

# Anaphylaxis: Basic concepts and management

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## OBJECTIVES

- ▶ Define anaphylaxis
- ▶ Recognise anaphylaxis and how to diagnose it
- ▶ Know the common aetiologies and understand the Australian epidemiology
- ▶ Carry out a proper treatment plan
- ▶ Understand the long term follow-up

## BRIEF HISTORY

- ▶ The first documented case of anaphylaxis was purportedly the death of the Pharaoh Menes from a wasp sting in 2640 BC.
- ▶ Seminal work on anaphylaxis did not occur until early 1900s- studies of sting prophylaxis in dogs
- ▶ Portier and Richet derived "anaphylaxis" from the Greek words "a-" (against) and "-phylaxis" (immunity, protection), literally meaning "without protection"

## DEFINITION

- ▶ Severe, systemic allergic reaction involving the RESPIRATORY and/or CARDIOVASCULAR system(s)
- ▶ Can have cutaneous and/or gastrointestinal features. However, these can be absent in 10-20% of episodes
- ▶ In children, respiratory features predominate (cough, husky voice/cry), compared with cardiovascular sx's in adults (low BP, collapse)



## CLINICAL SYMPTOMS



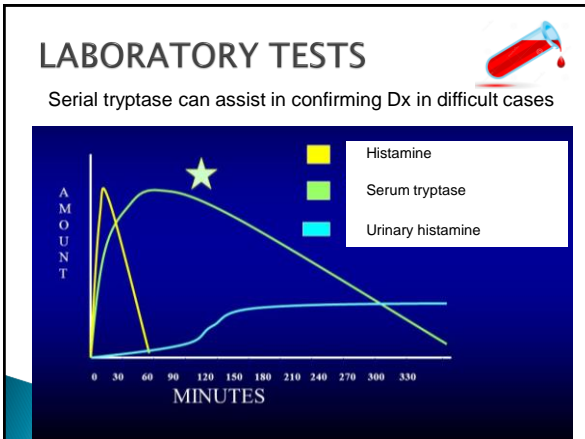
- ▶ Other symptoms which may be present include

Respiratory/airway	Cardiovascular	Skin	Gastrointestinal
Stridor/wheeze	Tachycardia/bradycardia	Urticaria (hives, wheals)	Nausea
Difficulty swallowing	Collapse/loss of consciousness	Angioedema	Vomiting
Persistent cough	Hypotension	Flushing	Abdominal pain
Dyspnoea	Pale and floppy (in infants)	Generalised itch	Diarrhoea
Hoarse voice			
Throat/chest tightness			

## DIAGNOSIS

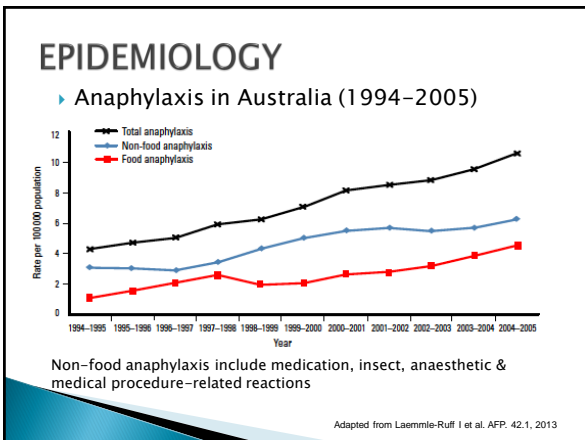
- ▶ Anaphylaxis is a CLINICAL DIAGNOSIS.
- ▶ SHOULD be considered in any patient acute respiratory distress, bronchospasm, hypotension and/or cardiac arrest
- ▶ Timing also helps as usually occurs within 30min of allergen exposure, but may take up to 2-4 hours





### EPIDEMIOLOGY

- ▶ Lifetime prevalence of anaphylaxis has been estimated to be 0.05–2.0%
- ▶ In Australia, anaphylaxis presentations are increasing
- ▶ However, deaths from anaphylaxis remain relatively rare, with 112 (mostly adult) identified deaths between 1997–2005

