

Paediatric Anaphylaxis

Key Points

- Anaphylaxis is a severe life-threatening event involving airway, breathing or cardiovascular compromise
- It should be managed according to the Resus Council anaphylaxis algorithm
- You need to supply 2 adrenaline auto-injectors on discharge to any child presenting with anaphylaxis

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Abbreviations

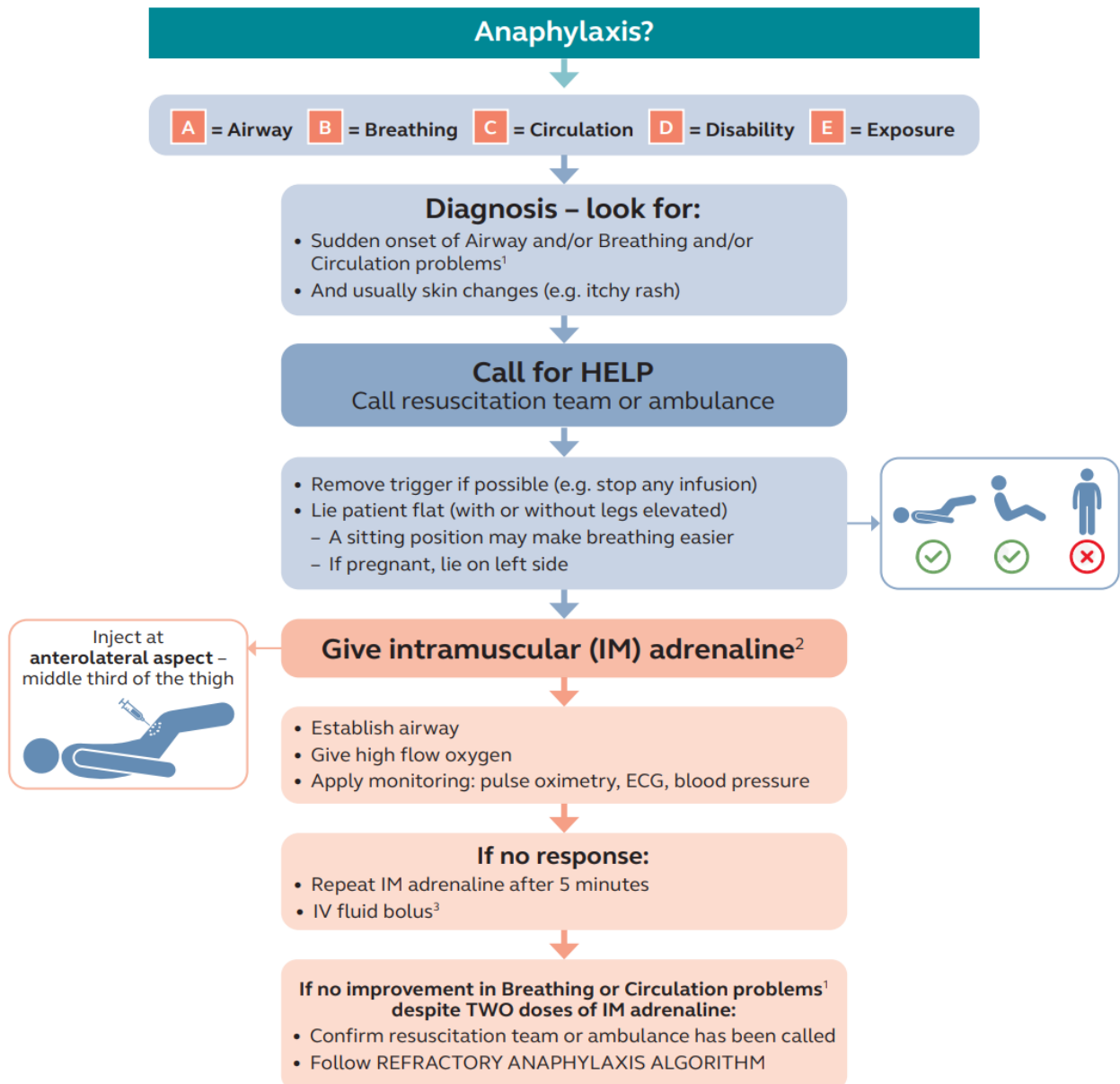
AAI	Adrenaline Auto-Injector
BSACI	Interest group for allergists
ECG	Electrocardiogram
IM	Intramuscular
IV	Intravenous
Spo ²	Oxygen Saturation
NaCl	Sodium Chloride

