



ThinkAskLearn
Health Professional Education

Anaphylaxis Anxiety Calming the Nervous

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1

Could you do it?

- You are working in an isolated nursing post
- 200 kms from a rural hospital
- There is a volunteer ambulance service available in town (Not paramedic)
- No other clinical staff available
- A doctor is available by phone – GP from Hospital
- You are at home relaxing....



2

Could you do it?

- You get a call at 2000hrs to attend severe respiratory distress
- You arrive in less than 5 mins
- On arrival
 - 20 year old girl
 - Severe respiratory distress
 - Audible wheeze and stridor
 - Pale,
 - Cyanotic



3

Could you do it?

- Unable to speak – “unable to breathe”
- Restless, Agitated
- Tachycardic P 128
- O₂ Sats 80%, RR 36
- Boyfriend presents- states she Hx asthma and is allergic to peanuts,
- Just been to the local café for dessert – Sticky date pudding with pistachio nuts



4

Could you do it?

- Oxygen provided
- Given neb – ventolin, atrovent and adrenaline
- Gives IM adrenaline 0.3mg, IM promethazine
- First 5-10 minutes little change
- Then pt deteriorates Sats 90% down to 45%
- 2040hrs - Calls GP from Hospital (200kms away)
- Recommends continue nebs, get IV access and administer hydrocortisone



5

Could you do it?

- 20:55hrs – Sats 65%, Increase in stridor, Bradycardia, worsening distress
- Advised to give 2nd dose of adrenaline - 1mg
- Slight improvement
 - Able to gain access
 - Gave hydrocortisone
- 21:25 – Deteriorates again
 - Sats 75%, HR 45
- Advised 1mg IV Adrenaline – Same given



6

Could you do it?

- No real improvement
- Dr advises - Attempt to perform surgical airway
- 4 attempts are made
- 5th attempt with biro
- Patient unable to be resuscitated further
- Resuscitation ceased at 21:50



7

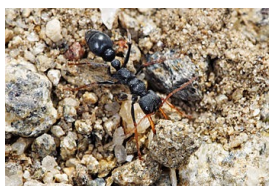
What did we learn?

- Most health care professionals under prepared for situations
- Avoidance (Scared) of adrenaline use in anaphylaxis
- Increase education to patients with anaphylaxis when presenting to ED's
- Encourage use of Epi Pen by patients with previous anaphylactic reactions ('too bulky')



8

Which kills more people?



McGain & Winkel, Toxicon, 2002



9

How common is Anaphylaxis?

- 'Uncommon but not rare'
- 8.4- 21 per 100 000 patient years
- High as 1 in 50 in specific areas
- 1 in 170 school children (self report)
- Death 1 per 3 million people per year
- In ED, 1 death in 200-300 patients treated with anaphylaxis

Brown et al, MJA 2018



10

What Causes Anaphylaxis?

- Insect stings: most commonly honeybee, Australian native ants, wasps
- Foods: most commonly peanuts, tree nuts, egg, seafood, cows milk, dairy products, seeds
- Medications: most commonly antibiotics, non-steroidal anti-inflammatory drugs
- Unidentified (no cause found)



11

Less common but still real

- Physical triggers (eg, exercise, cold)
- Biological fluids (eg, transfusions, immunoglobulin, antivenoms, semen)
- Latex
- Tick bites
- Hormonal changes: breastfeeding, menstrual factors
- Dialysis membranes (haemodialysis- associated anaphylaxis)
- Hydatid cyst rupture
- Aeroallergens: domestic/laboratory animals, pollen
- Food additives: monosodium glutamate, metabisulfite, preservatives, colours, natural food chemicals
- Topical medications (eg, antiseptics)



12

Pathophysiology of Anaphylaxis

- Allergen sensitisation – Allergy antibody (IgE) produced
- IgE attaches to Mast cells in skin, GI tract, resp system and peripheral blood basophils
- Subsequent exposure – Rapid mast cell activation
- Histamine release and other inflammatory mediators released
- Causes increased vascular permeability, smooth muscle spasm, mucosal oedema and inflammation



13

Defining Anaphylaxis

- Any **acute onset illness** with **typical skin features** (urticarial rash or erythema/flushing, and/or angioedema), **PLUS** involvement of **respiratory** and/or **cardiovascular** and/or persistent severe **gastrointestinal** symptoms. OR
- Any **acute onset** of **hypotension** or **bronchospasm** or **upper airway obstruction** where anaphylaxis is considered possible, even if typical skin features are not present.

