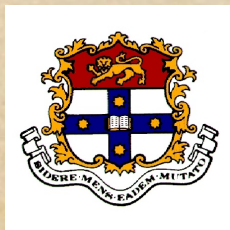


# Emergency Treatment of Anaphylactic Reactions

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# Outline

## Anaphylaxis

- Update Essentials
  - Recognition
  - Treatment
  - Investigations
  - Discharge and follow up
- Case





# Introduction

- Incidence is increasing, 0.5-30 severe cases/10000 people and 1-3 deaths per million<sup>1</sup>
- Sales of EpiPen junior increased by 300%; sales of EpiPen by 193%<sup>2</sup>
- True Emergency
  - Rapid and unpredictable onset
  - Potentially lethal
  - Effective widely available treatment
  - Patients are young and healthy
  - Transcends all medical specialties



• <sup>1</sup> Mounter-Vautrin DA et al. Epidemiology of pre-lethal and lethal anaphylaxis. (English). Revue Francaise d'Allergologie et d'Immunologie Clinique 2004; 44(3):315.

• <sup>2</sup> Kemp A. EpiPen epidemic: Suggestions for rational prescribing in childhood food allergy. Journal of Paediatrics & Child Health 2003; 39(5):372-375.



# History



- Index case allegedly was Pharaoh Menes in 2640 BC who was stung by a wasp aged 3 and died of an anaphylactic reaction
- In 1902 Prince Albert I invited 2 Parisian scientists (Charles Richet & Paul Portier) aboard his yacht to study the Portuguese man of War jellyfish.
  - They isolated the toxin and tried to vaccinate dogs
  - They discovered a new illness that killed within 30 minutes mainly through breathing difficulties
  - They coined **anaphylaxis** (against protection)



# History

- In 1956, Mary Hewitt Loveless showed that injecting wasp venom could cause anaphylaxis in people allergic to wasps
- She then successfully used wasp extracts to immunise these patients



# Definition

- Anaphylaxis is a severe, life threatening, generalised or systemic hypersensitivity reaction<sup>1</sup>
- Causes of anaphylaxis divided into 2 groups:
  - IgE mediated: This form is the true anaphylaxis that requires an initial sensitizing exposure, the coating of the mast cells and basophils by IgE, and the explosive release of chemical mediators upon re-exposure
  - Non-IgE mediated: These reactions, the so called “anaphylactoid” reactions, are similar to those of true anaphylaxis, but do not require an IgE immune reaction. They are usually caused by the direct stimulation of the mast cells and basophils. The same mediators as occur with true anaphylaxis are released and the same effects are produced. This reaction can happen, and often does, on initial as well as subsequent exposures, since no sensitization is required.

