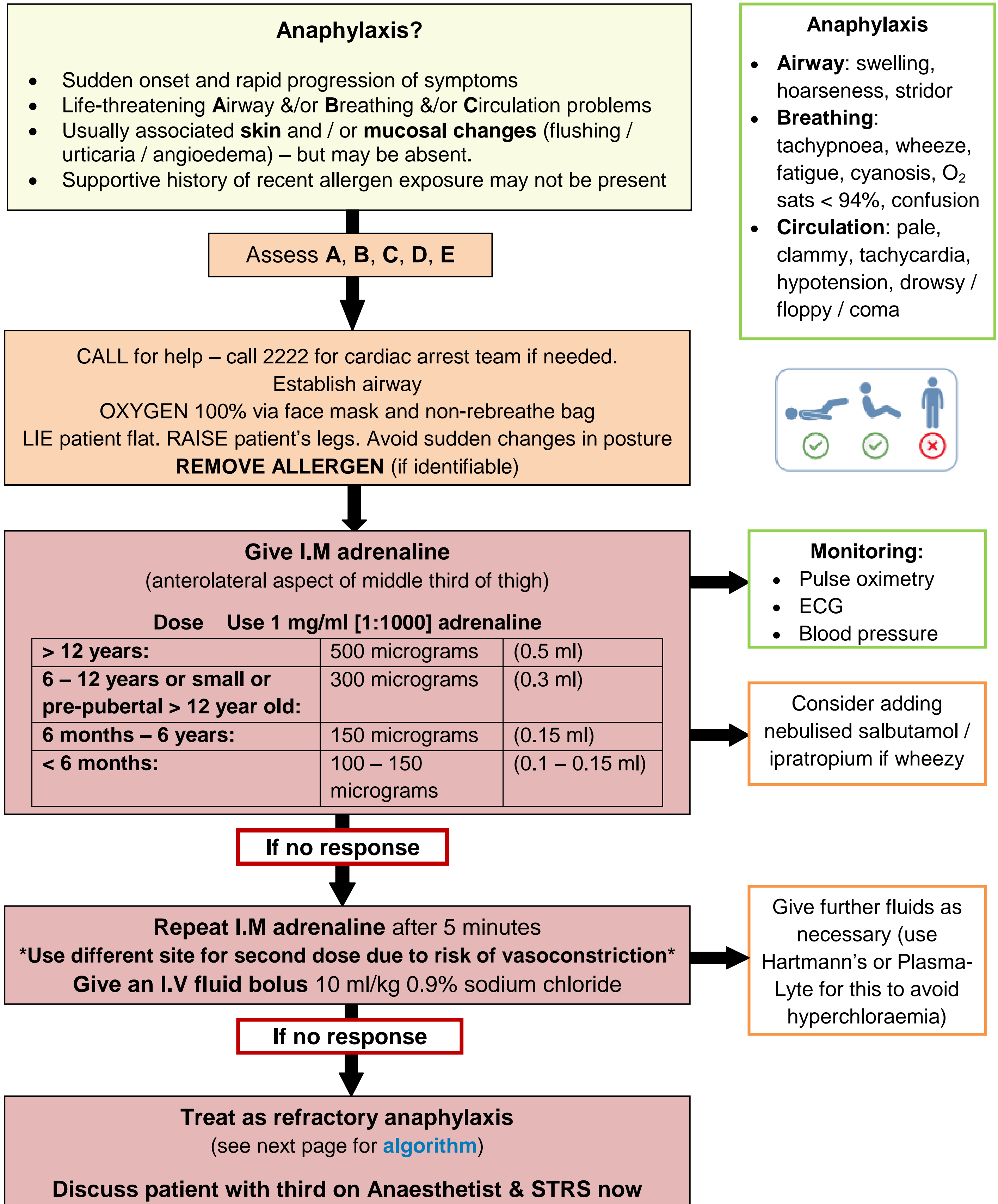
Anaphylaxis / acute allergic reaction

Author: Dr M Lazner / Paediatric Respiratory Team / Mr Christian Chadwick / Dr G Fonseka
Approved by: UHSussex Medicines Governance Committee December 2021
Publication date: December 2021. Version 3
Review date: December 2023



Anaphylaxis?

