[AAFP]

[AAFP]

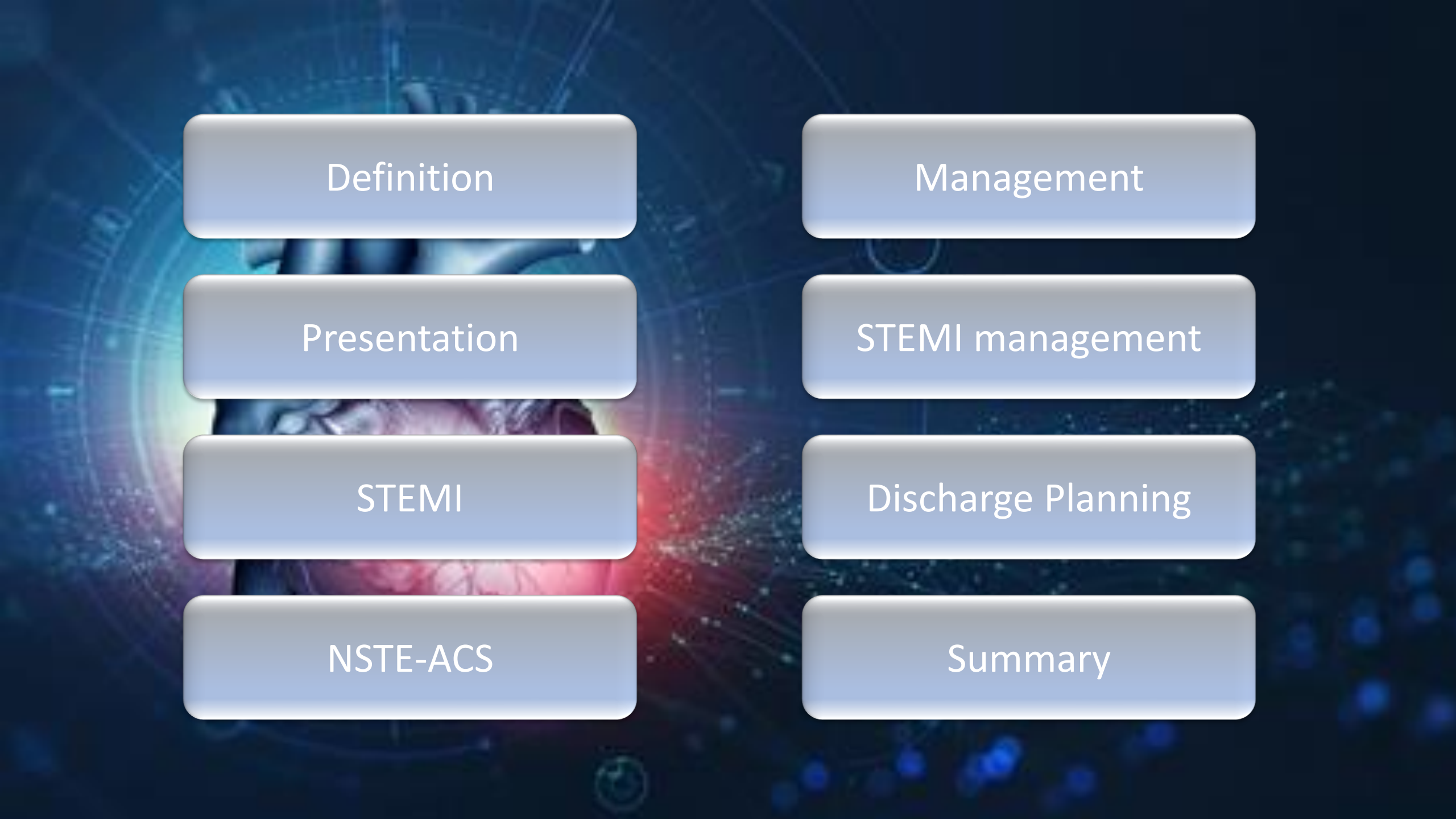
[Dynamed]

