CAUSES AND PREVENTION OF CARDIORESPIRATORY ARREST
Objectives

To understand:

• The causes of cardiorespiratory arrest in adults
• How to identify patients at risk
• The role of a Medical Emergency Team
• The initial management of patients at risk of a cardiorespiratory arrest
Causes of cardiorespiratory arrest

1. Airway obstruction

- CNS depression
- Blood, vomit, foreign body
- Trauma
- Infection, inflammation
- Laryngospasm
- Bronchospasm
Causes of cardiorespiratory arrest

2. Breathing inadequacy

- Decreased respiratory drive
  - CNS depression
- Decreased respiratory effort
  - neurological lesion
  - muscle weakness
  - restrictive chest defect
- Pulmonary disorders
  - pneumothorax, lung pathology
Causes of cardiorespiratory arrest

3. Cardiac abnormalities

**Primary**
- Ischaemia
- Myocardial infarction
- Hypertensive heart disease
- Valve disease
- Drugs
- Electrolyte abnormalities

**Secondary**
- Asphyxia
- Hypoxaemia
- Blood loss
- Septic shock
Recognition of patients at risk

• History, examination, investigations
• Clinical indicators of deterioration before in-hospital cardiac arrest in 80%
  – tachypnoea
  – tachycardia
  – hypotension
  – reduced conscious level
Medical Emergency Team (MET) Calling Criteria

• Airway - threatened
• Breathing
  – Respiratory arrest
  – RR < 5 or RR > 36
• Circulation
  – Cardiac arrest
  – PR < 40 or PR > 140
  – Systolic BP < 90

• Neurology
  – sudden fall in GCS > 2
• Any other worries

RR = respiratory rate
PR = pulse rate
Airway obstruction

**Symptoms and signs**
- Difficulty breathing, distressed, choking
- Shortness of breath
- Stridor, wheeze, gurgling
- See-saw respiratory pattern

**Actions**
- Suction, positioning
- BLS manoeuvres
- Advanced airway intervention
### Breathing inadequacy

**Symptoms and signs**
- Short of breath, anxious, irritable
- Decrease in conscious level
- Tachypnoea
- Cyanosis

**Action**
- Oxygen
- Ventilatory support
- Treat underlying cause where possible
Cardiac abnormalities: Acute Coronary Syndromes

Clinical syndromes form spectrum of the same disease process:

- Unstable angina
  ↓
- Non-Q wave myocardial infarction
  ↓
- Q wave myocardial infarction
Stable angina

- Pain from myocardial ischaemia
  - tightness/ache across chest
  - radiating to throat/arms/back/epigastrium
  - provoked by exercise
  - settles when exercise ceases

- NOT an acute coronary syndrome
Unstable angina

- Angina of effort with increasing frequency and provoked by less exertion
- Angina occurring recurrently and unpredictably - not specific to exercise
- Unprovoked and prolonged episode of chest pain - no ECG or laboratory evidence of MI
Non-Q wave myocardial infarction

- Symptoms suggesting MI
- Non-specific ECG abnormalities
  - ST segment depression
  - T wave inversion
- Elevated cardiac enzymes
- Unstable coronary artery disease
  - unstable angina
  - non-Q wave MI
Non-Q wave myocardial infarction

RHYTHM STRIP: II
25 mm/sec; 1 cm / mV
Q wave myocardial infarction

- Prolonged chest pain
- Acute ST segment elevation
- Q waves
- Elevated cardiac enzymes
  - creatine kinase
  - troponins
Anterolateral myocardial infarction

RHYTHM STRIP: II
25 mm/sec: 1 cm / mV
Immediate treatment in all acute coronary syndromes

• “MONA”
  – Morphine (or diamorphine)
  – Oxygen
  – Nitroglycerine (GTN spray or tablet)
  – Aspirin 300 mg orally (crushed/chewed)
Patients with ST segment elevation MI or MI with LBBB

Early coronary reperfusion therapy:

- Thrombolytic therapy
  - streptokinase
  - alteplase
- Percutaneous transluminal coronary angioplasty (PTCA)
- Coronary artery bypass surgery (CABG)
Indications for thrombolytic therapy for MI

Presentation < 12 h of typical chest pain, and:

- ST segment elevation:
  - > 0.2 mV in 2 adjacent chest leads, or
  - > 0.1 mV in 2 or more limb leads

- New onset left bundle branch block

- Dominant R waves and ST depression in V1-V3

- Presentation 12-24 h after onset of pain with continuing pain +/- evolving MI on ECG
Absolute contraindications to thrombolytic therapy

- Previous haemorrhagic stroke
- Other stroke or CVA within 6 months
- Active internal bleeding
- Aortic dissection
Unstable angina and non-Q wave MI

- “MONA”
- Heparin
  - continuous infusion unfractionated, or
  - subcutaneous low molecular weight
- Intravenous nitrate
- If “high risk” - glycoprotein IIb/IIIa inhibitor
- Consider beta-blockers
Any Questions?
Summary

• Airway, breathing or cardiac problems can cause cardiorespiratory arrest
• Patients often have warning symptoms and signs
• Early recognition may allow arrest prevention
• In acute coronary syndromes consider “MONA” and start reperfusion therapy early, if indicated