- Sudden onset and rapid progression of symptoms
- Life-threatening **A**irway &/or **B**reathing &/or **C**irculation problems
- Usually associated **skin** and / or **mucosal changes** (flushing / urticaria / angioedema) – but may be absent.
- Supportive history of recent allergen exposure may not be present

Assess **A**, **B**, **C**, **D**, **E**

CALL for help – call 2222 for cardiac arrest team if needed.
Establish airway
OXYGEN 100% via face mask and non-rebreathe bag
LIE patient flat. RAISE patient's legs. Avoid sudden changes in posture
REMOVE ALLERGEN (if identifiable)

Give I.M adrenaline
(anterolateral aspect of middle third of thigh)

Dose Use 1 mg/ml [1:1000] adrenaline

> 12 years:	500 micrograms	(0.5 ml)
6 – 12 years or small or pre-pubertal > 12 year old:	300 micrograms	(0.3 ml)
6 months – 6 years:	150 micrograms	(0.15 ml)
< 6 months:	100 – 150 micrograms	(0.1 – 0.15 ml)

If no response

Repeat I.M adrenaline after 5 minutes
Use different site for second dose due to risk of vasoconstriction
Give an I.V fluid bolus 10 ml/kg 0.9% sodium chloride

If no response

Treat as refractory anaphylaxis
(see next page for **algorithm**)

Discuss patient with third on Anaesthetist & STRS now

Anaphylaxis

- **Airway**: swelling, hoarseness, stridor
- **Breathing**: tachypnoea, wheeze, fatigue, cyanosis, O_2 sats < 94%, confusion
- **Circulation**: pale, clammy, tachycardia, hypotension, drowsy / floppy / coma

Monitoring:

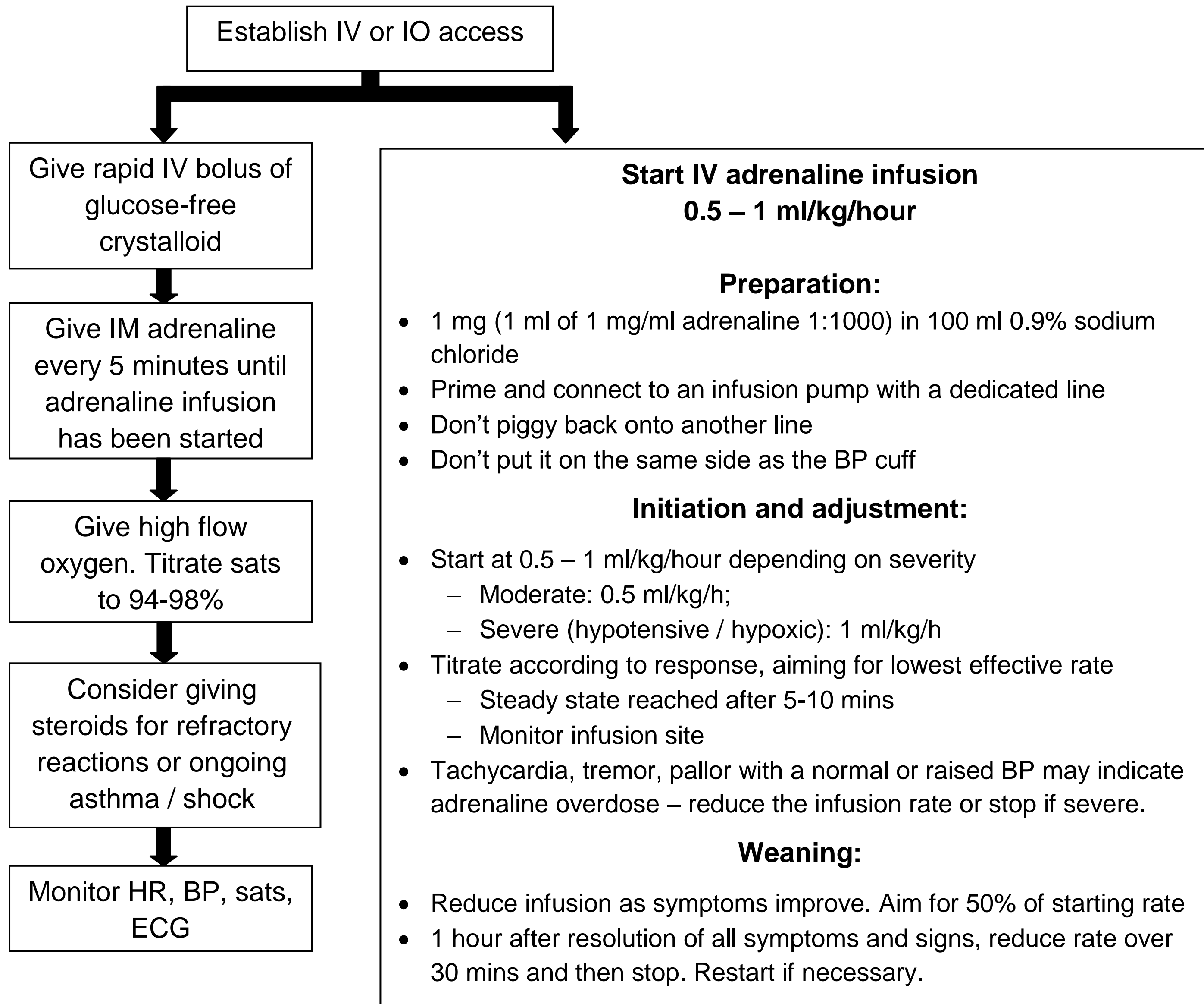
- Pulse oximetry
- ECG
- Blood pressure

Consider adding nebulised salbutamol / ipratropium if wheezy

Give further fluids as necessary (use Hartmann's or Plasma-Lyte for this to avoid hyperchloraemia)

Refractory anaphylaxis

= anaphylaxis requiring ongoing treatment (due to persisting respiratory or cardiovascular symptoms) despite two doses of IM adrenaline. Continue to repeat IM adrenaline after 5 minutes until the infusion has been started.



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

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

Large volumes may be required

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

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

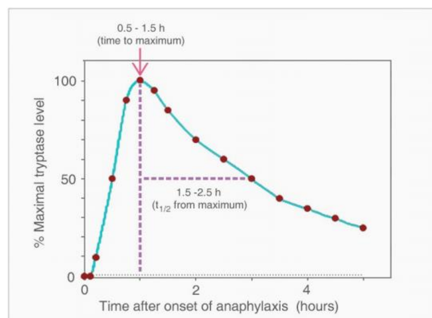
Biphasic reactions
= anaphylaxis that appears to resolve but then causes a recurrence of symptoms several hours later in the absence of further allergen exposure.
Occurs in ~5%. Median time to reaction ~ 12 hours

Risk factors
- more severe initial presentation
- initial reaction requiring > 1 dose adrenaline
- delay in adrenaline administration > 30 – 60 mins from symptom onset
- probably history of previous biphasic reactions

Investigation and post-resuscitation management:

1. **Ensure appropriate documentation. Record:**
    - the acute clinical features of the suspected anaphylactic reaction
    - time of onset of the reaction
    - the circumstances immediately before the reaction to identify the possible trigger
    - the treatments provided
    - the follow up and safety netting provided

2. **Take a mast cell tryptase level** (yellow-top clotted sample to biochemistry)
    - as soon as possible after treatment is started but d**o not delay resuscitation to take the sample)**
    - second sample within 1 – 2 hours (no later than 4 hours) from onset of symptoms



This is a non-specific indicator of mast cell activation; it aids the diagnosis of an anaphylactic episode.

3. **Consider giving a non-sedating oral antihistamine to treat cutaneous symptoms** e.g. cetirizine. If oral route is not available, chlorphenamine can be used.

Cetirizine PO	
≥ 12 years:	10 - 20 mg
6 – 11 years:	5 – 10 mg
2 – 6 years:	2.5 - 5 mg
< 2 years:	250 micrograms/kg

Chlorphenamine (IM or slow IV)	
> 12 years:	10 mg
6 – 12 years:	5 mg
6 months – 6 years:	2.5 mg
< 6 months:	250 micrograms/kg

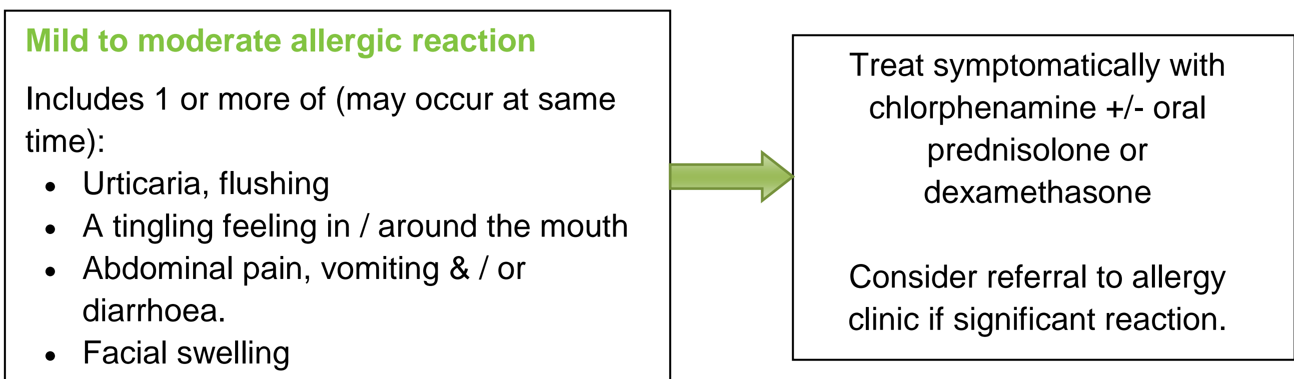
4. **Observe for at least 6 hours after anaphylactic reaction. Consider shorter or longer periods according to table below:**