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Anaphylaxis



1. Life-threatening problems

Airway

Hoarse voice, stridor

Breathing

↑work of breathing, wheeze, fatigue, cyanosis, SpO₂ <94%

Circulation

Low blood pressure, signs of shock, confusion, reduced consciousness

2. Intramuscular (IM) adrenaline

Use adrenaline at 1 mg/mL (1:1000) concentration

Adult and child >12 years: 500 micrograms IM (0.5 mL)

Child 6–12 years: 300 micrograms IM (0.3 mL)

Child 6 months to 6 years: 150 micrograms IM (0.15 mL)

Child <6 months: 100–150 micrograms IM (0.1–0.15 mL)

The above doses are for IM injection **only**.
Intravenous adrenaline for anaphylaxis to be given **only by experienced specialists** in an appropriate setting.

3. IV fluid challenge

Use crystalloid

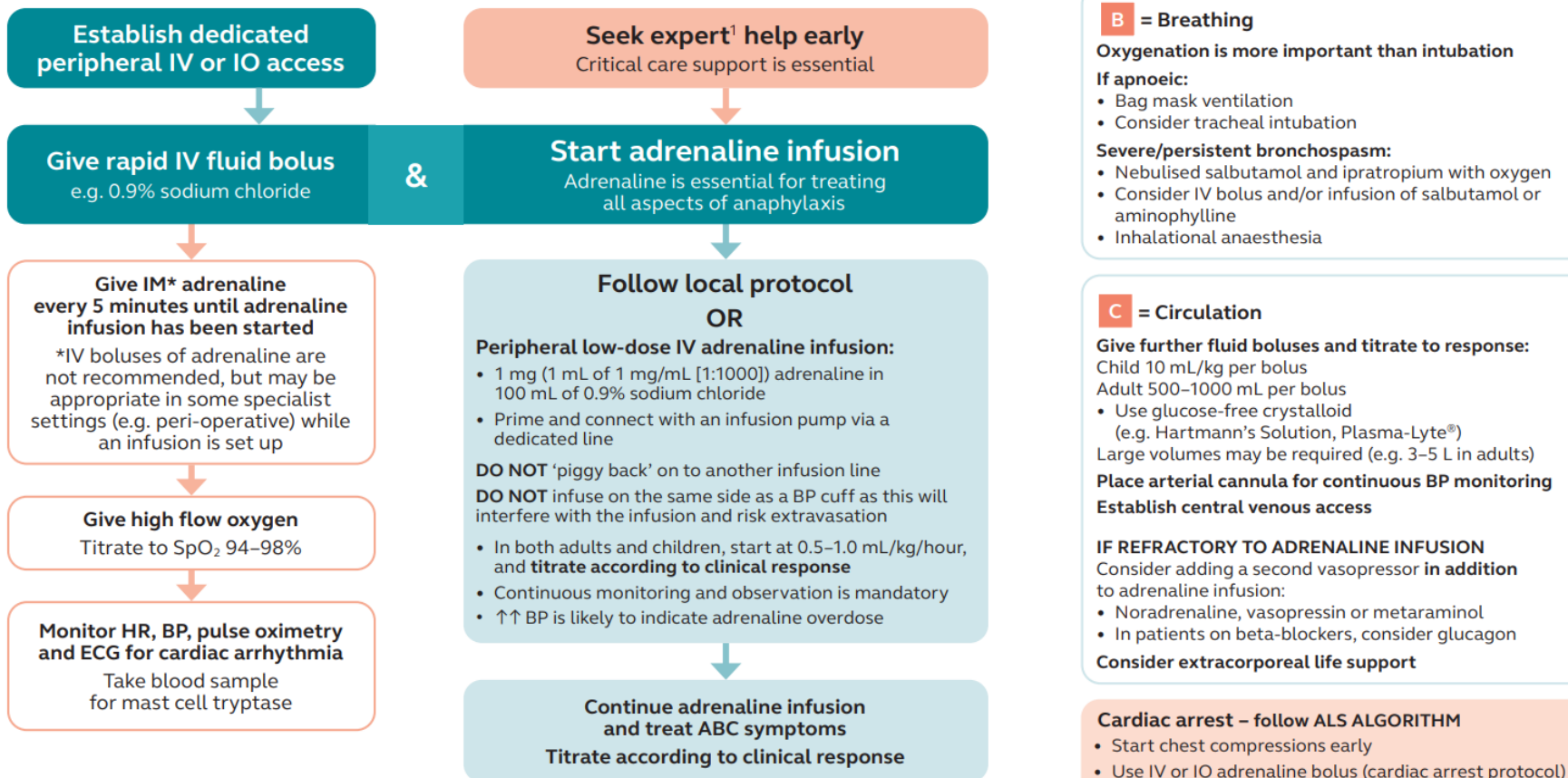
Adults: 500–1000 mL

Children: 10 mL/kg



Refractory anaphylaxis

No improvement in respiratory or cardiovascular symptoms despite 2 appropriate doses of intramuscular adrenaline



¹Intravenous adrenaline for anaphylaxis to be given only by experienced specialists in an appropriate setting.

A = Airway

Partial upper airway obstruction/stridor:
Nebulised adrenaline (5mL of 1mg/mL)

Total upper airway obstruction:
Expert help needed, follow difficult airway algorithm

B = Breathing

Oxygenation is more important than intubation

If apnoeic:

- Bag mask ventilation
- Consider tracheal intubation

Severe/persistent bronchospasm:

- Nebulised salbutamol and ipratropium with oxygen
- Consider IV bolus and/or infusion of salbutamol or aminophylline
- Inhalational anaesthesia

C = Circulation

Give further fluid boluses and titrate to response:

Child 10 mL/kg per bolus
Adult 500–1000 mL per bolus

- Use glucose-free crystalloid (e.g. Hartmann's Solution, Plasma-Lyte®)

Large volumes may be required (e.g. 3–5 L in adults)

Place arterial cannula for continuous BP monitoring

Establish central venous access

IF REFRACTORY TO ADRENALINE INFUSION

Consider adding a second vasopressor **in addition** to adrenaline infusion:

- Noradrenaline, vasopressin or metaraminol
