ALS
Special Circumstances III
Acute Coronary Syndromes

Metaxia Bareka

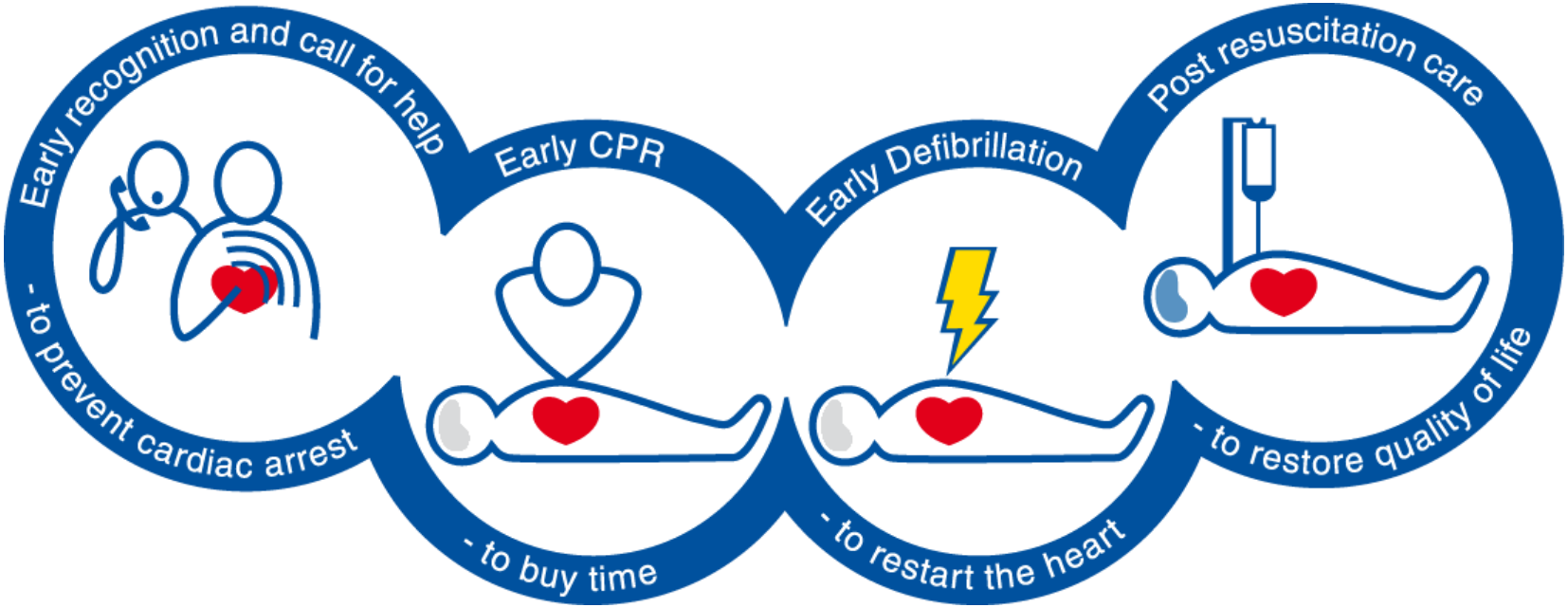
Anesthesiologist

ERC Course Organizer, Course Director

Discussion points

- Special Circumstanses - 4 “T”
  - Tension Pneumothorax
  - Tamponade
  - Toxins
  - Thrombosis
- Acute Coronary Syndromes

Chain of Survival



A irway

B reathing

C irculation

D isability

E xposure

Unresponsive and
not breathing normally

Call Emergency Services

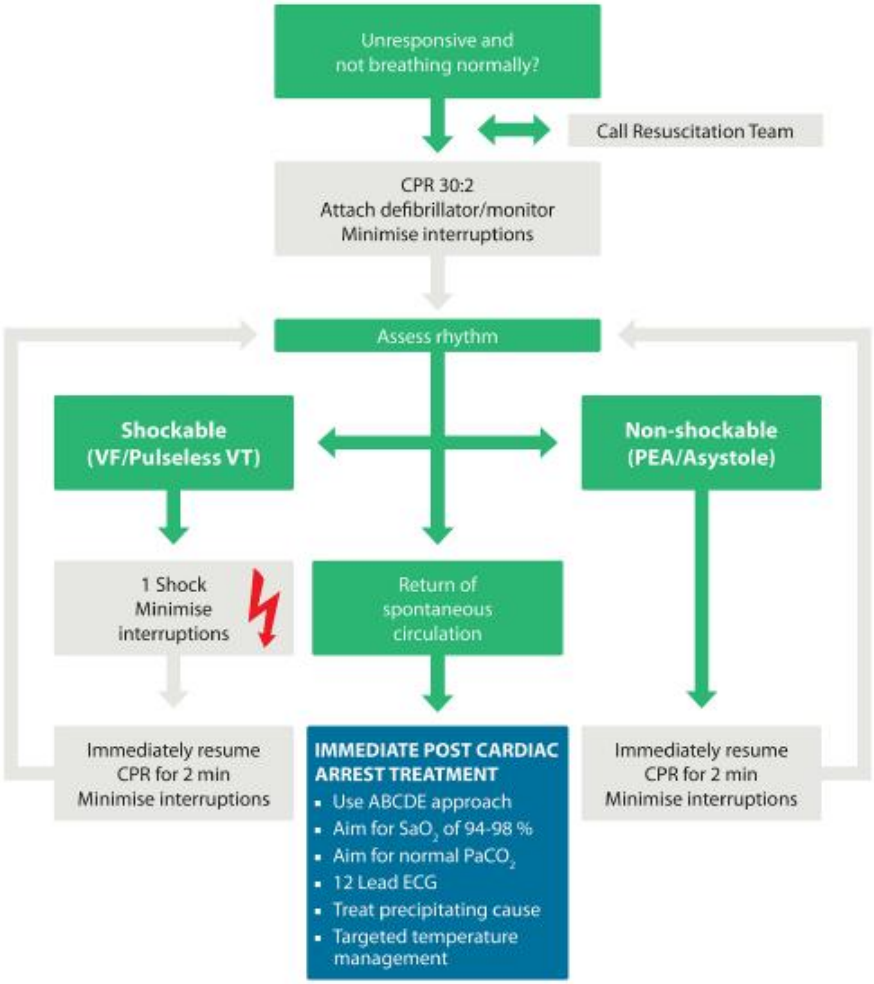
Give 30 chest compressions

Give 2 rescue breaths

Continue CPR 30:2

As soon as AED arrives:
switch it on
and follow instructions

Adult ALS Algorithm



DURING CPR

- Ensure high quality chest compressions
- Minimise interruptions to compressions
- Give oxygen
- Use waveform capnography
- Continuous compressions when advanced airway in place
- Vascular access (intravenous or intraosseous)
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks

TREAT REVERSIBLE CAUSES

Hypoxia	Thrombosis – coronary or pulmonary
Hypovolaemia	Tension pneumothorax
Hypo-/hyperkalaemia/metabolic	Tamponade – cardiac
Hypothermia/hyperthermia	Toxins