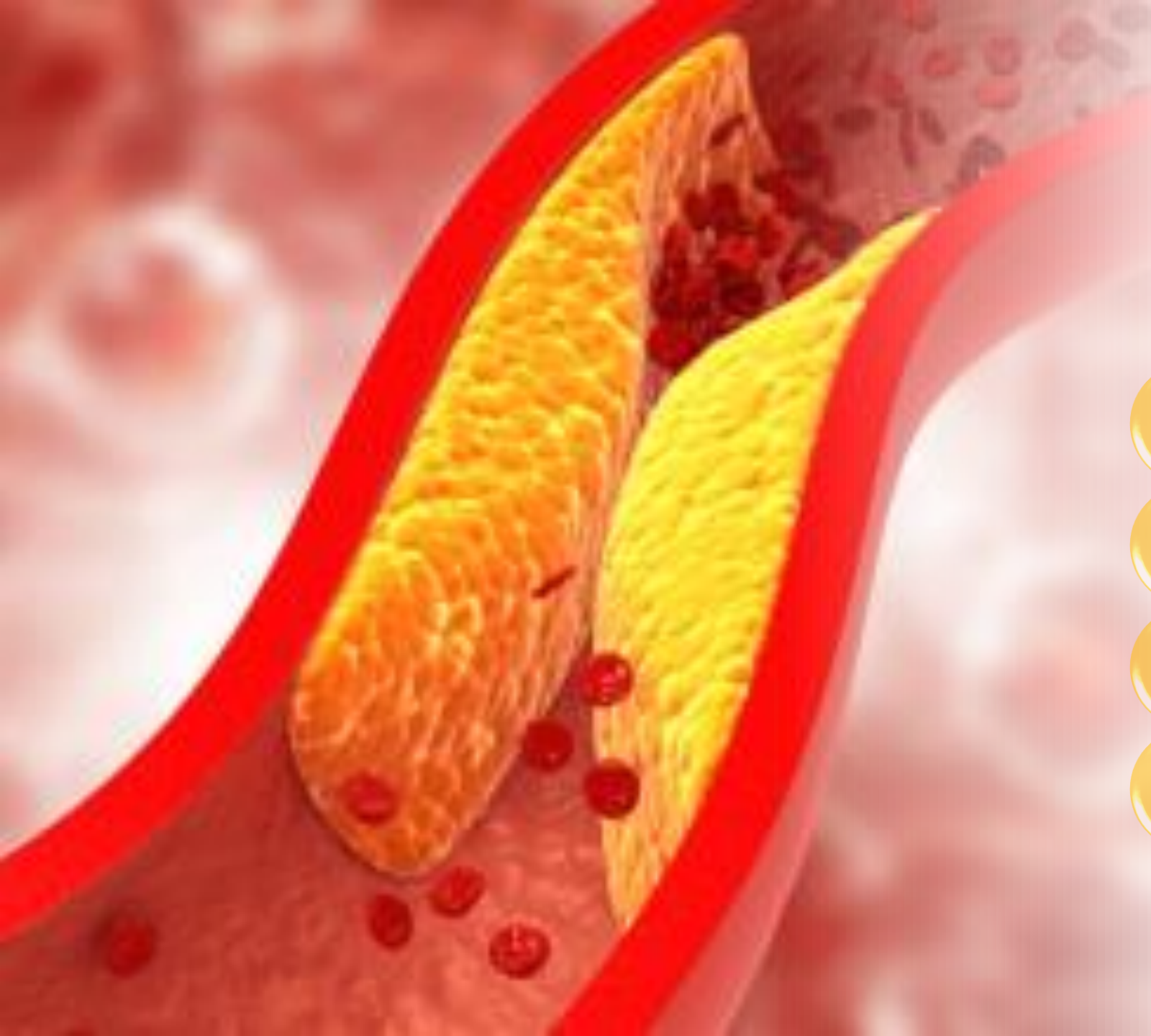
[AHA journal]

[Lancet]

Acute Coronary Syndrome in Resource Limited Areas

Registrar education series


Definition
Management
Presentation
STEMI management
STEMI
Discharge Planning
NSTE-ACS
Summary



Acute Coronary Syndrome

- What is acute coronary syndrome (ACS)?
- What usually causes ACS?
- What are classic risk factors for ACS?
- What are examples of validated clinical decision-making tools that can be used with ACS?

