Anaphylaxis

Definition

Multisystem severe hypersensitivity reaction of sudden onset (or rapidly progressive).
Requires at least 1 of the following 3 criteria:

1. Acute onset of mucocutaneous signs AND 1 of the following: respiratory compromise (wheezing-bronchospasm, dyspnea, stridor, hypoxemia), ↓BP (syncope), or hypotonia.
2. Rapid onset of 2 of the following after exposure to likely allergen: mucocutaneous signs, respiratory compromise, hypotension, or persistent gastrointestinal symptoms.
3. Hypotension after exposure to a known allergen.

Pathophysiology

- Allergic: Type 1 hypersensitivity reaction: allergen crosslinks specific IgE antibodies on mast cells and basophils → rapid release (degranulation) of stored histamine, LTs, PAF, cytokines & chemotactic factors →capillary leakage, mucosal oedema →ultimately shock and asphyxia. Usually immediate (<1hr), occasionally biphasic & rarely delayed.
- Anaphylactoid: degranulation via non-IgE mediated pathway.

Causes:

- Idiopathic.
- Foods: (peanuts, other nuts, shellfish, fish, eggs, milk, strawberries, mushrooms)
- Venom: (bee/wasp stings) or antivenoms
- Drugs (incl Abx, opioids, NSAIDs, IV contrast, muscle relaxant, streptokinase)
- Others: Latex, heat/cold, exercise.

Presentation

History: Previous reaction, new exposure to a drug / food.
Mucocutaneous: Urticaria, rhinitis, conjunctivitis and angio-oedema.
Respiratory: itching of the palate / external auditory meatus, dyspnoea, stridor / wheezing.
CVS: Palpitations, tachycardia, hypotension, syncope, collapse
GIT: Nausea, vomiting, abdominal pain, diarrhoea
Other: Sense of impending doom

Management

- Attach monitoring, take vital signs, ECG.
- Remove allergen, sting, wash mouth out etc.
- Airway: Consider suction, intubation (**adrenaline** 1:1000 5ml neb may help if poor view, but don't delay if worsening) – beware hypotension may be exacerbated with drugs.
- CPR if cardiac arrest
- High flow O_2
- **Adrenaline**
    - 0.3-0.5mg (0.3-0.5ml of 1:1000) [child 10mcg/kg or 0.01ml/kg 1:1000] IM stat
    - If unresponsive to 2 x IM doses or moribund, consider IV options:
        - Bolus of 0.1ml/kg 1:100,000 IV over 5-10min [1mcg/kg]
            - Dilute 1ml of 1:10,000 [100mcg] in 10ml **NS** to get 1:100,000 [10mcg/ml]
        - Infusion of 0.1mcg/kg/min-1mcg/kg/min, titrating from lower dose
            - Dilute 6ml of 1:1000 [6mg] in 1L **NS** [6mcg/ml] start @ 1ml/kg/hr [0.1mcg/kg/min]
            - If fluid an issue use 100ml **NS** [10mcg/ml] & start @ 0.1ml/kg/hr [0.1mcg/kg/min]
    - If resistant to adrenaline (e.g. on -blockers), try 1-2mg glucagon IV over 5min

- IVC & Fluids:
  - **0.9% Saline** or colloid 500ml-1L [child 10-20ml/kg] boluses.
- Other therapies:
  - **Salbutamol** 5mg [2.5mg<20kg] if bronchospasm only.
  - Steroids (?may ↓delayed/biphasic reactions) if asthmatic or severe: **hydrocortisone** 200mg [child:4mg/kg] IV or **prednisolone** 50mg [1mg/kg] PO
  - Antihistamines for skin manifestations. Avoid IV route as can ↓BP. $H_1 \pm H_2$ blockers:
    - **Promethazine** 10-25mg [child: 0.125-0.5mg/kg] PO or non-sedating **loratidine** 10mg [child: 5mg if ≤6yr, 2.5mg if 1-2yr] PO
    - **Ranitidine** 150mg [child: 3mg/kg] PO or 50mg [1mg/kg] IV

Investigations

- Consider serial serum tryptase levels (immediately, 2hr & 24hr post-exposure) – if high suggests degranulation by mast cells (low level doesn't exclude anaphylaxis)
- Outpatient allergy testing

Disposition

- Observation for at least 6hrs and admit if:
  - Asthmatic component to their anaphylactic reaction
  - Previous history of biphasic reactions
  - Possibility of continuing absorption of allergen
  - Poor access to emergency care
  - Presentation in the evening or at night
  - Severe reactions with slow onset caused by idiopathic anaphylaxis
- On discharge:
  - Organise prescription & education on usage of an EpiPen® (adult 300µg 1:1000 adrenaline, child<20kg 150µg 1:2000 adrenaline)
  - Encourage patient to wear a Medic alert bracelet/necklace endorsed by doctor.
  - Consider 3 day course of antihistamines and oral steroids.