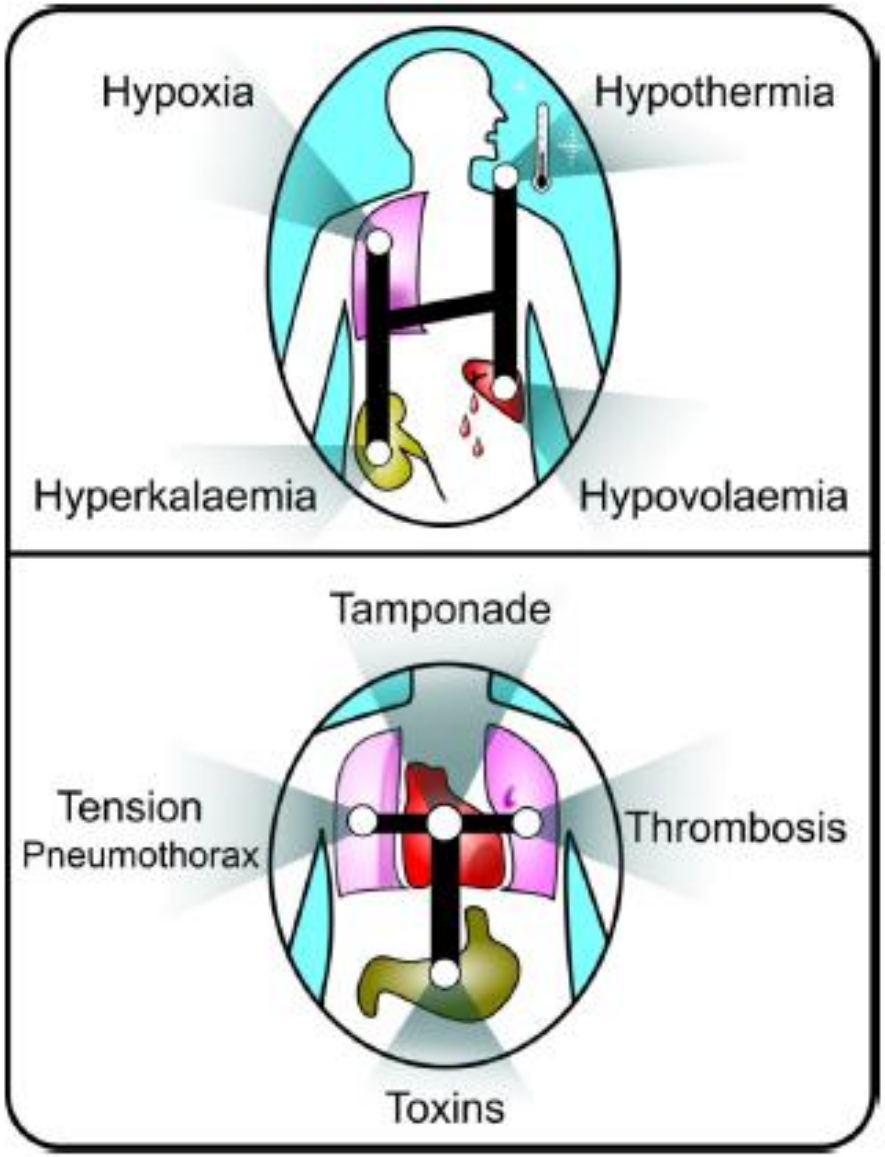
CONSIDER

- Ultrasound imaging
- Mechanical chest compressions to facilitate transfer/treatment
- Coronary angiography and percutaneous coronary intervention
- Extracorporeal CPR

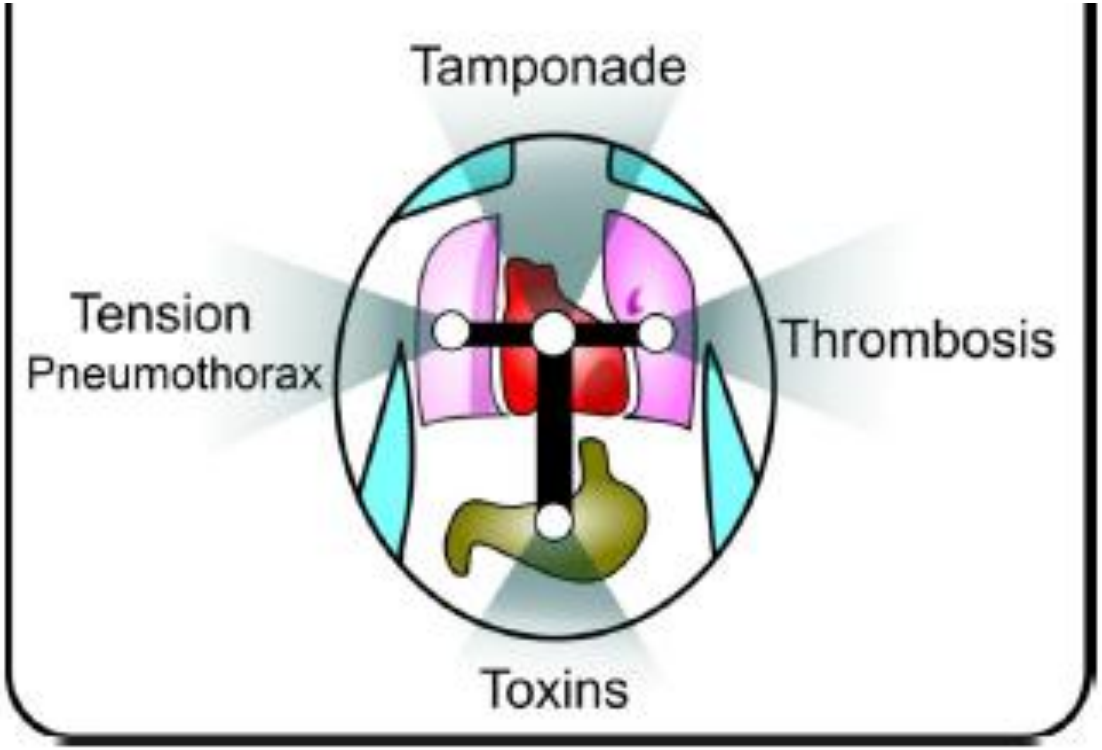
TREAT REVERSIBLE CAUSES

- Hypoxia
- Hypovolaemia
- Hypo-/hyperkalaemia/metabolic
- Hypothermia/hyperthermia
- Thrombosis – coronary or pulmonary
- Tension pneumothorax
- Tamponade – cardiac
- Toxins

Reversible causes



4 “T”