- In patients on beta-blockers, consider glucagon

Consider extracorporeal life support

Cardiac arrest – follow ALS ALGORITHM

- Start chest compressions early
- Use IV or IO adrenaline bolus (cardiac arrest protocol)
- Aggressive fluid resuscitation
- Consider prolonged resuscitation/extracorporeal CPR

1.0 Definition of Anaphylaxis

Anaphylaxis is a severe life threatening generalised or systemic hypersensitivity reaction, characterised by rapidly developing life-threatening airway and/or breathing and/or circulation problems usually associated with skin and mucosa changes.

Anaphylaxis is a clinical diagnosis. Think anaphylaxis with:

- Sudden or rapidly progressing symptoms
- **A**irway, **B**reathing or **C**irculation involvement
- Skin or mucosal involvement (Not always present and can be subtle)
- Diagnosis supported by exposure to known allergen, but no obvious trigger in up to 30%

Skin or gastrointestinal symptoms alone are not usually sufficient to qualify for a diagnosis of anaphylaxis.

2.0 Treatment of anaphylaxis

Anaphylaxis should be managed according to Resus Council algorithm above. The treatment for anaphylaxis is IM adrenaline. If a patient has their own adrenaline autoinjector, try to encourage them/their caregiver to administer this as this has been shown to improve patient confidence in self-management.

Use of antihistamines or steroids is not routinely recommended. A bolus of IV fluids (0.9% sodium chloride) should be considered at 10ml/kg if not responding to 1-2 doses of adrenaline.

Positioning is key in anaphylaxis management. Fatalities have been associated with standing patients up after administering adrenaline. Ideally patients should be supine with legs elevated. A supported sitting position may be more suitable if there are breathing difficulties.

3.0 Guidance for Allergy Prescriptions

Antihistamines

Antihistamines are no longer recommended for acute treatment of anaphylaxis. They can be considered for treatment of skin symptoms, but their use must not delay adrenaline or IV fluids. Once the patient has been stabilised, antihistamines can be used to treat skin symptoms.

