CARDIAC ARREST IN SPECIAL CIRCUMSTANCES 2
Objectives

To understand how resuscitation techniques should be modified in the special circumstances of:

- Hypothermia
- Immersion and submersion
- Poisoning
- Pregnancy
- Electrocution
- Anaphylaxis
- Acute severe asthma
- Trauma
Pregnancy: causes of maternal cardiac arrest

- Haemorrhage
- Pulmonary embolism
- Amniotic fluid embolism
- Placental abruption
- Eclampsia
- Drug toxicity
Resuscitation in pregnancy

- Two people to resuscitate
- Early involvement of obstetrician and neonatologist
Airway

- ↑ risk of regurgitation
- Cricoid pressure
- Tracheal intubation (difficult):
  - obesity of neck
  - breast enlargement
  - glottic oedema
Breathing

Difficult because of:

• Diaphragmatic splinting
• High inflation pressures may be required
Circulation

- Supine position causes caval compression
- Displace uterus using:
  - sandbags or (Cardiff) wedge
  - manual displacement
  - left lateral tilt
- Volume replacement
- Early surgical intervention if bleeding
Emergency caesarian section in 3rd trimester if resuscitation unsuccessful after 5 minutes
Electrocution
Electrocution

- Electricity (AC):
  - domestic
  - industrial
- Lightning strike (DC)
Factors influencing severity

- Current type and pathway through body
  - alternating (AC) - VF more common
  - direct (DC) - asystole more common
- Voltage
- Magnitude of delivered energy
- Resistance to current flow
- Area and duration of contact
Electrical injury
Lightning

- Depolarisation of myocardium
  - asystole or VF
- Respiratory muscle paralysis may cause respiratory arrest
- Widespread neurological damage
Rescue with Safety

- Switch off / isolate supply
- High tension may
  - arc / jump
  - spread through ground
Resuscitation

- Early BLS and ALS
- Early intubation if burns to face/neck
- Muscular paralysis may persist for 30 minutes after high voltage shocks
Indications for admission

- Cardiac arrest
- Loss of consciousness
- ECG abnormalities
- Soft tissue damage and burns
Anaphylaxis

- Anaphylaxis - hypersensitivity reaction mediated by IgE
- Anaphylactoid - similar reaction but not dependent on hypersensitivity
- Manifestations and management similar
Common clinical features

• Angio-oedema - laryngeal oedema
• Rash (urticaria / erythema)
• Hypotension
  – vasodilatation & ↑ vascular permeability
• Bronchoconstriction
• Rhinitis, conjunctivitis
• Abdominal pain, vomiting & diarrhoea
Resuscitation

• Remove likely allergen
• High flow oxygen
• Epinephrine
  – shock, stridor, etc - 0.5 ml 1:1000 i.m.
  – profound shock - titration of 1:10,000 i.v.
• Fluids
• Antihistamine - H\textsubscript{1}, consider H\textsubscript{2}
• Hydrocortisone and inhaled $\beta\textsubscript{2}$ agonist
Consider when compatible history of severe allergic-type reaction with respiratory difficulty and/or hypotension especially if skin changes present.

**Oxygen**

Stridor, wheeze, respiratory distress or clinical signs of shock

Epinephrine (adrenaline) 1:1000 solution 0.5 ml (500 micrograms) i.m.

Repeat in 5 minutes if no clinical improvement

Antihistamine (chlorpheniramine) 10-20 mg slow i.v.

**IN ADDITION**

For all severe or recurrent reactions and patients with asthma, give hydrocortisone 100-500 mg i.m./or slowly i.v.

If clinical manifestations of shock do not respond to drug treatment, give 1-2 litres i.v. fluid. Rapid infusion may be necessary.
Caution: early recurrence

- Severe reactions with slow onset
- Reactions in severe asthmatics
- Continuing to absorb allergen
- Previous history of biphasic reactions
Acute severe asthma

- Largely reversible
- Deaths considered avoidable
  - patients seek medical help late
  - slow response by medical personnel
  - premature discharge home
Asthma and cardiac arrest

• Hypoxia
  – bronchospasm
  – mucus plugging

• Arrhythmias
  – hypoxia
  – drug toxicity

• Tension pneumothorax
Near fatal asthma: features

- Silent chest
- Cyanosis
- Bradycardia
- Hypotension
- Exhaustion
- Coma
- Hypoxia, acidaemia, +/- hypercarbia
Immediate treatment (1)

- High concentration oxygen
- Inhaled $\beta_2$-agonists
- Early steroids
- Subcutaneous epinephrine 300 $\mu$g
- Inhaled anti-cholinergics, aminophylline i.v.
- Fluids
Immediate treatment (2)

• Mechanical ventilation only when maximal medical therapy has failed
• May not be possible to achieve normal blood gases
Resuscitation of the asthmatic patient in cardiac arrest

- Ventilation of lungs difficult
  - Bag-valve-mask → gastric inflation
  - Early intubation
- Risk of tension pneumothorax
- Effective chest compression difficult
- Allow prolonged respiratory time
- Consider open chest cardiac massage
Trauma related cardiac arrest

Causes:

• Severe brain injury
• Hypovolaemia, hypoxia
• Injuries to vital organs
• Tension pneumothorax
• Cardiac tamponade
• Underlying medical problems
Resuscitation for trauma

- Identify and treat life-threatening injuries before cardiac arrest
- Protect cervical spine
- Hypoxia and/or hypovolaemia $\rightarrow$ PEA
- Oxygen, stop bleeding, fluids
- Resuscitative thoracotomy for cardiac arrest associated with penetrating injury
Open chest cardiac massage: Indications

- Recent cardiothoracic surgery
- PEA after penetrating trauma
- Hyperinflated lungs or fixed rib cage
- During abdominal or thoracic surgery
Any Questions?
Summary

• Prompt and correct treatment may prevent cardiac arrest
• Modify advanced life support techniques for special circumstances of arrest