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14

Signs and Symptoms

- **Mild or moderate allergic reactions**
- Swelling of lips, face, eyes
- Hives or welts
- Tingling mouth
- Abdominal pain, vomiting (these are signs of a severe allergic reaction to insects)



15

Urticarial Rash



16

Urticarial Rash



17

Urticarial Rash



18

Peanut urticarial rash



19

Severe Allergic Reaction



20

Ace inhibitor Allergic Reaction



21

More Significant Signs

- Watch for any one of the following signs of anaphylaxis:
- Difficult/noisy breathing
- Swelling of tongue
- Swelling/tightness in throat
- Difficulty talking and/or hoarse voice
- Wheeze or persistent cough
- Persistent dizziness or collapse
- Pale and floppy (young children)

22

Severe Hypotension



23

Severe Hypotension



24

Anaphylaxis and Death

- Linked to poorly controlled asthma who delay treatment of adrenaline
- Death occurs within 30 mins of food based trigger
- Insect stings within 10-15 mins
- Drug interaction with 5 mins
- No deaths occur after 6 hrs of contact with trigger

Nolan et al, ERC 2020



25

Treatment

- ABCDE approach for all
- Principles of management are essentially the same for all age groups
- All patients should be monitored in a high care environment
- Min monitoring includes:
 - NIBP, SpO₂, 3 lead ECG,



26

First line Treatment

- Patient positioning
 - Avoid standing if possible
 - Airway problems may prefer to sit up
 - Lying flat may improve circulation
 - Raised legs **** STOP!!!!



27

First Line Treatment

- Remove the trigger
 - Stop the medication/bloods
 - Remove the bee sting



28

First Line Treatment

- If in cardiac arrest
 - Start CPR
 - Usual protocol
- Airway obstruction
 - BVM with Hi Flow oxygen
 - Give adrenaline!!!!
 - Cricothyroidotomy
 - Call for help early



29

First Line Treatment

- Adrenaline
 - No randomised controlled trials
 - Consistent anecdotal evidence / End of needle effect
- Alpha-receptor agonist,
 - Peripheral vasoconstriction
 - Reduces oedema.
- Beta-receptor activity
 - dilates the bronchial airways
 - increases the force of myocardial contraction
 - suppresses histamine and leukotriene release
- Beta-2 adrenergic receptors on mast cells
 - that inhibit activation and attenuates the severity of IgE-mediated allergic reactions



30

First Line Treatment

- Adrenaline seems to work best when given early after the onset of the reaction
- But it is not without risk, particularly when given intravenously.
- Adverse effects are extremely rare with correct doses injected intramuscularly (IM)



31

First Line Treatment

- Intramuscular Adrenaline
 - There is a greater margin of safety
 - It does not require intravenous access
 - The IM route is easier to learn
- Use anterolateral thigh muscle



