

# Medical management of severe anaphylactoid and anaphylactic reactions\*

## Clinical recognition

### Early

- sensations of warmth, itching especially in axillae and groins
- feelings of anxiety or panic

### Progressive

- erythematous or urticarial rash
- oedema of face, neck, soft tissues

### Severe

- hypotension (shock)
- bronchospasm (wheezing)
- laryngeal oedema (dyspnoea, stridor, aphonia, drooling)
- arrhythmias, cardiac arrest

**Note:** The onset of severe clinical features may be extremely rapid without prodromal features.

## Acute management

A severe anaphylactoid reaction is a life-threatening emergency.

As in all medical emergencies, initial management should be directed at the ABC of resuscitation, namely: Airway, Breathing and Circulation. If working alone, call for assistance.

1. Cease administration of any suspected medication or diagnostic contrast material immediately, remove allergen from patient's mouth, scrape out bee stings.

2. Administer oxygen by face mask at 6–8 L/minute.

### 3. Adults

Inject adrenaline **1:1000** intramuscularly:

small adults (<50 kg) give 0.25 mL

average adults (50–100 kg) give 0.50 mL

large adults (>100 kg) give 0.75 mL

### Children (up to 25 kg)

Use adrenaline **1:10 000**

or

dilute 1 ampoule (1 mL) of adrenaline 1:1000 with 9 mL water for injection or normal saline.

Inject **intramuscularly** up to a maximum of 500 microgram (5 mL) according to the guide (**approximates to 10 microgram/kg**).

1 year (10 kg) give 1 mL

3 years (15 kg) give 1.5 mL

5 years (20 kg) give 2 mL

8 years (25 kg) give 2.5 mL

Children >25 kg as for small adults

Note: Approximate body weight may be calculated by the formula  $2 \times \text{Age} + 9 = \text{weight in kg}$ .

4. Establish one, or preferably two, wide bore intravenous lines (16 gauge or larger). Commence rapid fluid resuscitation with normal saline or Hartmann's solution.

5. If there is severe laryngospasm, bronchospasm, circulatory shock or coma, intubate and commence intermittent positive pressure ventilation.

6. If there has been little or no response to the initial intramuscular dose of adrenaline, administer 5 microgram/kg slowly into the intravenous line. Repeat at 5 minute intervals depending on response. If the patient remains shocked, start an adrenaline infusion (preferably via a central venous line), commencing at 0.25 microgram/kg/minute, and titrating as required to restore blood pressure. Large doses of adrenaline may be needed.

## Additional measures

- Beta<sub>2</sub> agonists for bronchospasm: administer salbutamol or terbutaline by aerosol or nebuliser.
- Antihistamines: administer both H<sub>1</sub> and H<sub>2</sub> receptor blockers slowly intravenously: promethazine 0.5–1 mg/kg and ranitidine 1 mg/kg or famotidine 0.4 mg/kg or cimetidine 4 mg/kg
- Corticosteroids: administer intravenously: hydrocortisone 2–6 mg/kg or dexamethasone 0.1–0.4 mg/kg
- Nebulised adrenaline (5 mL of 1:1000) may be tried in laryngeal oedema and often will ease upper airways obstruction. However, do not delay intubation if upper airways obstruction is progressive.

## Supportive treatment

- Observe vital signs frequently and, if possible, monitor electrocardiogram and pulse oximetry.
- All patients who have suffered a severe anaphylactoid reaction must be admitted to hospital. Patients who remain clinically unstable after initial resuscitation should be admitted to an intensive care unit.
- If patients are not admitted to hospital, for example if they respond to first treatment, provide information to them in case of a possible late reaction.

## Notes

1. The mainstay in the treatment of severe anaphylaxis is the prompt use of adrenaline which can be lifesaving. Withholding adrenaline due to misplaced concerns of possible adverse effects can result in deterioration and death of the patient. Adrenaline must be used at the first suspicion of anaphylaxis. It is safe and effective.

2. All ampoules of adrenaline contain 1 mg (1000 microgram). Adrenaline 1:1000 contains 1 mg in 1 mL (i.e. 1000 microgram/mL), whereas adrenaline 1:10 000 contains 1 mg in 10 mL (i.e. 100 microgram/mL).

Either concentration may be used intramuscularly or injected into a fast flowing intravenous infusion. If injected directly into a vein, only the 1:10 000 strength should be used (or 1 mL of 1:1000 diluted with 9 mL normal saline).

The initial dose of adrenaline is 5 microgram/kg (children 10 microgram/kg). The repeat dose for adults and children is 5 microgram/kg. The volume doses given in 'Acute management' are an approximation to this and are appropriate in acute emergency situations to avoid unnecessary delays.

3. Although additional vasopressor agents are rarely needed, occasional cases are resistant to adrenaline – especially if the patient is taking beta blocking drugs. If adrenaline in adequate doses is not improving the situation, give glucagon 1 mg intravenously and consider changing to a noradrenaline infusion.

4. If anaesthesia is required for intubation, use fentanyl 1–10 microgram/kg intravenously. Care should be taken if using thiopentone, midazolam or propofol as these drugs will exacerbate hypotension. Suxamethonium 1–2 mg/kg may be used to facilitate intubation, but should be used **only** if the operator is sure of being able to intubate. Cricoid pressure should be applied during laryngoscopy and intubation.

5. Corticosteroids and antihistamines may modify the overall duration of a reaction and may prevent relapse. However, onset of action will be delayed and they must never be used to the exclusion of adrenaline.

6. Some drugs and intravenous fluids used in the treatment of anaphylactoid reactions may themselves cause such a reaction. This includes intravenous antihistamines and corticosteroids. Reactions to these substances are rare and should not preclude their use unless the patient has had a known previous reaction to them.

7. Less severe reactions can only be classified in retrospect. Therefore administration of adrenaline should not be delayed.

8. All patients should be followed up for investigation of possible provoking factors and further management.

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The chart has been updated and endorsed by the Australasian College for Emergency Medicine, the Australasian Society of Clinical Immunology and Allergy, the Australian and New Zealand College of Anaesthetists, the Royal Australasian College of Physicians, the Royal Australian and New Zealand College of Radiologists, and the Royal Australian College of General Practitioners.