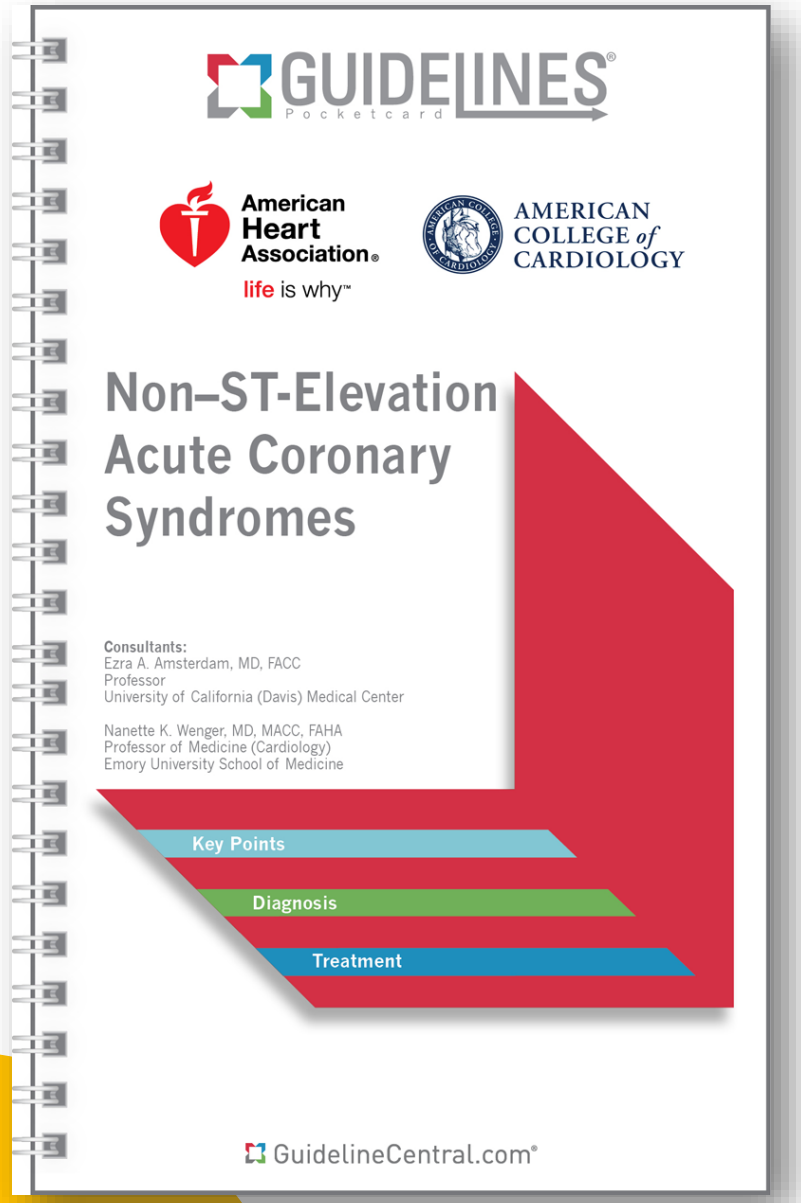
Presentation

What are presenting:

- Symptoms?
- Physical exam abnormalities?
- ECG changes?
- POCUS findings?

STEMI

- How is a STEMI diagnosed?



NSTE-ACS

How is NSTE-ACS diagnosed?

What are the two categories of NSTE-ACS?

ACS Management

- What is the management of ACS?

STEMI Management

What is the management of a STEMI?

Discharge planning

- What should be included on your discharge planning checklist?

ACS

Acute coronary syndrome is a spectrum of presentations due to acute myocardial ischemia and/or necrosis

