

ANAPHYLAXIS

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An anaphylactic reaction or anaphylaxis is an exaggerated immunological response to a substance to which an individual has become sensitised. When the patient is in contact with the substance, histamine, serotonin, tryptase and other vasoactive substances are released from basophils and mast cells. Anaphylactoid reactions are clinically indistinguishable from anaphylaxis, but are mediated by the drug or substance directly, and not by sensitised IgE antibodies.

Direct release of small amounts of histamine is commonly seen with drugs such as morphine and non-depolarising muscle relaxants (tubocurarine, alcuronium, atracurium). Clinical manifestations are usually minor and consist of urticaria (skin redness and swelling), usually along the line of the vein, flushing and occasionally mild hypotension.

Any drug can potentially cause an allergic reaction but agents used in anaesthetic practice that have been implicated in producing anaphylactic reactions include thiopentone, suxamethonium, non-depolarising muscle relaxants, ester local anaesthetics, antibiotics, plasma expanders (dextrans, starches and gelatins) and latex.

Clinical Presentation of Anaphylaxis

The commonest features are cardiovascular. Not all signs occur in every patient - one feature may be more obvious than others. Reactions range from minor to life-threatening. An awake patient will have a range of symptoms, but the diagnosis is more difficult in an anaesthetised patient.

Suspect anaphylaxis in an anaesthetised patient who suddenly becomes hypotensive or develops bronchospasm, particularly if this follows administration of a drug or fluid. Latex allergy may be delayed in onset, sometimes taking up to 60 minutes to occur.

- **Haematological.** Coagulopathy.
 - **Cutaneous.** Flushing, erythema, urticaria.
- ### MANAGEMENT
- #### Immediate Treatment of a Severe Reaction
- Stop administration of the causal agent and call for help.
 - Follow the ABC of resuscitation.
 - Adrenaline is the most useful drug for treating anaphylaxis as it is effective in bronchospasm and cardiovascular collapse.
- #### A - Airway and Adrenaline
- Maintain airway and administer 100% oxygen.
 - Adrenaline. If i/v access available give 1:10,000 adrenaline in 0.5-1ml increments, repeated as required. Alternatively give i/m 0.5 - 1mg (0.5 - 1ml of 1: 1000 solution) repeated each 10 minutes as required.
- #### B - Breathing
- Ensure adequate breathing. Intubation and ventilation may be required.
 - Adrenaline will treat bronchospasm and swelling of the upper airway.
 - Nebulised bronchodilators (e.g. 5mg salbutamol) or i/v aminophylline may be required if bronchospasm is refractory (loading dose of 5mg/kg followed by 0.5mg/kg/hour).
- #### C - Circulation
- Assess the circulation. Start CPR if cardiac arrest has occurred.
 - Adrenaline is the most effective treatment for severe hypotension
 - Insert 1 or 2 large bore i/v cannulae and rapidly infuse normal saline. Colloid may be used (unless it is thought to be the source of the reaction).
 - Venous return may be aided by lifting the patient's legs or tilting the patient head down.
 - If the patient remains haemodynamically unstable after fluids and adrenaline - give further doses of adrenaline or an intravenous infusion (5mg in 50mls saline or dextrose 5% through a
- **Cardiovascular.** Hypotension and cardiovascular collapse. Tachycardia, arrhythmias, ECG may show ischaemic changes. Cardiac arrest.
 - **Respiratory System.** Oedema of the glottis, tongue and airway structures may cause stridor and airway obstruction. Bronchospasm - may be severe.
 - **Gastrointestinal.** There may be abdominal pain, diarrhoea or vomiting.

syringe pump, or 5mg in 500mls saline or dextrose 5% given slowly by infusion). Uncontrolled intravenous boluses of adrenaline can cause dangerous surges in blood pressure and arrhythmias. Give the drug carefully, observing the response and repeating when required. Try to monitor the ECG, blood pressure and pulse oximetry.

Intramuscular dose of adrenaline in children

> 5 years	0.5ml of 1:1000
4 years	0.4ml of 1:1000
3 years	0.3ml of 1:1000
2 years	0.2ml of 1:1000
1 year	0.1ml of 1:1000

Further Management

- Give antihistamine agents. H₁ blockers eg chlorpheniramine (10mg i/v) and H₂ blockers ranitidine (50mg i/v slowly) or cimetidine (200mg i/v slowly).
- Corticosteroids Give hydrocortisone 200mg i/v followed by 100-200mg 4 to 6 hourly. Steroids will take several hours to work.
- Make a decision whether to cancel or continue with proposed surgery.

- Transfer the patient to a high care area (eg intensive care or high dependency unit) for further observation and treatment. Anaphylactic reactions may take several hours to fully resolve and the patient must be closely observed during this time.

Less severe reactions

Anaphylaxis sometimes results in less severe reactions which are not life threatening. Treatment is similar to the regime above, but i/v adrenaline may not be required. Manage the ABC as described, and assess the response. Drugs such as ephedrine or methoxamine may be effective to treat hypotension along with i/v fluids. However, whenever the patient's appears to be worsening always use adrenaline.

Diagnosis and Investigations

Diagnosis is made on clinical grounds - though it may not be possible to define exactly which agent precipitated the attack. Make a record of events in the notes and when appropriate inform the patient and his/her general practitioner. If the patient requires further anaesthesia or surgery avoid the use of the suspected precipitating agents.

Some specialised laboratories can estimate Tryptase (a breakdown product of histamine) which can help to confirm the diagnosis. Take blood into glass tubes 60 minutes after the reaction. This test is unavailable in many places.