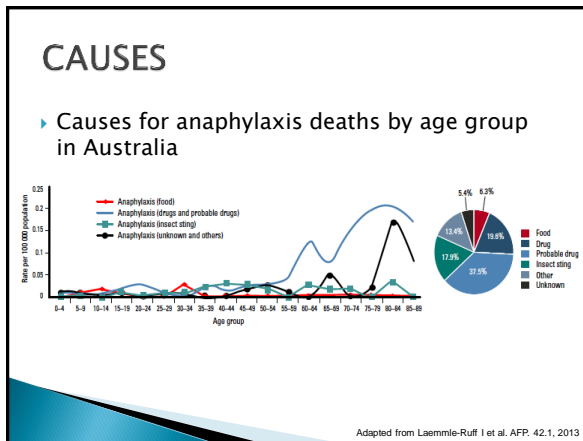


### CAUSES

- ▶ Medications, food and insect venom are the most common triggers in Australia
- ▶ In Australian adults, medications (penicillins, anaesthetics, NSAIDs and opiates) account for ~60% of deaths in Australia
- ▶ Foods (nuts, eggs, cow's milk, wheat, shellfish, fish and sesame) are the most common trigger in Australian children & account for 6% of deaths. NUTS carry highest risk

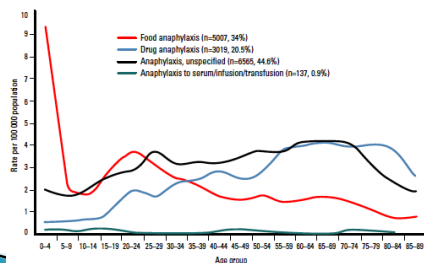
### CAUSES

- ▶ Insect stings account for ~20% of deaths and mostly in males aged more than 35 years. There is limited data in Australia
- ▶ Exercise-induced anaphylaxis can occur in association with a food trigger or in isolation yet this is uncommon
- ▶ Similarly latex, radiocontrast media and idiopathic anaphylaxis are very rare



## CAUSES

- Causes for anaphylaxis admissions by age group in Australia



Adapted from Laemmle-Ruff I et al. AFP. 42:1, 2013

## RISK FACTORS



- Factors that influence the risk of fatal anaphylaxis, include severity of underlying allergy, allergen dose, patient age, medical comorbidities and concurrent medication use.
- ASTHMA and CARDIOVASCULAR DISEASE in particular are associated with an increased risk of severe or fatal anaphylaxis

## RISK FACTORS



- Beta-blockers and angiotensin converting enzyme inhibitors (ACEIs), can increase the severity of anaphylaxis and/or render anaphylaxis more refractory to treatment

OLDER ADULTS (50–80yo)	MEDICATION_ Antibiotic, anaesthetic, NSAIDS, cardiovascular and respiratory comorbidities, concurrent medications (eg. ACEI, beta-blockers)
ADULTS (35–85yo)	INSECT VENOM_ Being male (likely to be related to increased risk of exposure)
CHILDREN, ADOLESCENT & YOUNG ADULTS (10–35y)	FOODS_ Active asthma, peanut trigger, ingestion of food not prepared at home

## MANAGEMENT



- ADRENALINE is first line treatment. IM injection into the anterolateral thigh is the preferred route for initial Rx
- Supportive therapy with nebulised beta-2 agonists (bronchospasm), anti-H1 (cutaneous symptoms), and/or glucocorticoids (biphasic reactions) is utilised, yet plays less important role
- These medications should never be used as an alternative to, or before, adrenaline

## IMMEDIATE ACTION



- Remove allergen (if still present).
- Call for assistance.
- Lay patient flat. Do not allow them to stand or walk. If breathing is difficult, allow them to sit.



- Give INTRAMUSCULAR INJECTION (IMI) OF ADRENALINE (epinephrine) without delay using an adrenaline autoinjector if available OR adrenaline ampoules and syringe.
- Give oxygen (if available).
- Call ambulance to transport patient if not already in a hospital setting.


**ALWAYS give adrenaline autoinjector FIRST, then asthma reliever** if someone with known asthma and allergy to food, insects or medication has SUDDEN BREATHING DIFFICULTY (including wheeze, persistent cough or hoarse voice) even if there are no skin symptoms.

## ADRENALINE DOSING




- 1:1 000 adrenaline IM** into outer mid thigh
- 0.01 mg/kg up to 0.5mg per dose
  - (EpiPen Jr 0.15mg and EpiPen 0.3mg)
- Repeat every 5 minutes as needed
- If multiple doses required or a severe reaction consider adrenaline infusion if skills and equipment available.