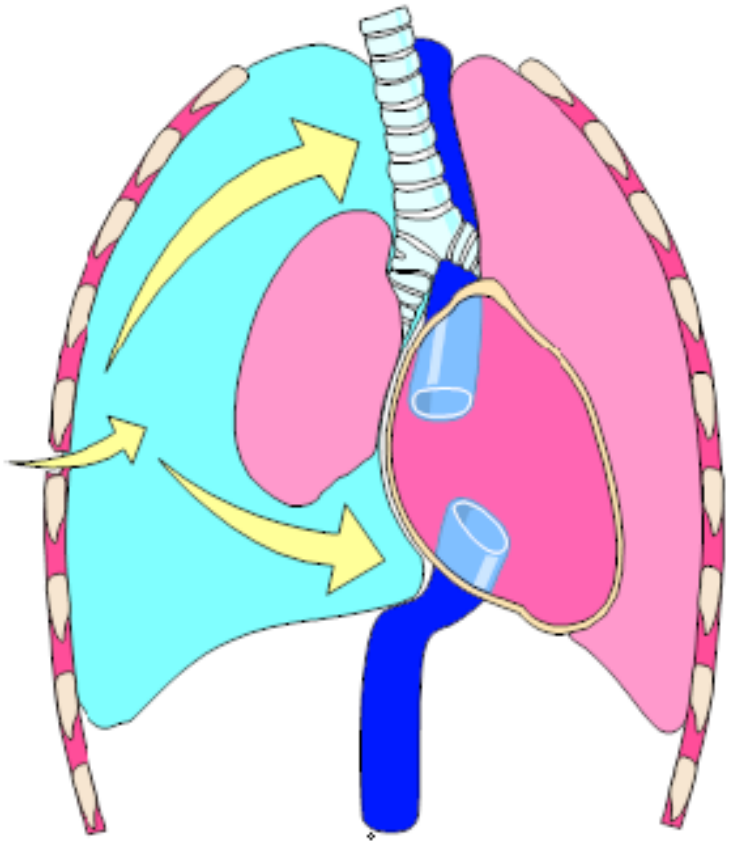


Tension Pneumothorax

- Primary cause of PEA
- Frequent after attempts for CVC insertion
- Clinical diagnosis

Tension Pneumothorax

- Check tube position if intubated
- Clinical signs
  - Decreased breath sounds
  - Hyper-resonant percussion note
  - Tracheal deviation
- Initial treatment with needle decompression or thoracostomy

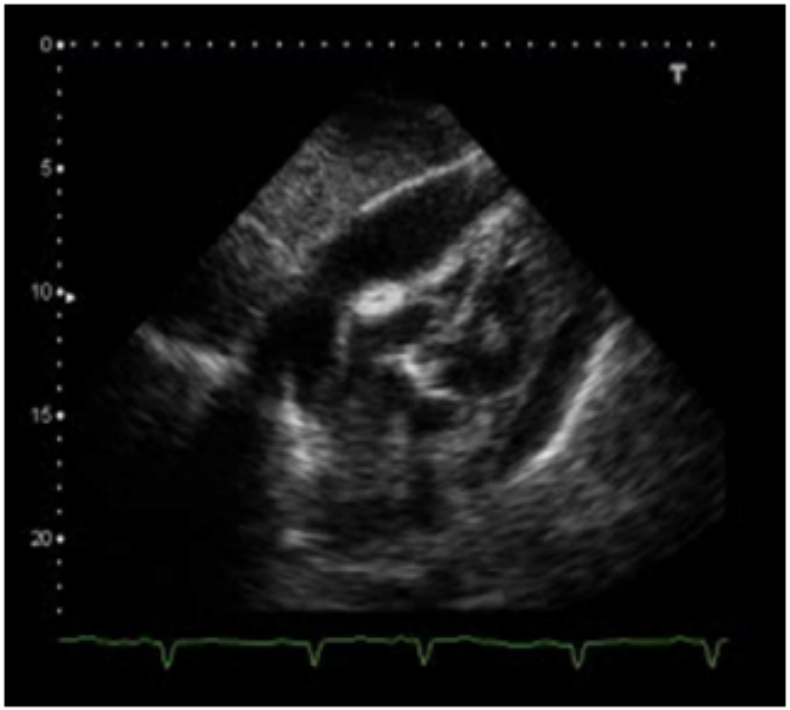


Cardiac Tamponade

- Typical signs:
  - Distended neck veins
  - Hypotension
- Absence during cardiac arrest
- Suspicions during cardiac arrest:
  - Perforating chest trauma
  - Cardiac surgery

Cardiac Tamponade

- Difficult to diagnose without echocardiography
- Consider if penetrating chest trauma or after cardiac surgery
- Treat with needle pericardiocentesis or resuscitative thoracotomy



Toxins

- Rare unless evidence of deliberate overdose
- Review drug chart

Toxins

- Poisoning from drugs for medical reasons or "leisure"
  - Wrong dosage
  - Drug interactions
- Household substances
- Professional exposure

Toxins

ABCDE approach

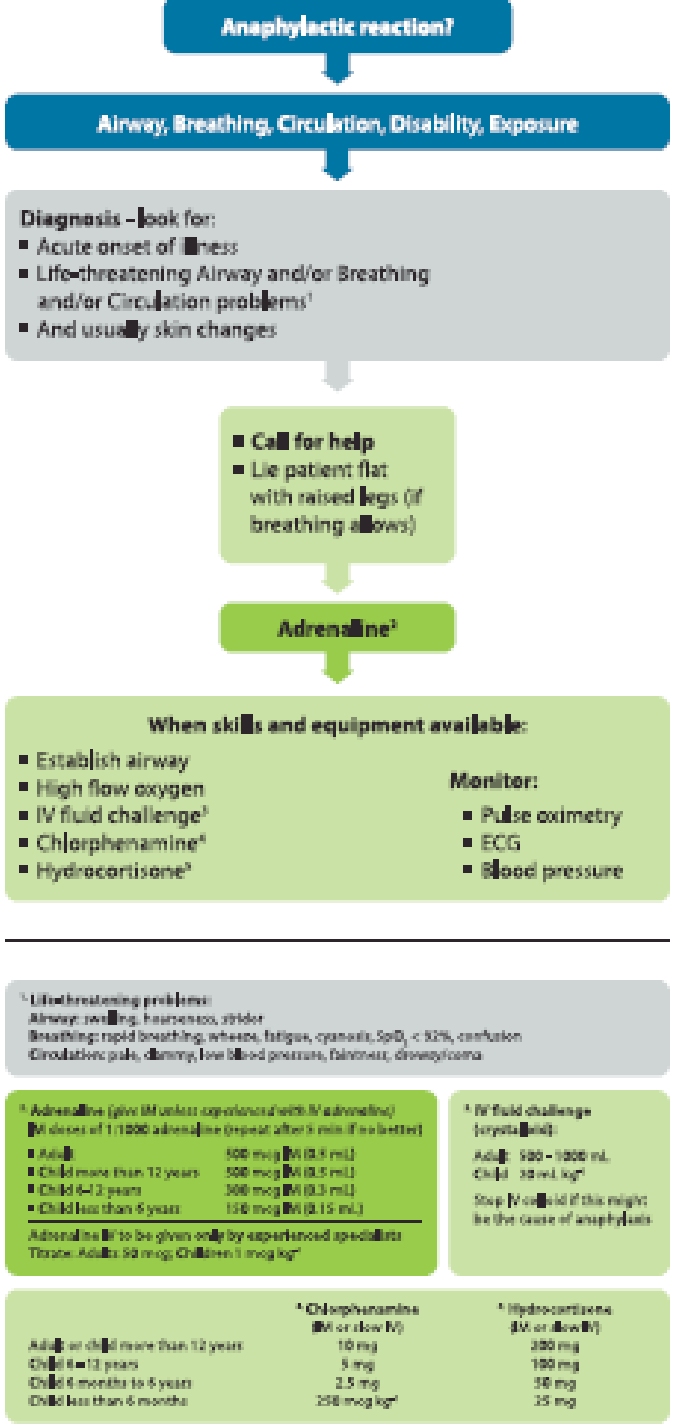
- Personal safety
- Avoid mouth to mouth ventilation
- Identify toxin
- Family, friends
- Contact poisoning center
  - tel 2107793777
  - http://apps.who.int.poisoncentres