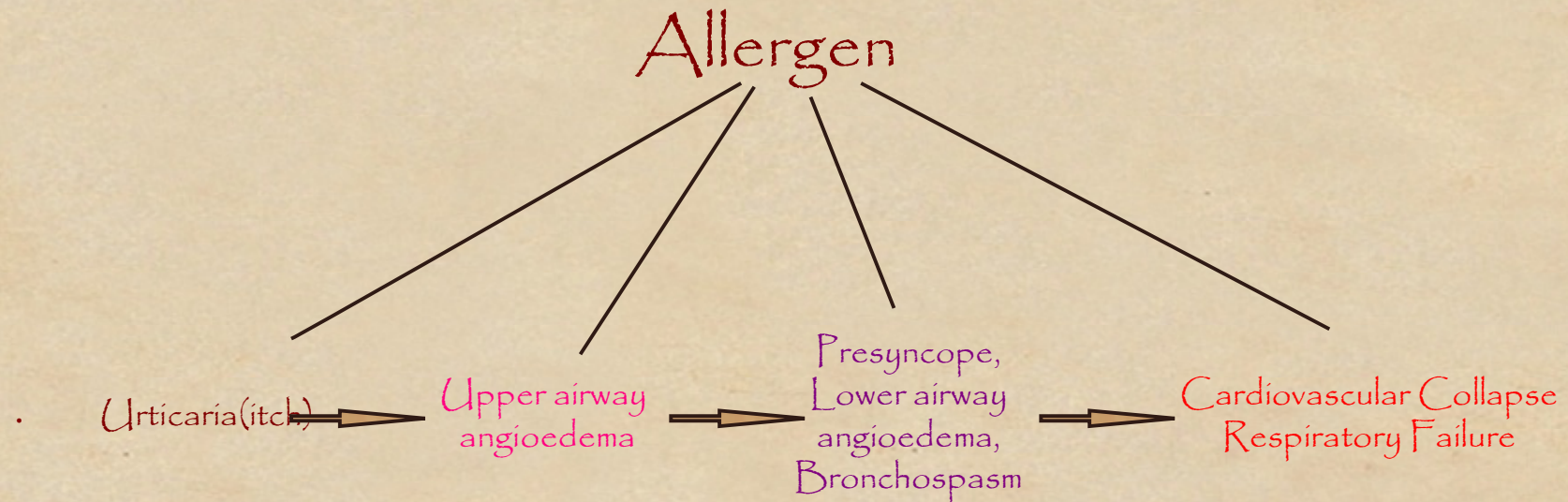


# Aetiology

<b>Venomous stings and Bites</b>	Ants, bees, wasps
<b>Drugs</b>	Penicillins, cephalosporins, cotrimoxazole, NSAIDS, narcotics, radiological contrast, ACE inhibitor, vaccines, gelofusin
<b>Food</b>	sea food, nut, egg, monosodium glutamate, kiwi fruit
<b>Idiopathic</b>	
<b>Other</b>	Exercise induced, latex

