

NHS CATS
Children's Acute Transport Service



Clinical Guidelines

Anaphylaxis

Document control

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Applicable to	All CATS employees
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The purpose of this guideline is to provide a structured approach for the treatment of cases of suspected anaphylaxis.

Assessment

Anaphylaxis is likely when all the following criteria are met:

- Sudden onset and rapid progression of symptoms
- Life-threatening airway and/or bronchospasm and/or circulation problems
- Skin and/or mucosal changes (flushing, urticarial, angioedema)

A history of exposure to an allergen supports the diagnosis but is not essential.

Anaphylaxis should be suspected when:

- Previous history of severe or life-threatening reactions
- Previous history of severe reactions
- History of asthma
- Current treatment with beta-blockers
- 'Medic-alert' bracelet or carries own adrenaline auto-injector

Common allergens/triggers include:

- Food: nuts, milk/dairy, fish
- Venom: wasp, bee
- Drugs: antibiotics, anaesthetic drugs, chlorhexidine
- Contrast media
- Latex

History of latex allergy must be sought unless this is the presenting complaint.

Risk factors for latex allergy:

- Repeated bladder catheterisation
- Neural tube defects: spina bifida
- Cloacal abnormalities
- Multiple surgical procedures, especially as a neonate
- Atopy and multiple allergies

- Food allergies: fruit and vegetables including bananas, celery, fig, chestnuts, avocados, papaya and passion fruit are most significant. Children with a strong or confirmed allergy to banana should be considered allergic to latex and managed accordingly.

Life-threatening features of anaphylaxis include:

- Airway: swelling, hoarse voice, stridor
- Breathing: shortness of breath, tachypnoea, wheeze, cyanosis, respiratory arrest
- Circulation: pale, clammy, tachycardia, low blood pressure, shock, cardiac arrest
- Confusion, agitation or decreased level of consciousness

Immediate management

Anaphylaxis is unpredictable initially and may progress rapidly to cardiac arrest within minutes.

Fatal anaphylaxis is associated with delayed adrenaline administration.

- Call for senior help early.
- Patient positioning: lie flat and elevate legs.
- Remove the trigger if possible.
- Primary treatment: **adrenaline**
 - Give IM adrenaline 1 in 1000 (1mg/ml) (see dosing table)
 - Further IM doses to be repeated at 5min intervals according to patient's response.
 - If a 3rd dose is needed an intravenous adrenaline infusion should be administered.

IM adrenaline (1 in 1000)

< 6 years 150 mcg (0.15ml)

6 to 12 yrs 300mcg (0.3 ml)

> 12 yrs 500mcg (0.5 ml)

Repeated after 5 minutes if required

IV / IO adrenaline (1 in 10,000)

1 mcg/kg, maximum 50 mcg

IV infusion adrenaline (0.3mg/kg in 50ml)

run at 0.05-0.5 mcg/kg/min

OR

IV infusion adrenaline (1mg in 100ml 0.9%saline bag)

run at 0.5 to 1.0 ml/Kg/hr

titrate to response

Secondary treatments

- High-flow oxygen (>10L/min via mask and reservoir bag).
- Establish secure airway (see Intubation below).
- Vascular volume expansion 10ml/kg (isotonic fluid e.g. Hartmann's or PlasmaLyte 148) – large volumes may be required.
- Bronchodilators to manage bronchospasm: salbutamol nebulisers 2.5mg - 5mg.
- Vasopressors – consider noradrenaline infusion ± vasopressin for refractory hypotension.
- Consider ECMO for refractory shock.
- Consider glucagon if the patient is betablocked.
- Evidence for steroids is lacking - consider steroids in resistant anaphylaxis

AGE	Hydrocortisone IM or slow IV
< 6 months	25 mg
6 months – 6 years	50 mg
6 – 12 years	100 mg
> 12 years	200 mg

Intubation

Indications for intubation

- Airway obstruction
- Cardiorespiratory collapse

Before intubation

- If the child has evidence of airway obstruction call for *urgent senior anaesthetic and ENT* support for intubation.
- Consider adrenaline 0.5 ml/kg 1:1000 nebulised (maximum 5 ml) while waiting.
- Consider video laryngoscopy and strategies for failed intubation e.g., supraglottic airway or front of neck access.
- Consider 10ml/kg fluid bolus and preparing adrenaline for infusion.

Following intubation

Ventilate as for air trapping/bronchospasm:

- Pressure control (aim PIP <35 cm H₂O)
- Slow respiratory rate (e.g. rate 10-15 bpm)

- Long expiratory time (e.g. I:E 1:3)
- Permissive hypercapnia - aim pH >7.2
- PEEP 5-10 cm H₂O to overcome intrinsic PEEP
- Consider manual decompression
- Ensure neuromuscular blockade
- Monitor ETCO₂
- Regular chest physiotherapy and suctioning for mucus plugging
- Bronchospasm should be treated as per *asthma guideline*
- Consider pneumothorax if patient deteriorates or becomes more unstable

Cardiopulmonary arrest following an anaphylactic reaction

- Start CPR immediately and follow current APLS cardiopulmonary resuscitation guidelines.
- Use doses of adrenaline recommended in the APLS CPR guidelines.
- The IM route for adrenaline is not recommended after cardiac arrest has occurred.

Investigations

Mast cell tryptase levels help confirm the diagnosis of anaphylactic reaction.

Ideally send three timed samples for mast cell tryptase:

- Immediately after reaction has been treated
- 1-2 hours after the start of symptoms
- At 24 hours or in convalescence (baseline sample) after the reaction

Each sample should be 0.5mL-5mL of serum or clotted blood.

It is essential to record the times on these samples and document in the notes.

Reporting of reaction

- All adverse drug reactions should be reported to the Medicine and Healthcare products Regulatory Agency (MHRA) <https://yellowcard.mhra.gov.uk>
- The patient must be referred to an allergist in a defined Regional Allergy Centre (www.bsaci.org).
- All fatal cases of suspected anaphylaxis should be discussed with the coroner.

References

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