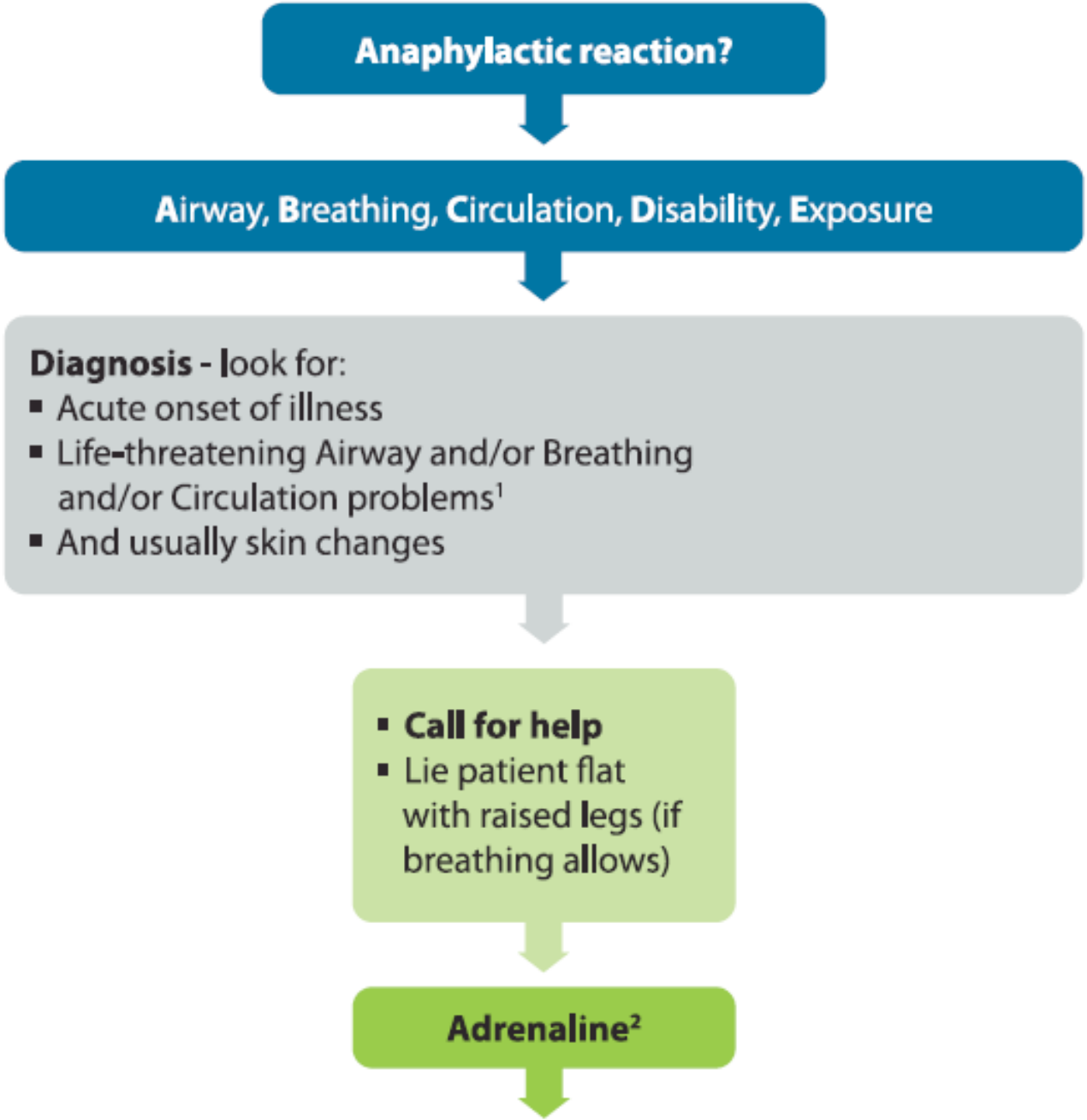
Toxins

Therapeutic measures improving outcome:

- Decontamination
- Enhancing elimination
- Specific antidotes

- Gastrointestinal decontamination
  - Patients with intact airway
  - Activated charchoal
  - 1h from ingestion


Anaphylactic reaction?
Airway, Breathing, Circulation, Disability, Exposure
Diagnosis – look for:
Acute onset of illness
Life-threatening Airway and/or Breathing and/or Circulation problems[1]
And usually skin changes
Call for help
Lie patient flat with raised legs (if breathing allows)
Adrenaline[2]
When skills and equipment available:
Establish airway
High flow oxygen
IV fluid challenge[3]
Chlorphenamine[4]
Hydrocortisone[5]
Monitor:
Pulse oximetry
ECG
Blood pressure
[1] Life-threatening problems:
Airway: swelling, hoarseness, stridor
Breathing: rapid breathing, wheeze, fatigue, cyanosis, SpO2 < 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 mcg IM (0.5 mL)
Child more than 12 years 500 mcg IM (0.5 mL)
Child 6–12 years 300 mcg IM (0.3 mL)
Child less than 6 years 150 mcg IM (0.15 mL)
Adrenaline IV to be given only by experienced specialists
Titrate. Adults 50 mcg; Children 1 mcg kg-1
[3] IV fluid challenge (crystalloid)
Adult 500 – 1000 mL
Child 20 mL kg-1
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 mcg kg-1
[5] Hydrocortisone (IM or slow IV)
Adult or child more than 12 years 200 mg
Child 6–12 years 100 mg
Child 6 months to 6 years 50 mg
Child less than 6 months 25 mg


Anaphylactic reaction?
Airway, Breathing, Circulation, Disability, Exposure
Diagnosis - look for:
Acute onset of illness
Life-threatening Airway and/or Breathing and/or Circulation problems[1]
And usually skin changes
Call for help
Lie patient flat with raised legs (if breathing allows)
Adrenaline[2]

Anaphylactic reaction

1. **Life-threatening problems:**
   Airway: swelling, hoarseness, stridor
   Breathing: rapid breathing, wheeze, fatigue, cyanosis, SpO_2 < 92%, confusion
   Circulation: pale, clammy, low blood pressure, faintness, drowsy/coma

Anaphylactic reaction

2. **Adrenaline** *(give IM unless experienced with IV adrenaline)*
IM doses of 1:1000 adrenaline (repeat after 5 min if no better)

▪ Adult	500 mcg IM (0.5 mL)
▪ Child more than 12 years	500 mcg IM (0.5 mL)
▪ Child 6-12 years	300 mcg IM (0.3 mL)
▪ Child less than 6 years	150 mcg IM (0.15 mL)

Adrenaline IV to be given **only by experienced specialists**
Titrate: Adults 50 mcg; Children 1 mcg kg^{-1}

Adrenaline[2]

When skills and equipment available:

- Establish airway
- High flow oxygen
- IV fluid challenge[3]
- Chlorphenamine[4]
- Hydrocortisone[5]

Monitor:

- Pulse oximetry
- ECG
- Blood pressure

[3] **IV fluid challenge (crystalloid):**

Adult 500 - 1000 mL
Child 20 mL kg^{-1}

Stop IV colloid if this might be the cause of anaphylaxis

Anaphylactic reaction

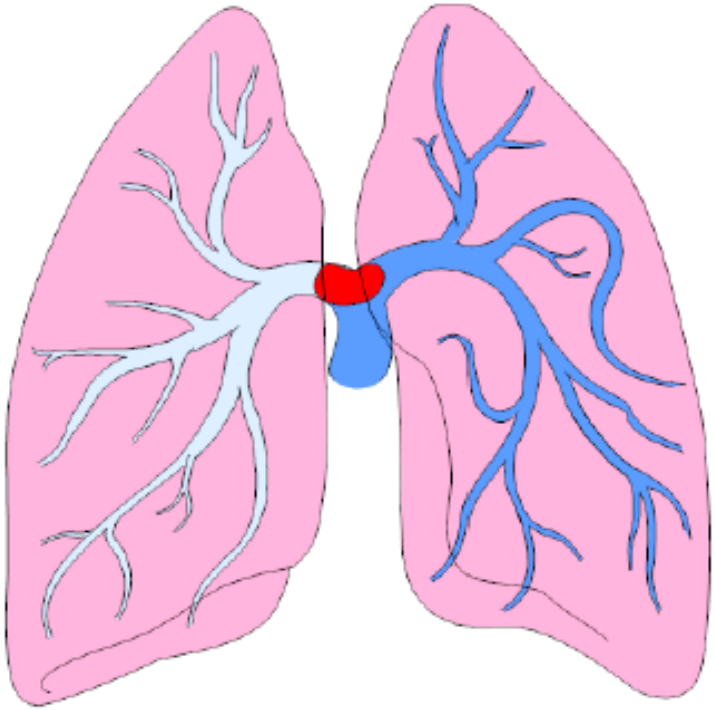
	[4.] Chlorphenamine (IM or slow IV)	[5.] Hydrocortisone (IM or slow IV)
Adult or child more than 12 years	10 mg	200 mg
Child 6 - 12 years	5 mg	100 mg
Child 6 months to 6 years	2.5 mg	50 mg
Child less than 6 months	250 mcg kg^{-1}	25 mg

Thrombosis

- Massive pulmonary embolism
- Thrombosis of coronary arteries

Thrombosis

- If high clinical probability for PE consider fibrinolytic therapy
- If fibrinolytic therapy given continue CPR for up to 60-90 min before discontinuing resuscitation



Thrombosis

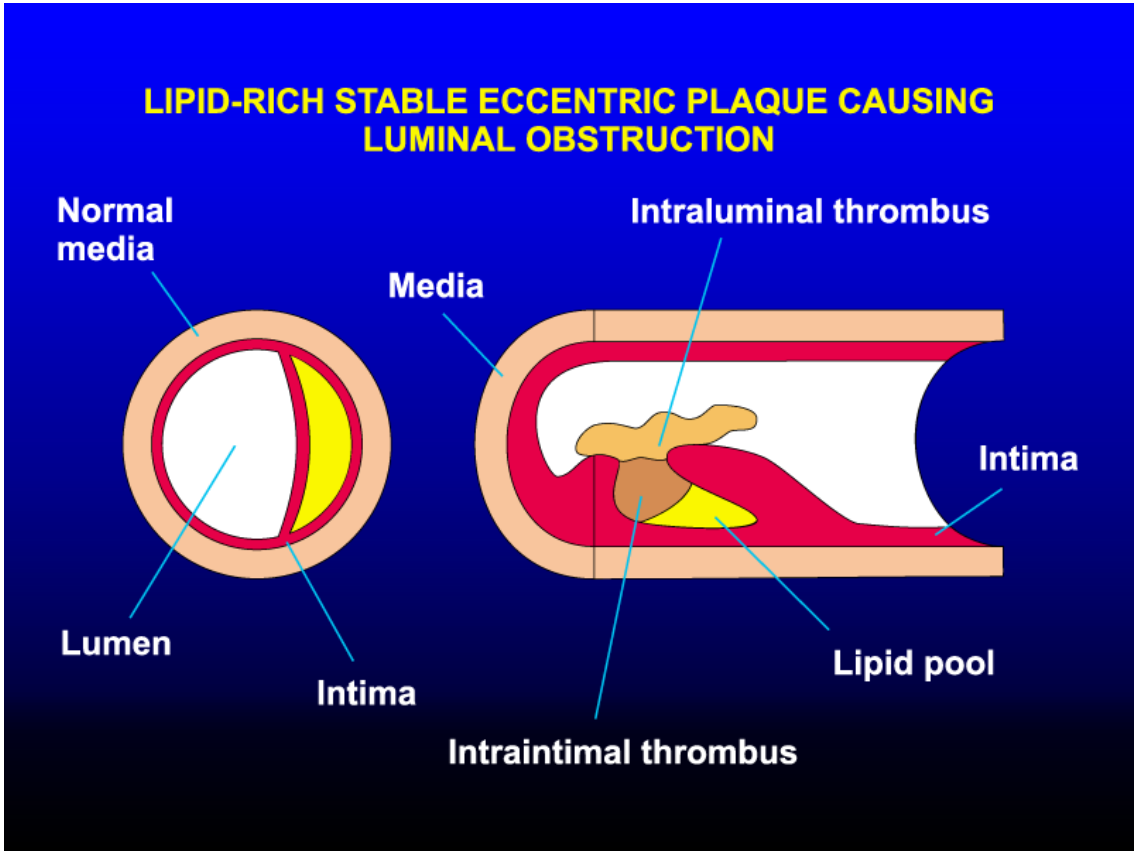
- Thrombosis of coronary arteries
  - Acute Coronary Syndrome
  - Ischemic heart disease
- Commonest cause of cardiac arrest

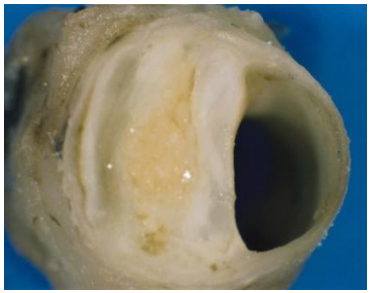
Acute coronary syndromes

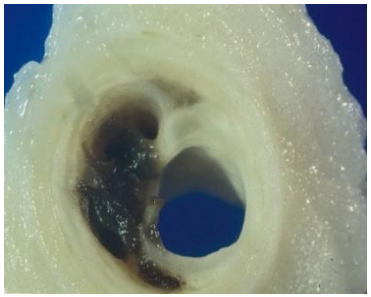
Spectrum of clinical presentation caused by:

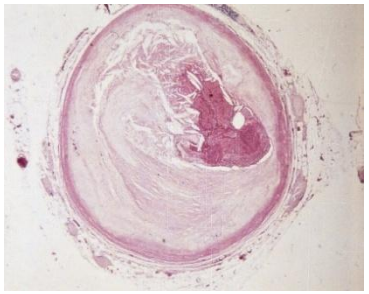
- Atherosclerotic plaque rupture
- Smooth muscle constriction
- Thrombus formation