Once a patient has been stabilised, use a **non-sedating oral antihistamine** (e.g. cetirizine) in preference to chlorphenamine which causes sedation.^{11,69} Recommended doses are shown in Table 4. If the oral route is not possible, chlorphenamine can be given by intravenous or intramuscular injection, but note that such H1-receptor antihistamines can cause hypotension when given as a rapid IV bolus.⁷⁰

Age	Dose of oral cetirizine
< 2 years	250 micrograms/kg
2–6 years	2.5–5 mg
6–11 years	5–10 mg
12+ years	10–20 mg
Adults	10–20 mg

Table 4. Recommended doses for oral cetirizine for an allergic reaction

Adrenaline Auto-injectors

Adrenaline auto-injectors are produced by 3 different companies:

- Epipen - produces 0.15mg and 0.3mg devices
- Jext - produces 0.15mg and 0.3mg devices
- Emerade- remains to be discontinued due to device failure recall. This is not stocked at FHFT.

PLEASE SUPPLY 2 DEVICES AT DISCHARGE

Steroids

The routine use of corticosteroids is no longer recommended. They can be considered with refractory anaphylaxis or with ongoing asthma or shock. Their use should never delay adrenaline.

Bronchodilators

It can be difficult to distinguish between an asthma exacerbation and anaphylaxis. If a patient with asthma deteriorates following exposure to an allergen, they should be treated with IM adrenaline. Similarly, if there is doubt over diagnosis, the patient should be treated with IM adrenaline.

Further bronchodilator therapy with either salbutamol or ipratropium can be considered as an adjunct to adrenaline, but their use should never delay the administration of adrenaline.

4.0 Refractory Anaphylaxis

Refractory anaphylaxis is defined as anaphylaxis requiring ongoing treatment for persisting cardiorespiratory symptoms despite two doses of IM adrenaline. This should be managed as per the algorithm above. **Critical care support must be sought early – call 2222 and contact SORT.**

5.0 Biphasic reaction risk and discharge criteria

Anaphylaxis can occur as a uniphasic or biphasic reaction, with biphasic reactions occurring in 5% of patients.

The second phase usually occurs within 4-12 hours of the initial symptoms or signs and may be more severe.

Risk factors for a biphasic reaction include more severe reaction at presentation, initial reaction requiring more than one dose of adrenaline, delay in adrenaline administration >30-60 minutes or history of previous biphasic reaction.

All children need a senior review prior to discharge.

A minimum of 2 hours observation is required, but most children will probably require a minimum of 6 hours of observation, please see criteria below.



On the basis of a review of the available evidence, the Working Group recommends a risk-stratified approach to the length of in-hospital observation following anaphylaxis:

Consider fast-track discharge (after 2 hours observation from resolution of anaphylaxis) if:	Minimum 6 hours observation after resolution of symptoms recommended if:	Observation for at least 12 hours following resolution of symptoms if any one of the following:
• Good response (within 5–10 minutes) to a single dose of adrenaline given within 30 minutes of onset of reaction and • Complete resolution of symptoms and • The patient already has unused adrenaline auto-injectors and has been trained how to use them and • There is adequate supervision following discharge	• 2 doses of IM adrenaline needed to treat reaction* or • Previous biphasic reaction	• Severe reaction requiring >2 doses of adrenaline. • Patient has severe asthma or reaction involved severe respiratory compromise. • Possibility of continuing absorption of allergen, e.g. slow-release medicines. • Patient presents late at night, or may not be able to respond to any deterioration. • Patients in areas where access to emergency care is difficult.
In all cases, discharge must comply with NICE Clinical Guidance CG134. ⁹⁶		

*It may be reasonable for some patients to be discharged after 2 hours despite needing two doses of IM adrenaline, e.g. following a supervised allergy challenge in a specialist setting.

6.0 Patient/Carer Information

Before discharge, the following should be explained to the family and written information provided.