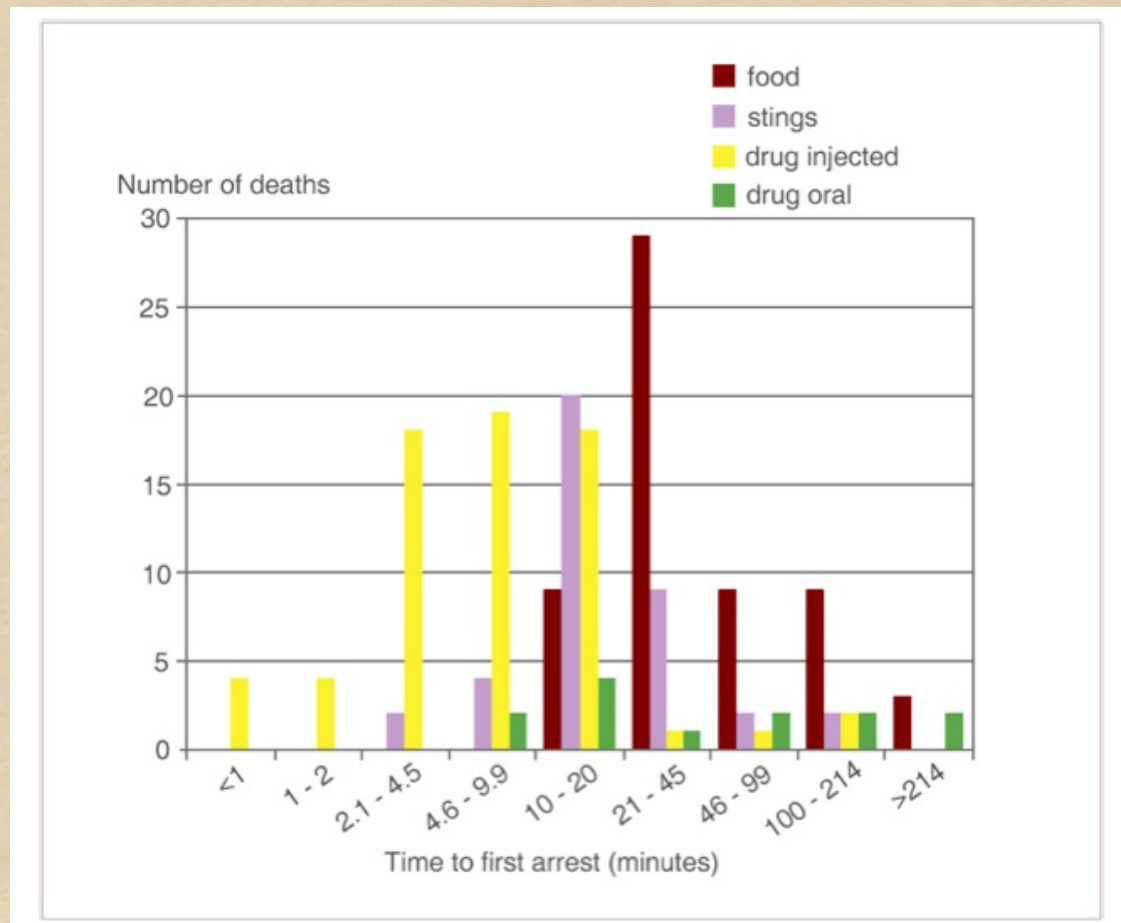


# Spectrum of Allergic Emergencies





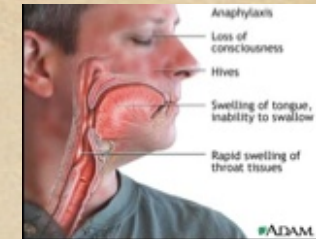
# Time Course for Fatal Reactions



Gupta et al. Time trends in allergic disorders in the UK. Thorax 2007; 62(1):91-6



# Clinical Features of Anaphylaxis



<b>General</b>	Anxiety, malaise, weakness, paresthesia, dry mouth
<b>Cutaneous</b>	Nasal congestion, rhinorrhoea, conjunctival erythema, tearing, itch, flushing, urticaria, angioedema
<b>GIT</b>	Nausea, vomiting, abdominal pain, diarrhoea
<b>Respiratory</b>	Upper airway oedema (difficulty speaking, swallowing, hoarseness, stridor), dyspnoea, bronchospasm, hypoxaemia
<b>CVS</b>	Tachycardia, hypotension, arrhythmias, cardiogenic shock, pulmonary oedema, cardiac arrest
<b>CNS</b>	Headache, dizziness, confusion, LOC



# Recognition of Anaphylaxis

- Anaphylaxis is likely if:
  - Patient is exposed to allergen
  - Develops rapidly progressing symptoms and signs (within minutes)
  - Usually involves skin/mucosa, life threatening airway/breathing and/or circulation problems
  - Reaction is usually unexpected



# Traps even for experienced players

- Diagnostic difficulty caused by:
  - Lack of consistent clinical manifestations and variability of presentation
  - Differential diagnosis (severe asthma, septic shock, vaso vagal, panic attack, idiopathic (non allergic) urticaria or angioedema)
- Inappropriate use of adrenaline or lack of adrenaline for significant anaphylaxis



# Severity grading

Grade	Defined By
<b>Mild</b> (skin and subcutaneous tissue)	Generalised erythema, urticaria, periorbital oedema or angioedema
<b>Moderate</b> (features suggestive of Respiratory, CVS and or GIT involvement)	Dyspnoea, stridor, wheeze, nausea, vomiting, dizziness, diaphoresis, chest or throat tightness, abdominal pain
<b>Severe</b> (hypoxia, hypotension or CNS involvement)	Cyanosis or SpO <sub>2</sub> ≤ 92%, hypotension (SBP < 90 mmHg in adults), confusion, collapse, LOC or incontinence



# Management

- Depends on
  - Location
  - Training and skills of rescuers
  - Number of responders
  - Equipment and drugs available



# Management

- As diagnosis is not always obvious, follow a systematic approach to critically ill patient
- Use ABCDE approach
- Treat life threatening problems as you find them
- Basic principles of treatment are the same for all age groups



# The Basics

- Recognition of ill patient
- Call for help early
- Assess and manage ABCDEs
- Adrenaline therapy if indicated
- Investigation and follow up by allergy specialist



# Therapeutic Considerations

<b>Adrenaline (<math>\beta &gt; \alpha</math>)</b>	IM 0.01 mg/kg up to 0.5mg (1:10000) IV 0.3-0.5mg of 1:10000 in severe shock, 2 <sup>nd</sup> dose required in 35%, infusion in 10%
<b>Posture</b>	Lie Flat with legs elevated
<b>Fluids</b>	Bolus 20ml/kg, up to 40ml/kg total
<b>Atropine &amp; Vasopressors</b>	Consider atropine for refractory bradycardia (0.02mg/kg); consider metaraminol (2-10 mg in adults) for persistent hypotention
<b>Antihistamines</b>	Selective non sedating agents for symptomatic relief of skin symptoms only. NO ROLE FOR IV PHENERGAN
<b>Steroids</b>	No proven benefit, particularly early. No harm in giving.





Anaphylactic reaction?