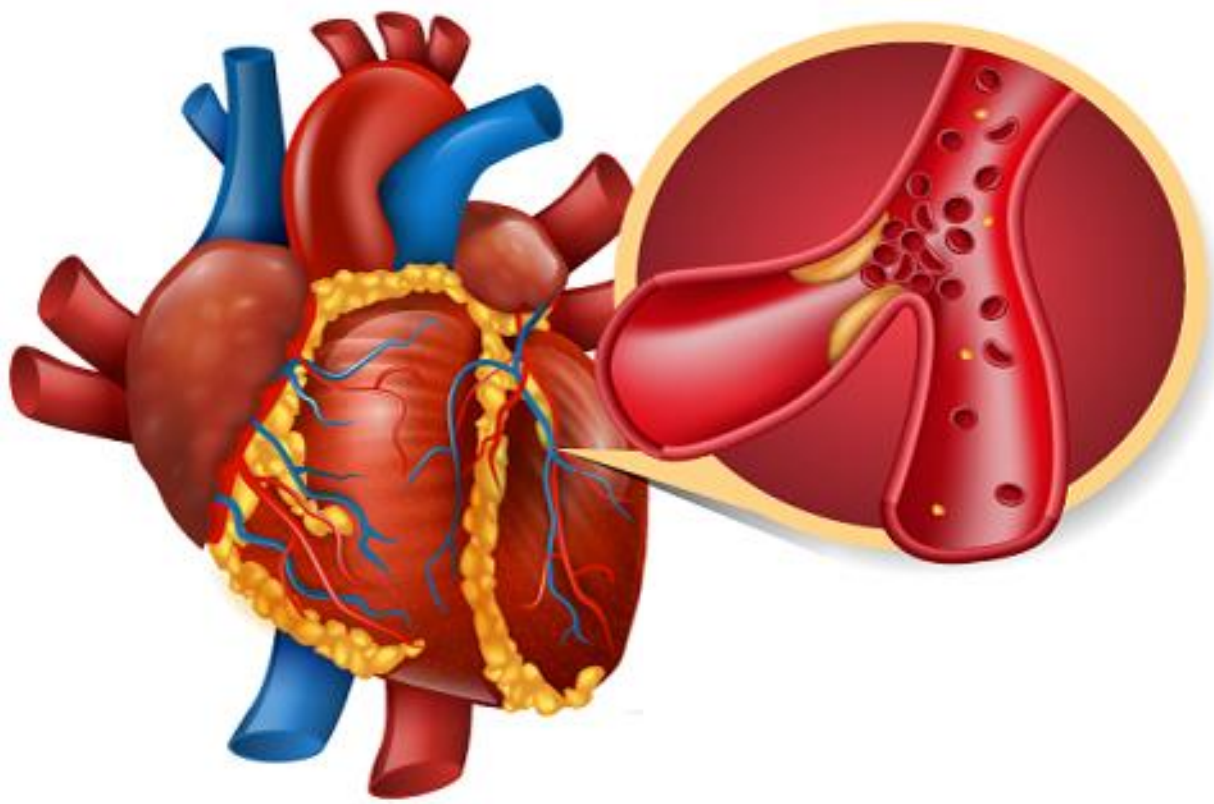
- ST elevation myocardial infarction
- Non STI elevation MI (NSTEMI) and Unstable angina (UA)

Most commonly caused by platelet aggregation after a plaque ruptures

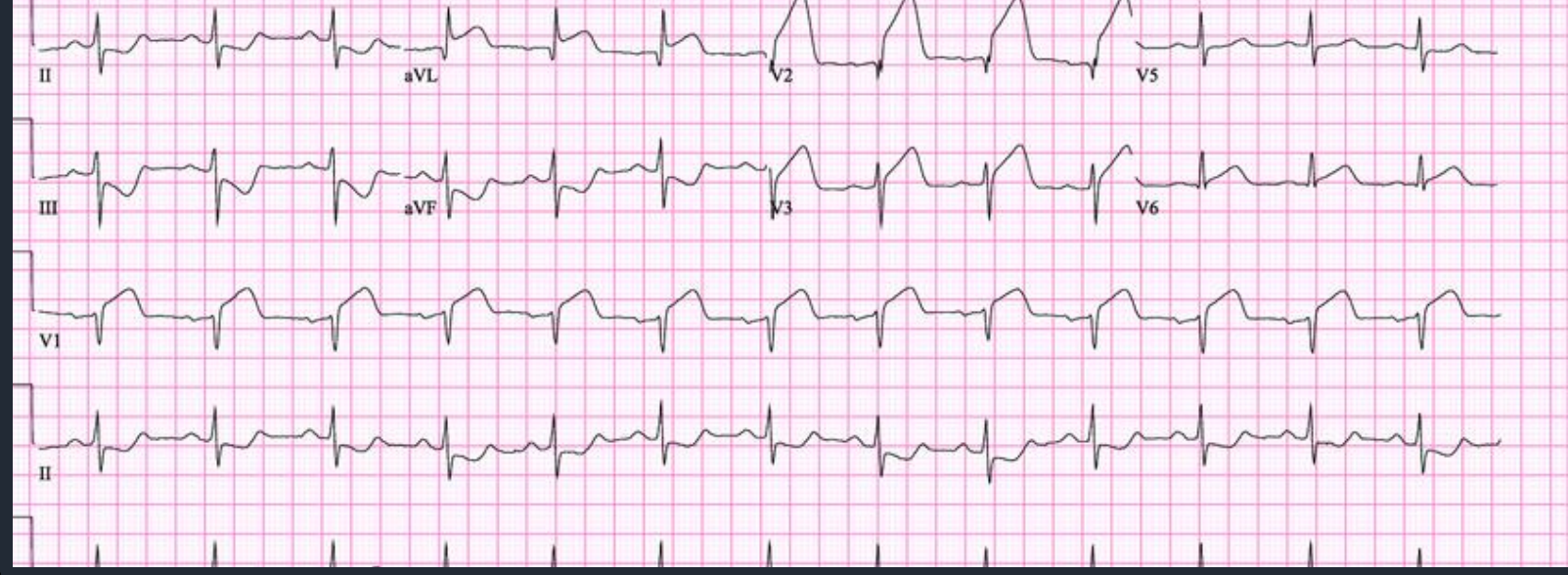
Risk factors:

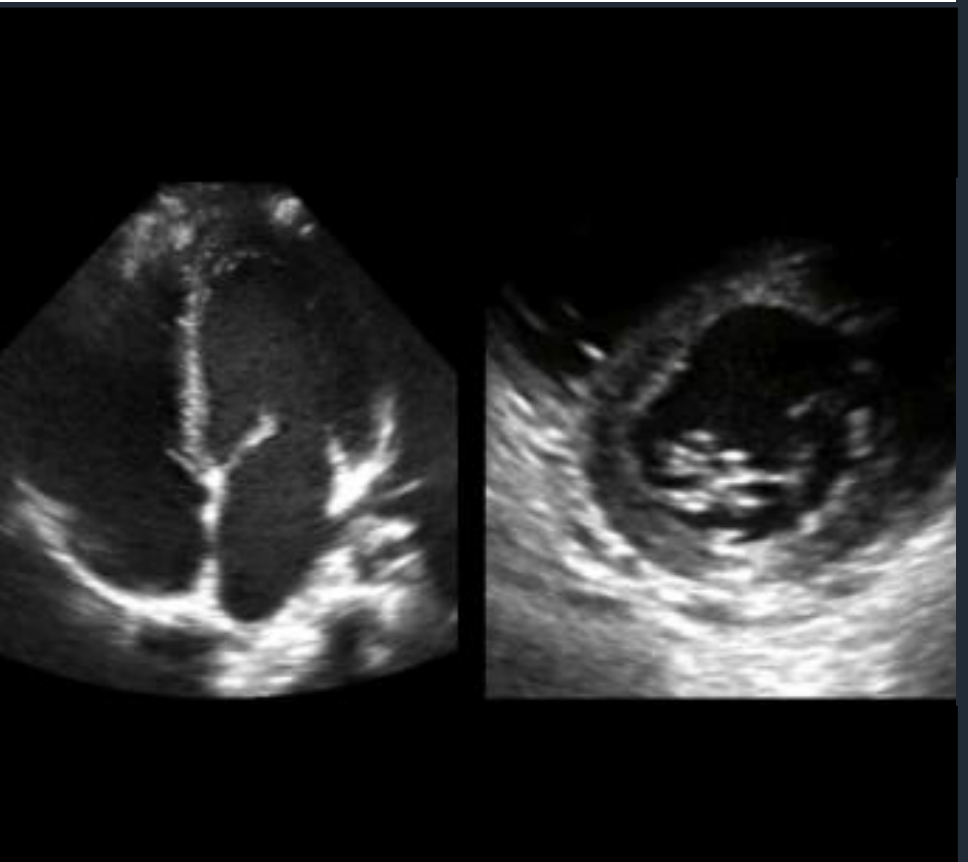
- **Non-modifiable**: increasing age, male sex, chronic renal insufficiency, known atherosclerotic disease, family history 55M, 65F
- **Modifiable**: tobacco use, hypertension, hyperlipidemia, diabetes, physical inactivity, obesity
- *ASCVD calculator*

GRACE, *TIMI*, AMIS, *CRUSADE bleeding risk*



Presentation





Symptoms

- Retrosternal chest pain
  - With/without radiation to 1 or 2 arms
- Oppressive chest pressure
- Abdominal pain
- Dyspnea
- Nausea/vomiting
- Diaphoresis
- Syncope
- Absence of chest wall tenderness