Recognising & managing an allergic reaction

- Discussed signs and symptoms of mild and severe reactions and how to treat them
- Explain about the possibility of biphasic reactions
- Provided information on the use of antihistamine for mild to moderate reactions

Using the adrenaline auto-injector (AAI)

- Demonstration of correct use of AAI
- All children need 2 adrenaline auto-injectors to be provided at discharge

Avoidance of trigger

- Advice about avoiding the suspected trigger
- Provide an allergy action plan for the family available from BSACI website <https://www.bsaci.org/about/download-paediatric-allergy-action-plans>

Follow-up and advice

- All patients presenting with anaphylaxis requiring adrenaline will need follow up in the paediatric allergy clinic – please refer on discharge
- Provide parents with the 'Useful Allergy Resources' document at the end of this guideline

Reporting

- An anaphylaxis registry has been set up in the UK. Healthcare professionals are encouraged to report all anaphylaxis events anaphylaxie.net (to register, healthcare professionals should email anaphylaxis.registry@ic.ac.uk).

Useful Allergy Information Resources for parents**Anaphylaxis campaign**

www.anaphylaxis.org.uk Helpline: 01252 542029

The Anaphylaxis campaign was set up to help people who have life-threatening allergic reactions to foods, latex and insect stings. They supply useful information and support through their website and telephone helpline about managing food allergy, allergy in schools, food alerts and other allergy information.

Allergy action

www.allergyaction.org.uk

A website developed to promote awareness and offer practical advice for people with food allergies. The website includes details of food labelling and how to make translation cards for use on holidays abroad.

Food allergy and anaphylaxis network

www.foodallergy.org

FAAN is the US charity working like the English charities to raise the recognition of food allergy and anaphylaxis and the issues surrounding this disease. They have many useful areas on their website including allergy-free recipes.

Allergy UK

www.allergyuk.org Helpline: 01322 619898

Allergy UK is the leading national charity dedicated to supporting the estimated 21 million allergy sufferers in the UK. They provide a dedicated helpline, support network and online forum for those with allergy.

Itchy Sneezy Wheezy

www.itchysneezywheezy.co.uk

A website that contains easy to understand information on the diagnosis and management of allergic conditions (eczema, asthma, hay fever and food allergies).

Food Maestro App

<http://foodmaestro.me>

The FoodMaestro app is a useful resource developed in partnership with Guy's & St Thomas' Hospital Trust. It allows you to enter your personal food requirements, and scan food labels or search to find suitable foods in UK supermarkets. It is free to download on Apple and Android devices.

Auto-injector Training

Please look at the website for the company that manufactures your adrenaline auto-injector pen. They all have really useful training videos on how to use adrenaline auto-injectors, and the Epipen and Jext websites both provide free text-alert services to remind you when your pen is due to expire.

Each company has produced a trainer device, which is just like your auto injector device except that it has no adrenaline and no needle. It can be used and re-used to teach yourself and others to be confident in the use of an auto injector device in an emergency. If you were not issued with a trainer device at diagnosis, please request one from your auto-injectors company website.

Adrenaline Auto-injector Websites:

- Epipen <http://www.epipen.co.uk/patients/>
- Jext <http://www.jext.co.uk>
- Emerade <http://www.emerade.com>

Spare pens in school

<https://www.sparepensinschools.uk/>

This is a useful resource with information about anaphylaxis and adrenaline use in schools.

Remember! Be prepared - carry your rescue medicines (antihistamine and adrenaline pens) with you at all times!

Make sure your friends and family know what to do if you have an allergic reaction.

References

British Society for Allergy & Clinical Immunology (BSACI) (no date) *Paediatric Allergy Action Plans*. Available at: <https://www.bsaci.org/about/download-paediatric-allergy-action-plans> (Accessed 24.11.22).

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Full version control record

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Contributor(s):	Nina Somerville (Lead Paediatric Respiratory Nurse Specialist)
Lead Director / Chief of Service:	Dr Rekha Sanghavi, CoS for Paediatrics and Neonates
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This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date.

This guideline is for use in Frimley Health Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version Control Sheet

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1.0	June 2020	Dr K O'Farrell, Dr M Soliman, Consultant Paediatricians	Final	
2.0	November 2022	Paediatrician	Final	
2.1	July 2024	Paediatrician	Draft	Amendments to antihistamine choices and pharmacy check
3.0	August 2024	Paediatrician	Final	Approved for publication.

Related Documents

None