Airway, Breathing, Circulation, Disability, Exposure

Diagnosis - look for:

- Acute onset of illness
- Life-threatening Airway and/or Breathing and/or Circulation problems<sup>1</sup>
- And usually skin changes

- Call for help
- Lie patient flat
- Raise patient's legs

Adrenaline<sup>2</sup>

When skills and equipment available:

- Establish airway
  - High flow oxygen
  - IV fluid challenge<sup>3</sup>
  - Chlorphenamine<sup>4</sup>
  - Hydrocortisone<sup>5</sup>
- Monitor:**
- Pulse oximetry
  - ECG
  - Blood pressure

**1 Life-threatening problems:**

- Airway:** swelling, hoarseness, stridor  
**Breathing:** rapid breathing, wheeze, fatigue, cyanosis, SpO<sub>2</sub> < 92%, confusion  
**Circulation:** pale, clammy, low blood pressure, faintness, drowsy/coma

**2 Adrenaline (give IM unless experienced with IV adrenaline)**

- IM doses of 1:1000 adrenaline (repeat after 5 min if no better)
- Adult 500 micrograms IM (0.5 mL)
  - Child more than 12 years: 500 micrograms IM (0.5 mL)
  - Child 6 - 12 years: 300 micrograms IM (0.3 mL)
  - Child less than 6 years: 150 micrograms IM (0.15 mL)

Adrenaline IV to be given **only by experienced specialists**  
Titrate: Adults 50 micrograms; Children 1 microgram/kg

**3 IV fluid challenge:**

- Adult - 500 - 1000 mL
- Child - crystalloid 20 mL/kg

Stop IV colloid if this might be the cause of anaphylaxis

**4 Chlorphenamine (IM or slow IV)**

- Adult or child more than 12 years 10 mg
- Child 6 - 12 years 5 mg
- Child 6 months to 6 years 2.5 mg
- Child less than 6 months 250 micrograms/kg

**5 Hydrocortisone (IM or slow IV)**

- 200 mg
- 100 mg
- 50 mg
- 25 mg



# Case

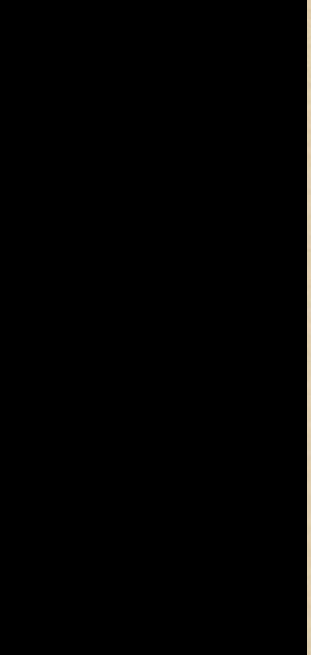
- 35 year old man presents for sclerotherapy of varicose veins in his right leg
  - Past history is unremarkable
  - No medications, no allergies, non smoker, 20-30ms of alcohol/day
  - Married, factory floor manager





10 minutes after LA and sclerosing solution is injected into his leg





What Do you Do?



- Stop any infiltration and procedure
- Get help
- Check ABCDE<sub>s</sub>
- Consider non sedating antihistamine for symptomatic relief
- Advise observation in ED
- Advise transport by ambulance
- Document, refer to immunologist
- Follow up



# Case

- Same case but.....
  - Anxious
  - Paraesthesia to tongue and lips
  - Difficulty speaking
  - Chest tightness
  - Generalised rash
  - Not feeling well, nausea, dizzy





What Do You Do?





# Case

- Call for help
- Call 000
- DRABCDE
- Keep patient and yourself as calm as possible
- Apply oxygen via NRBM
- Give 5ml 1:1000 nebulised adrenaline
- Give 0.3-0.5mg adrenaline IM
- Insert IV and start IV fluids (stat)





# Case

- Minimal improvement
- Paramedics are on their way when:
  - Becomes centrally cyanosed
  - Increasing chest tightness and bronchospasm
  - Fluctuating level of consciousness, unable to measure BP
  - Vomits and aspirates



# Case



- What Now?





- Reassess ABC
- ALS principles
- Suction airway if possible
- Support airway
- Start CPR if not responsive
- Titrate 100micrograms IV at a time of adrenaline (dilute 1 ml of 1:1000 with 10mls normal saline)





# Crisis Resource Management

- Know your environment
- Anticipate and Plan
- Call for help
- Prioritise
- Allocate attention wisely
- Distribute workload
- Communicate effectively



Thank You