## POSITIONING PATIENT




- ▶ ~25% of deaths outside of hospital occurred within seconds of changing to a more upright posture
- ▶ Maintain supine posture
  - If breathing is difficult – sit patient
  - Elevate legs – if hypotension/severe anaphylaxis
  - ‘Lie flat’ now added as initial management on anaphylaxis plan
  - If vomiting left lateral decubitus position is adequate

## ANTIHISTAMINES




- ▶ Antihistamines have no role in treating or preventing respiratory or cardiovascular symptoms of anaphylaxis. Can help with cutaneous sx's
- ▶ Do not use oral sedating antihistamines as side effects (drowsiness or lethargy) may mimic some signs of anaphylaxis
- ▶ **Injectable promethazine should not be used** in anaphylaxis as it can worsen hypotension and cause muscle necrosis

## CORTICOSTEROIDS



- ▶ The benefit of corticosteroids in anaphylaxis is unproven
- ▶ However, it is common practice to prescribe a 2-day course of oral steroids (e.g. oral prednisolone 1 mg/kg, maximum 50 mg daily) to reduce the risk of symptom recurrence after a severe reaction or a reaction with marked or persistent wheeze


## ADRENALINE INFUSION



- ▶ If inadequate response or deterioration start IV adrenaline infusion. LIAISE with an emergency/critical care specialist.
- ▶ Mix 1 mL of 1:1000 adrenaline in 1000 mL of normal saline
- ▶ Start infusion at 5 mL/kg/hour (~0.1 µg/kg/minute ~ 2 drops/second in adult)
- ▶ Titrate rate up or down according to response
- ▶ Monitor continuously

IV BOLUSES ARE NOT RECOMMENDED


## ADDITIONAL MEASURES



For Upper airway obstruction	<ul style="list-style-type: none"> <li>• Nebulised adrenaline (5mL i.e. 5 ampoules of 1:1000).</li> <li>• Consider need for advanced airway management if skills and equipment are available</li> </ul>
For persistent hypotension/shock	<ul style="list-style-type: none"> <li>• Give normal saline (maximum of 50mL/kg in first 30 minutes).</li> <li>• Glucagon (1-2mg IM/IV as starting dose) especially for patients on beta blockers or has heart failure.</li> <li>• In adults, selective vasoconstrictors metaraminol (2-10mg) or vasopressin (10-40 units) only after advice from an emergency medicine/critical care specialist.</li> <li>• See Appendix for additional information</li> </ul>
For persistent wheeze	<p><b>Bronchodilators:</b></p> <ul style="list-style-type: none"> <li>• Salbutamol 8 - 12 puffs of 100µg using a spacer OR 5mg salbutamol by nebuliser.</li> <li>• <b>Note: Bronchodilators do not prevent or relieve upper airway obstruction, hypotension or shock.</b></li> </ul> <p><b>Corticosteroids:</b></p> <ul style="list-style-type: none"> <li>• Oral prednisolone 1 mg/kg (maximum of 50 mg) or intravenous hydrocortisone 5 mg/kg (maximum of 200 mg).</li> <li>• <b>Note: Steroids must not be used as a first line medication in place of adrenaline.</b></li> </ul>

## MID-TERM MANAGEMENT

- ▶ If there is a risk of re-exposure prescribe an adrenaline autoinjector
- ▶ Teach the patient how to use it & provide them with an ASCIA Action Plan for Anaphylaxis
- ▶ ASCIA website [www.allergy.org.au/anaphylaxis](http://www.allergy.org.au/anaphylaxis)



## LONG-TERM MANAGEMENT

- ▶ Refer ALL patients who present with anaphylaxis for specialist review
- ▶ The allergy specialist will:
  - Identify/confirm cause
  - Educate regarding avoidance/prevention strategies, management of comorbidities
  - Provide ASCIA Action Plan for Anaphylaxis – preparation for future reactions
  - Initiate immunotherapy where available (some insect venoms)

## TAKE HOME MESSAGES

1. Careful clinical assessment for anaphylaxis (resp & CVS system)
2. Adrenaline 0.01mL of 1/1000 IM into the lateral thigh = most rapid absorption
3. Remember posture → stay flat
4. Remember Epipen (<20kg = Epipen Junior 150mcg; >20kg = Epipen adult 300mcg)
5. If giving antihistamines - use less-sedating
6. Prescribe Epipen and Anaphylaxis action plan
7. Educate and provide advice regarding allergen exposure. Remember risk factors
8. Refer to specialist for review (ASCIA CERTIFIED)

## ANAPHYLAXIS e-TRAINING

Health Professionals e-training

[ASCIA anaphylaxis e-training for health professionals](#)

Go to <https://etraininghp.ascia.org.au>



THANK YOU