**

- Outline the key features of anaphylaxis
- What skin changes can occur as part of anaphylaxis?
- Outline the pathophysiology of an anaphylactic reaction
- What dose and route of adrenaline would you give to an adult patient with anaphylaxis?
- What dose and route of adrenaline would you give to a child aged 15 years with anaphylaxis?
- What dose and route of adrenaline would you give to a child aged 10 years with anaphylaxis?
- What doses and routes of chlorphenamine and hydrocortisone would you give to an adult with anaphylaxis?
- What blood test can help in the retrospective diagnosis of anaphylaxis?