Consider fast track discharge – minimum 2 hours observation from resolution of symptoms if:	**Minimum 6 hours observation after resolution of symptoms if:**
• Good response (within 5–10 minutes) to a single dose of adrenaline given within 30 mins of onset of reaction & • Complete resolution of symptoms & • child already has unused adrenaline auto-injectors and has been trained how to use them & • there is adequate supervision following discharge	• 2 doses of IM adrenaline needed to treat reaction* or • Previous biphasic reaction – may need at least 12 hours depending on risk (see discharge section) *See next page
Patient must be reviewed by a senior clinician pre-discharge.	

In some circumstances patients should be admitted for up to 24 hours. This may include:

- *Severe reactions requiring > 2 doses of adrenaline.
- Reactions in individuals with severe asthma or reaction involved a severe respiratory component.
- Reactions with the possibility of continuing absorption of allergen e.g. slow release medicines.
- Patients presenting in the evening or at night, or those who may not be able to respond to any deterioration.
- Patients in areas where access to emergency care is difficult.

Not anaphylaxis?



Discharge and follow up:

1. Consider **prescribing a course of oral anti-histamines and prednisolone for up to 3 days**. May be helpful for treatment of urticaria, and may decrease the chance of further reaction.

2. All children who have had a suspected or proven anaphylactic reaction should be **referred to the allergy clinic** (fill out an OPD form if discharged from CED; or on the

CareFlow discharge letter if admitted). Mark the referral as “urgent” – within 6 – 8 weeks.

- Provide blood test form for baseline mast cell tryptase to be taken before clinic appointment (parent can book blood test with level 5 outpatient nursing staff).

3. Adrenaline auto-injector (AAI) pens should be provided to the following children following an anaphylactic reaction:

a. Those at increased risk of idiopathic reaction i.e. unknown cause; or

b. Those at continuing high risk of reaction (e.g. venom stings, food allergies)

The Respiratory specialist nurses will provide definitive training in AAI use.

In hours: Bleep 8914 to request training

Out of hours: Telephone 62518 / 62519 / 63127 and leave a message on the answering machine with patient’s contact details to arrange training at the earliest opportunity. ENSURE THIS IS DONE BY THE ASSESSING CLINICIAN PRIOR TO CHILD BEING ADMITTED.

In the meantime, discharge patient with the training pack (DVD, dummy AAI) available in the CED storeroom **and an outpatient prescription** for:

- **Adrenaline auto-injector** x 2 (1 to be kept with child / parent; 1 to be kept at school)
- 150 micrograms for children up to 30 kg; 300 micrograms for children > 30 kg (300 micrograms may be more appropriate for some children 15 – 30 kg); 500 micrograms for older children and adolescents.

4. Provide child and carer information about:

- anaphylaxis and the signs and symptoms of an anaphylactic reaction
- the risk of a biphasic reaction
- what to do if an anaphylactic reaction occurs
- how to avoid the suspected trigger
- the allergy clinic referral
- patient support groups (allergy UK, Anaphylaxis campaign **https://www.anaphylaxis.org.uk/**)

5. Print off and give child and carer a written anaphylaxis management plan.

This is available from **https://www.bsaci.org/** under professional resources > paediatric resources or **https://sparepensinschool.uk**

6. Advise child and carer to attend their GP surgery in 2 weeks to discuss any follow-up questions with their GP / practice nurse.

7. Report reaction to the MHRA using the yellow card reporting scheme if reaction was to a medicine including vaccines, herbal remedies or homeopathic remedies: **https://yellowcard.mhra.gov.uk**

Notes

References:

1. NICE clinical guideline 134: Anaphylaxis: assessment and referral after emergency treatment.
2. Emergency Treatment of Anaphylactic Reactions – Resuscitation Council UK (2021) **www.resus.org.uk**. Last accessed 7 September 2021.