

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 - H₁, consider H₂
- Hydrocortisone and inhaled β₂ 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 β_2 -agonists
- Early steroids
- Subcutaneous epinephrine 300 μg
- 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 → 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