32

First Line Treatment

- 10mcg/kg up to 500mcg of 1:1000
- 1 EpiPen or 1 AnaPen

Nolan et al, ERC 2010 ASCIA 2023



33

Anapen vs EpiPen



34

ascia **How to use adrenaline (epinephrine) devices**

EpiPen®	Jext®
<ol style="list-style-type: none"> 1. Remove the cap and pull off the safety release. 2. Hold leg still and place orange end against outer mid-thigh (with or without clothing). 3. Push down hard until a click is heard or felt and hold in place for 5 seconds. Remove EpiPen®. <p>Anapen® 150mcg is prescribed for children 1-5 (10kg). Jext® 150mcg is prescribed for children over 10kg and adults.</p>	<ol style="list-style-type: none"> 1. Form fist around Jext® and pull off yellow cap. 2. Place black Jext® tip against outer mid-thigh (with or without clothing). 3. Push black tip firmly until a click is heard and hold in place for 5 seconds. Remove Jext®. <p>Anapen® 150mcg is prescribed for children 1-5 (10kg). Jext® 150mcg is prescribed for children over 10kg and adults.</p>
<ol style="list-style-type: none"> 1. Pull off black needle shield. 2. Pull off grey safety cap from red button. 3. Place needle firmly against outer mid-thigh (with or without clothing). 4. Press red button as it clicks and hold for 5 seconds. Remove Anapen®. <p>Anapen® 150mcg is prescribed for children over 10kg and adults.</p>	<ol style="list-style-type: none"> 1. Hold as shown. Do not use Jext®. 2. Place needle into meat and Jext® must make noise. 3. Press plunger firmly. <p>neffy® 150mcg is prescribed for children 1-5 (10kg). neffy® 150mcg is prescribed for children over 10kg and adults.</p>

Follow the ASCIA Action Plan or First Aid Plan for Anaphylaxis. Each device is for single use only. Give the next device to the ambulance with the time it was given.

Nov 2025

Dec 2025

35

First Line Treatment

- 10mcg/kg up to 500mcg of 1:1000
- 1 EpiPen or AnaPen or Jext or Neffy
- Repeat the IM adrenaline dose if there is no improvement in the patient's condition
 - About 10% will need 2 doses
- Give 2nd dose after 5mins
 - Set a watch, don't hesitate

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36

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ACTION PLAN FOR Anaphylaxis

Name: _____ Date of birth: (DD / MM / YYYY) _____
 Confirmed (signature): _____
 Family/emergency contact(s): _____ Mobile: _____
 1. _____
 2. _____
 Plan prepared by: _____ (Inscribed solo authorisation)
 Medication in the plan, as consented by the parent/guardian, according to the plan:
 Signed: _____ Date: (DD / MM / YYYY) _____
 Adverse effects/previous: _____
 Adrenaline device: _____
 Date: _____
 This plan does not replace but rather is recommended for use with the device.

MILD TO MODERATE ALLERGIC REACTIONS

SIGNS

Swelling of lips, face, tongue
 Hives or rashes
 Tracheal wheeze, vomiting, diarrhoea or severe abdominal pain

ACTIONS

- Stay with person, call for help
- Use adrenaline (epinephrine) device
- Give antihistamine - see above
- Phone health/emergency contact
- Insert allergy - Rik out ring & visible
- Take allergy - seek medical help or contact Rik and let it stop off

WATCH FOR ANY ONE OF THE FOLLOWING SIGNS

Swelling of tongue
 Difficulty breathing
 Pale and floppy (young children)
 Loss of consciousness

ANAPHYLAXIS (SEVERE ALLERGIC REACTIONS)

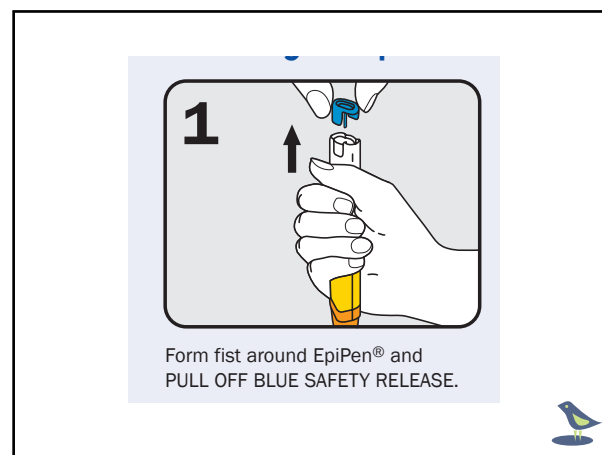
ACTIONS

- 1. LAY PERSON FLAT** - do NOT allow them to stand or walk
 - If unconscious or pregnant, place in recovery position - on left side if pregnant
 - If breathing is difficult allow them to sit with legs outstretched
 - Hold person's airway flat, not upright
- 2. GIVE ADRENALINE DEVICE**
 - Phone ambulance - 000 (000 or 111 RAG)
 - Phone health/emergency contact
 - Further adrenaline may be given if no response after 5 minutes
 - Transfer person to hospital for at least 4 hours of observation
- IF IN DOUBT GIVE ADRENALINE DEVICE**
 - Consume CTR as per first aid instructions
 - or not breathing rapidly

