## Anaphylaxis

Resus Council 2021 suggests that recognition is key

Have a low threshold for suspecting anaphylaxis!

## What is Anaphylaxis

A rapid, severe, systemic reaction affecting any of these systems:

Airway – swelling, shortness, difficulty, hoarse voice, stridor

**Breathing** – bronchospasm, tachypnoea, drop in sats, hypoxia, wheeze

**Circulation** – hypotension, tachy/bradycardia, pale/clammy, dizziness

Gastrointestinal – adbo pains, vomiting, diarrhoea

**Skin/mucosal** – redness, hives, itching

ANY ABC + one other, or 2x ABCs = treat as anaphylaxis

If in doubt, treat as anaphylaxis (NICE)

## What causes anaphylaxis

A massive release of mediators when our antibodies detect a foreign substance that they recognise from prior exposure

Histamine is an example of a mediator (causes vasodilation and bronchospasm)

Different mediators affect different body systems: hence why we look for a variety of symptoms

### Treatment

The only effective emergency treatment for anaphylaxis is adrenalin 1:1000

Adrenalin does a lot of things:

Alpha 1 agonist = peripheral vasoconstriction (keeps blood at our core)

Beta 1 agonist = increased heart rate and heart muscle strength (more effective pulse)

Beta 2 agonist = Bronchodilator (bigger airways)

### Second Line Treatments

Chlorphenamine – takes 30-60mins to work and treats skin issues more than ABC issues

Hydrocortisone – takes 2-6hrs to work but does suppress inflammation to restore fluid to blood, and thus raise BP

Salbutamol – good additional Beta 2 agonist to help bronchodilation

## 2021 Resus Council Guidelines

Diagnose FAST any rapid ABC changes, and/or skin changes
Remove any trigger if possible (stings etc.)

I.M. Adrenaline 1:1000 into anterior thigh (dose on next slide)

Maintain airway – give O2 to keep SATS in normal range

If no response or change in 5-minutes:

- Give I.M. Adrenaline again
- Call 999 for time-critical (cat 1) transfer

## Adrenalin IM Dosing

Adults: 500 micrograms adrenaline 1: 1000 solution (= 500 micrograms = 0.5 mL of 1:1000)

# NOTE THAT THIS IS HALF A VIAL/HALF A PREDRAWN SYRINGE Children

The recommended doses are based on what is safe and practical to draw up and inject in an emergency (The equivalent volume of 1:1000 adrenaline is shown in brackets)

- > 12 years: 500 micrograms IM (0.5 mL) i.e. same as adult dose (300 micrograms IM (0.3 mL) if child is small or prepubertal)
  - > 5 12 years: 300 micrograms IM (0.3 mL)
  - > 6 months— 6 years: 150 micrograms IM (0.15 mL)
  - < 6 months: 100-150 micrograms IM (0.1- 0.15 mL)</p>

### **Key Points:**

ANYONE can give adrenaline in an emergency

Acute hospital must be considered even if the reaction is reduced quickly

Fluids may be required to support a drop in BP due to fluid leakage into intracellular spaces, which can happen in anaphylaxis



### GUIDELINES 72021

### Refractory anaphylaxis

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

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Establish dedicated peripheral IV or IO access

Seek expert<sup>1</sup> help early

Critical care support is essential

Give rapid IV fluid bolus e.g. 0.9% sodium chloride Start adrenaline infusion

Adrenaline is essential for treating all aspects of anaphylaxis

#### Give IM\* adrenaline every 5 minutes until adrenaline infusion has been started

\*IV boluses of adrenaline are not recommended, but may be appropriate in some specialist settings (e.g. peri-operative) while an infusion is set up

Give high flow oxygen

Titrate to SpO₂ 94-98%

Monitor HR, BP, pulse oximetry and ECG for cardiac arrhythmia

Take blood sample for mast cell tryptase

#### Follow local protocol

OR

#### Peripheral low-dose IV adrenaline infusion:

- 1 mg (1 mL of 1 mg/mL [1:1000]) adrenaline in 100 mL of 0.9% sodium chloride
- Prime and connect with an infusion pump via a dedicated line

DO NOT 'piggy back' on to another infusion line
DO NOT infuse on the same side as a BP cuff as this will
interfere with the infusion and risk extravasation

- In both adults and children, start at 0.5–1.0 mL/kg/hour, and titrate according to clinical response
- Continuous monitoring and observation is mandatory
- ↑↑BP is likely to indicate adrenaline overdose

Continue adrenaline infusion and treat ABC symptoms

Titrate according to clinical response

Intravenous 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

## More reading

<u>Anaphylaxis – The Resus Room</u> (podcast – excellent)

Overview | Anaphylaxis: assessment and referral after emergency treatment | Guidance | NICE

AllergyWise - Allergic Reaction Training Courses | AllergyWise