Fissured plaque









Acute coronary syndromes

Clinical syndromes caused by the same disease process:

- Unstable angina
- Non-ST-elevation myocardial infarction
- ST-elevation myocardial infarction

Stable angina

Pain or discomfort from myocardial ischaemia:

- Tightness/ache usually across chest
- May radiate to throat/arms/back/epigastrium
- Consistently provoked by exercise
- Settles when exercise stops

NOT an acute coronary syndrome

Unstable angina

1. Angina on exertion with increasing frequency over a few days, provoked by less exertion

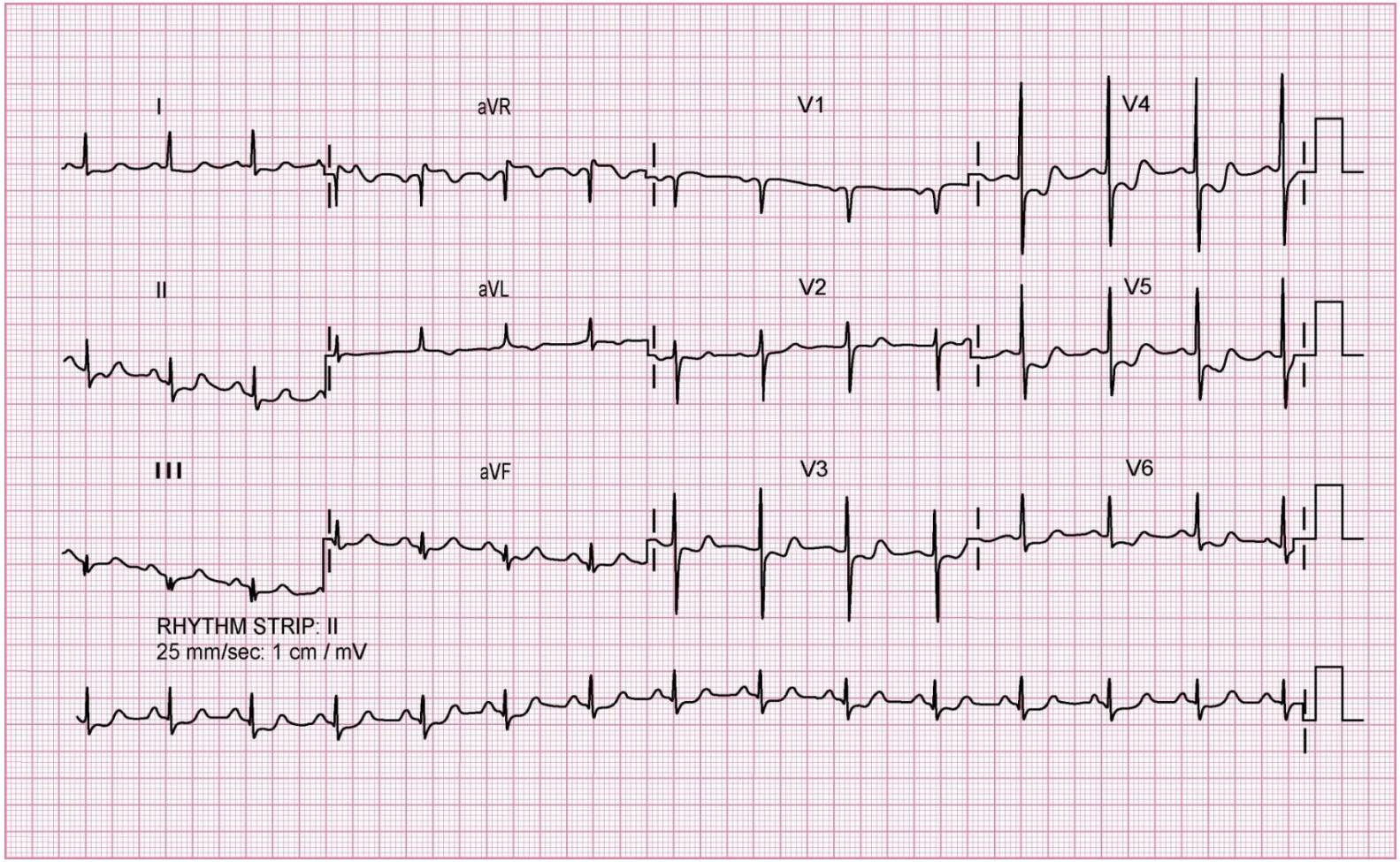
   OR

2. Angina occurring recurrently and unpredictably - not specific to exercise

   OR

3. Unprovoked and prolonged episode of chest pain
   - ECG may be normal
   - ST segment depression suggests high risk
   - No troponin release
   - Cardiac enzymes usually normal