ALWAYS GIVE ADRENALINE DEVICE (EpiPen®) - Even without a doctor's prescription, a person with severe allergic reactions should use an adrenaline device (EpiPen®) immediately if they experience symptoms of anaphylaxis. EpiPen® is a life-saving device that can be used by anyone. It is not a substitute for medical treatment. EpiPen® is a life-saving device that can be used by anyone. It is not a substitute for medical treatment. EpiPen® is a life-saving device that can be used by anyone. It is not a substitute for medical treatment.

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38



39



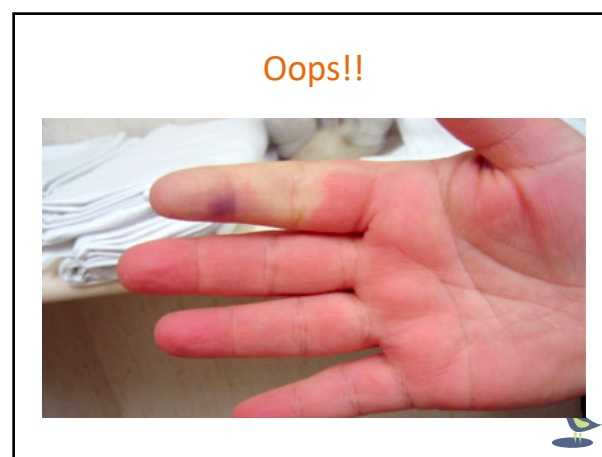
40

Problems with Autoinjectors

- Lack of use of epinephrine auto-injectors (common)
- Not available for purchase in many countries
- Not prescribed by physician
- Not affordable
- Prescription not filled or picked up
- Not accessible when anaphylaxis occurred
- Not used because:
 - Patient used another medication, e.g. H₁-antihistamine or asthma puffer^a
 - Reaction seemed to be mild
 - Reaction seemed to improve quickly
 - Patient was unsure when to inject
 - Patient was afraid to inject
 - Epinephrine was past expiry date
 - Previous systemic allergic reaction improved quickly
- Apparent lack of response to epinephrine (uncommon)
 - Rapid progression of anaphylaxis
 - Empty ventricle syndrome
 - Patient taking another medication that interfered with epinephrine effect
 - Epinephrine injected too late
 - Epinephrine dose too low
 - On a mg/kg basis for body weight of patient
 - Due to auto-injector being past the expiry date
 - Delayed absorption
 - Route of injection not optimal
 - Site of injection not optimal
 - Epinephrine injected using incorrect technique, e.g. not enough force
 - Adverse reaction to sodium metabisulfite preservative in the epinephrine solution (rare)

Simmons et al 2010

41

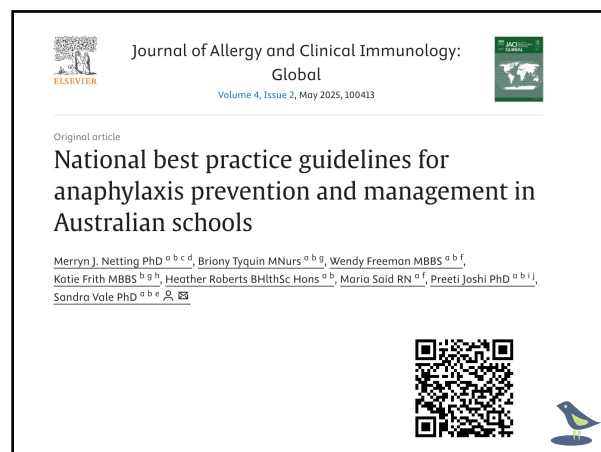


42

More info – Free E-learning



43



44

What did we learn?

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45

ASCIA – Free E-learning



46