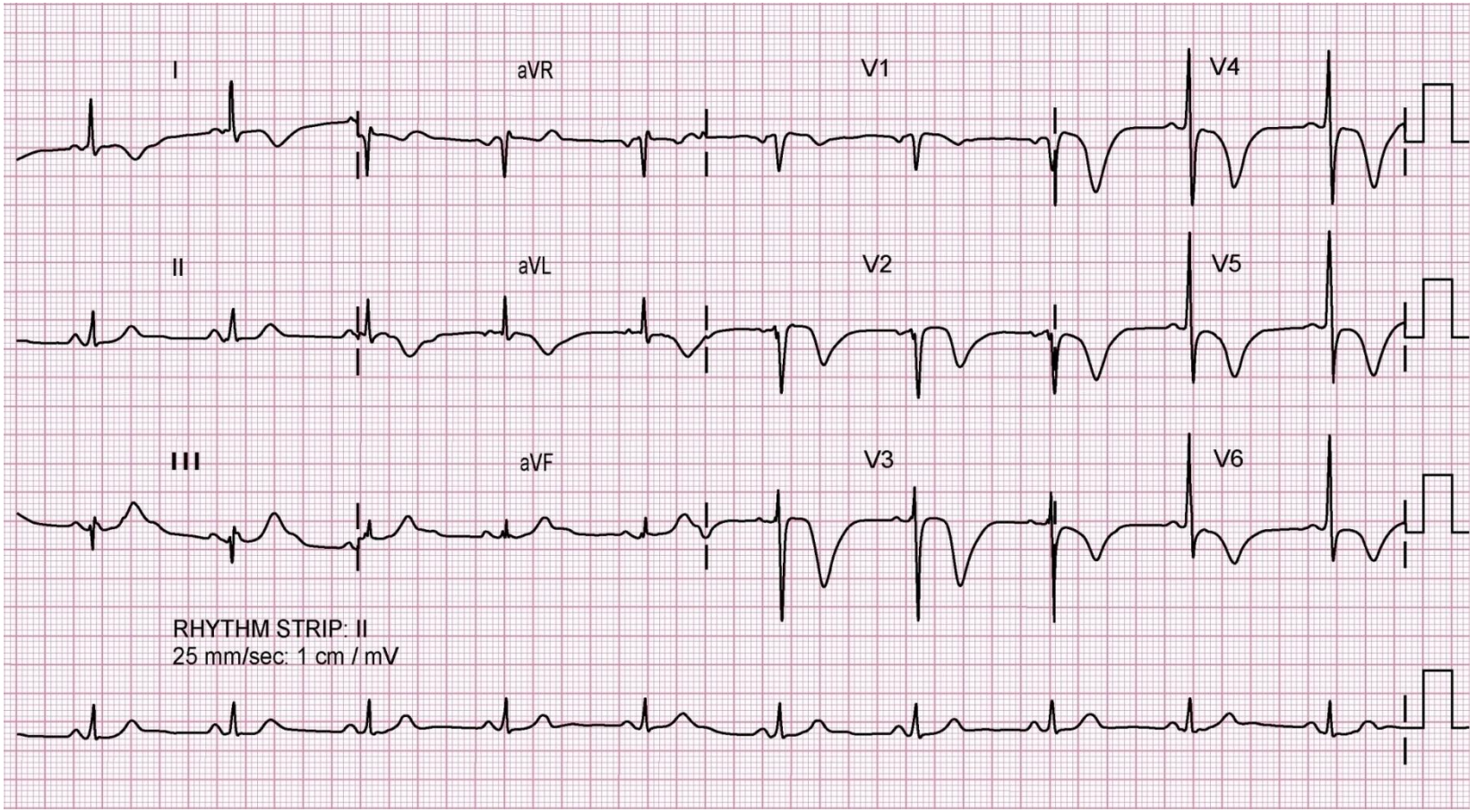
Acute ST depression



Non-ST-elevation myocardial infarction (NSTEMI)

- Symptoms suggesting acute MI
- Non-specific ECG abnormalities
  - ST segment depression
  - T wave inversion
- Troponin release
- Usually elevated cardiac enzymes
  - e.g. creatine kinase (CK)

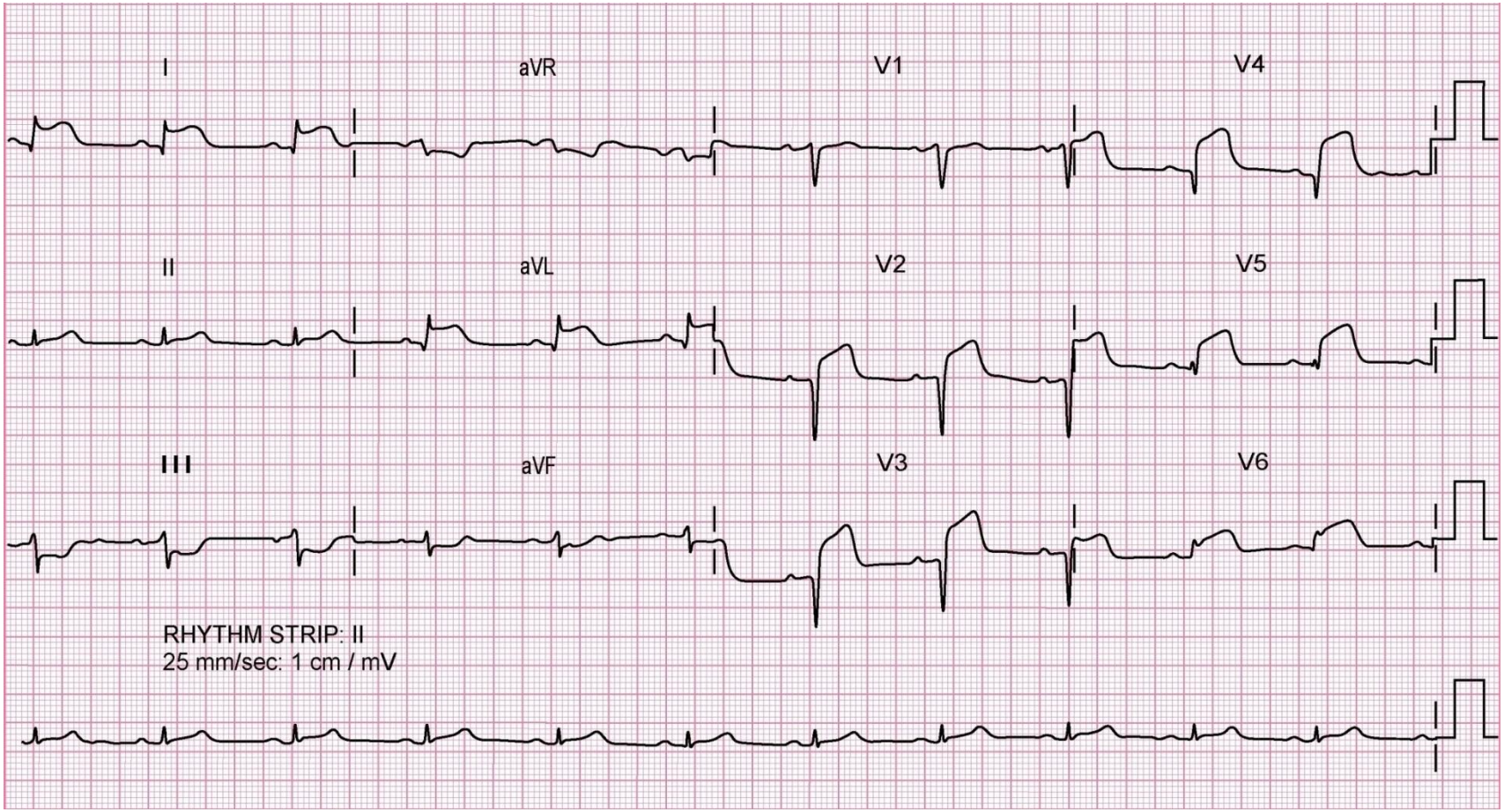
NSTEMI


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
RHYTHM STRIP: II
25 mm/sec: 1 cm / mV

ST-elevation myocardial infarction (STEMI)

- Symptoms suggesting acute MI
- Acute ST segment elevation
- Q waves likely to develop
- Troponin release
- Usually elevated cardiac enzymes (e.g. CK)
- Early effective treatment may limit myocardial damage and prevent Q wave development

Anterolateral STEMI



Immediate treatment for all ACSs

ABCDE approach

- **A**spirin 300 mg orally (crush/chew)
- **N**itrate (GTN spray or tablet)
- **O**xygen **if** appropriate (aim 94-98% SpO2)
- **M**orphine (or diamorphine)

Immediate treatment for all ACSs

- Anti-thrombotic
  - Aspirin
  - Clopidogrel or prasugrel
  - LMW heparin or fondaparinux
  - If very high risk: glycoprotein IIb/IIIa inhibitor
- Pain relief
  - Nitrate
  - Morphine
- Oxygen if appropriate
- Myocardial protection
  - Beta blocker
  - Coronary angiography/PCI in most patients

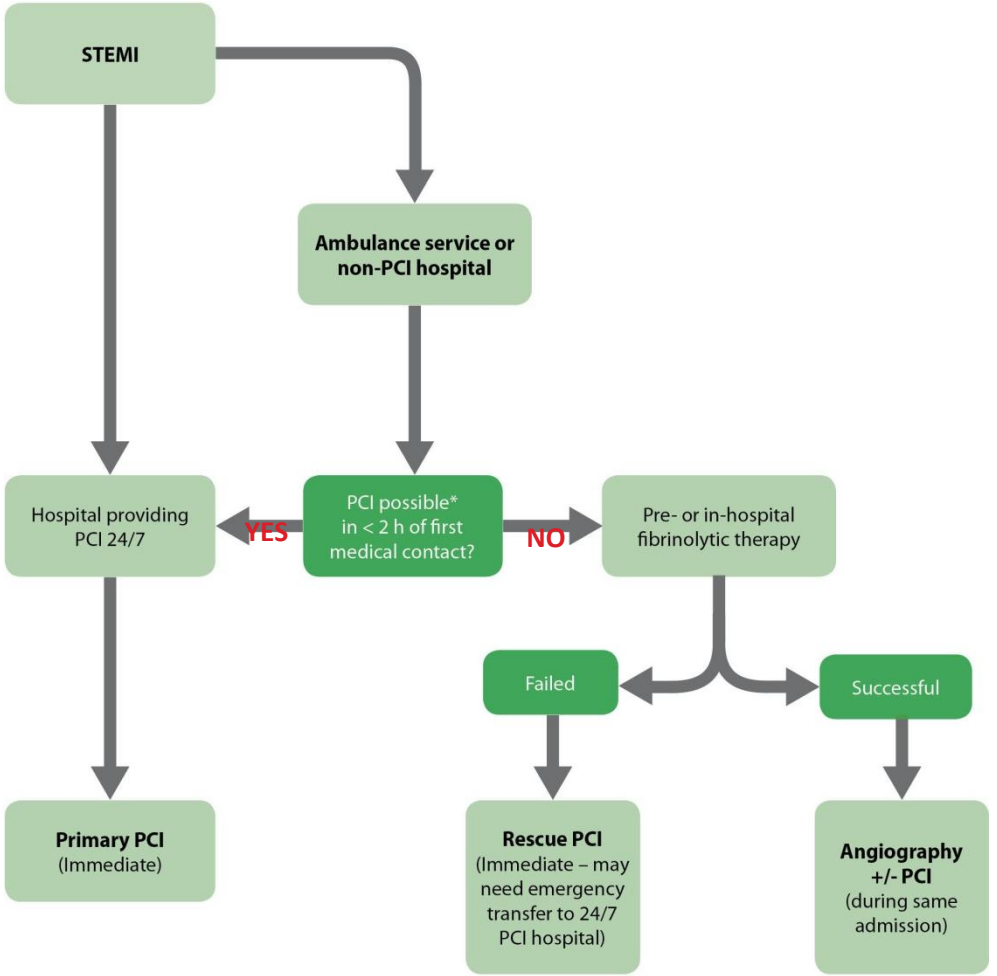
STEMI (or acute MI with new LBBB)

Emergency reperfusion therapy:

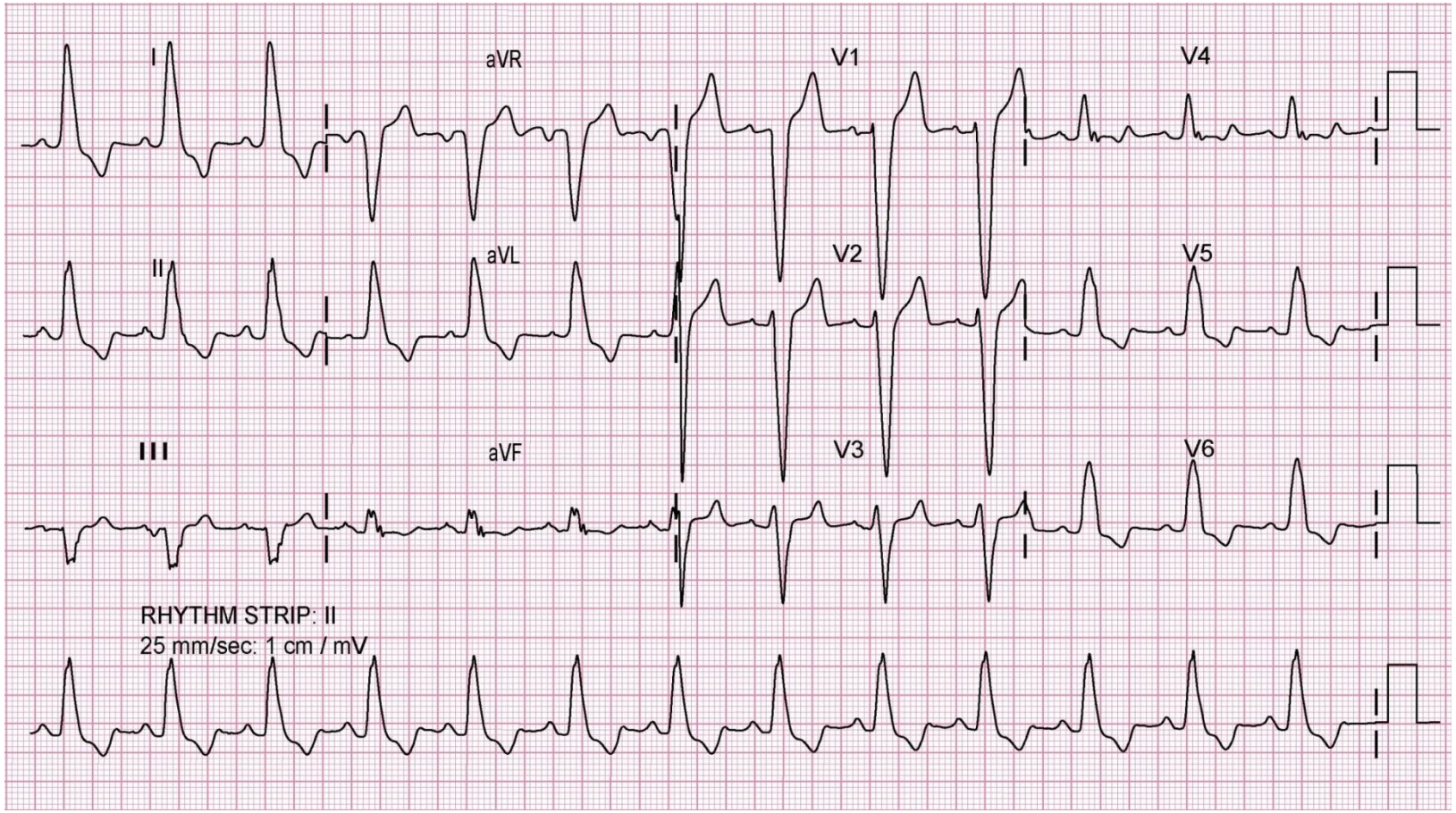
- Percutaneous coronary intervention (PCI)
- Fibrinolytic therapy

Avoid delay – “Time is muscle”

Access to emergency reperfusion



Left bundle branch block



Absolute contraindications to fibrinolytic therapy

- Previous haemorrhagic stroke
- Other stroke or CVA within 6 months
- CNS damage or neoplasm
- Active internal bleeding
- Aortic dissection
- Recent major surgery or trauma
- Known bleeding disorder

STEMI – further management

- Anti-thrombotic therapy
- Beta blocker
- ACE inhibitor
- Coronary angiography and reperfusion strategies e.g. PCI

Any questions?

Summary

- Recognise the different presentations
- Use ABCDE approach
- Start appropriate immediate treatment
- Arrange emergency reperfusion therapy when appropriate
- Identify other high-risk patients for further investigation and treatment


KEEP
CALM
AND
ABCDE

Thank you !