Atypical

Less likelihood

Physical findings

- Transient MR murmur, hypotension, diaphoresis, pulmonary edema, or rales

EKG

- New transient ST segment deviation
- T wave inversion in multiple precordial leads
- Fixed Q waves ST depression 0.5 to 1 mm
- T wave inversion greater than 1 mm

POCUS

- Regional wall motion abnormalities

STEMI

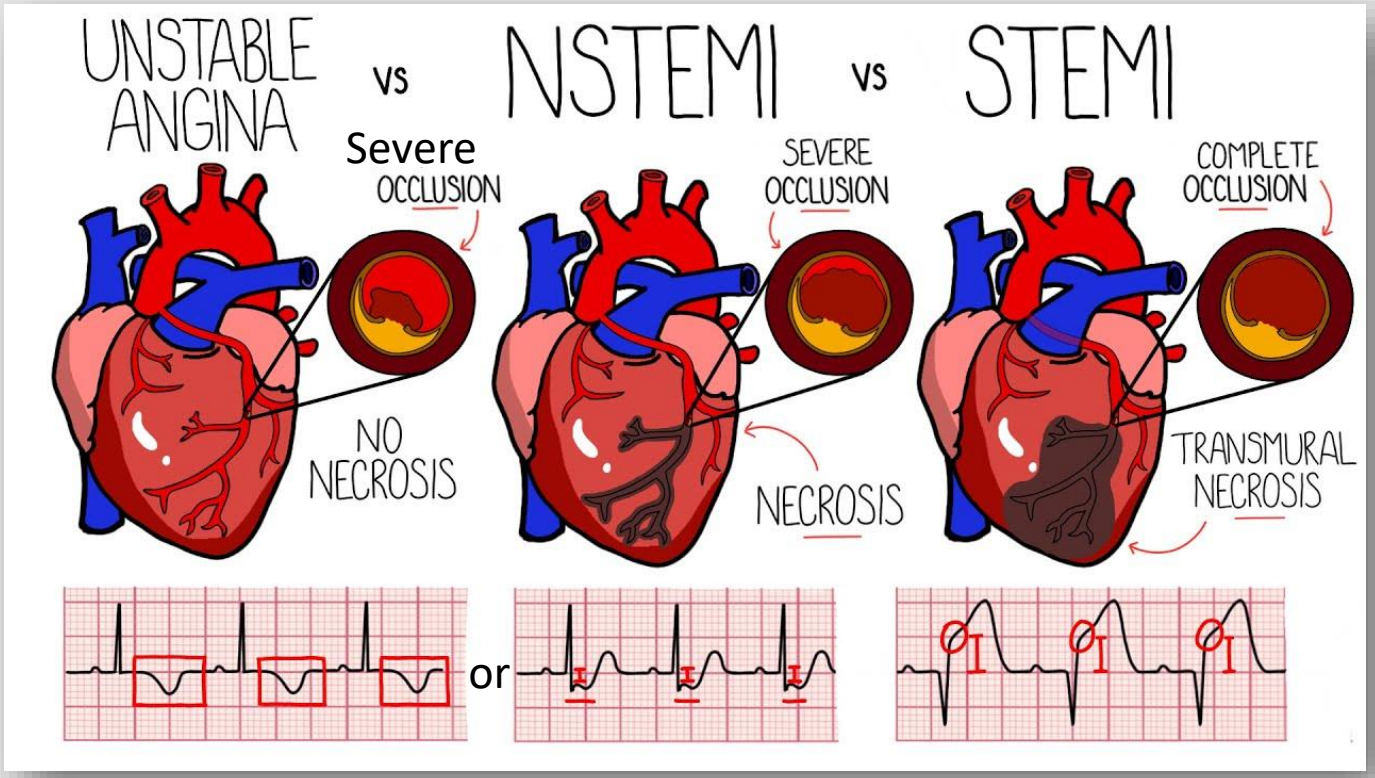
Symptoms characteristic of myocardial ischemia

- Perform ECG within 10 minutes of presentation

Persistent ST elevation in the absence of a LBBB or LVH

- ≥ 2 mm in men or ≥ 1.5 mm (0.15 mV) in women in leads V2-V3
- ≥ 1 mm (0.1 mV) in 2 other contiguous chest leads or limb leads

NSTE-ACS

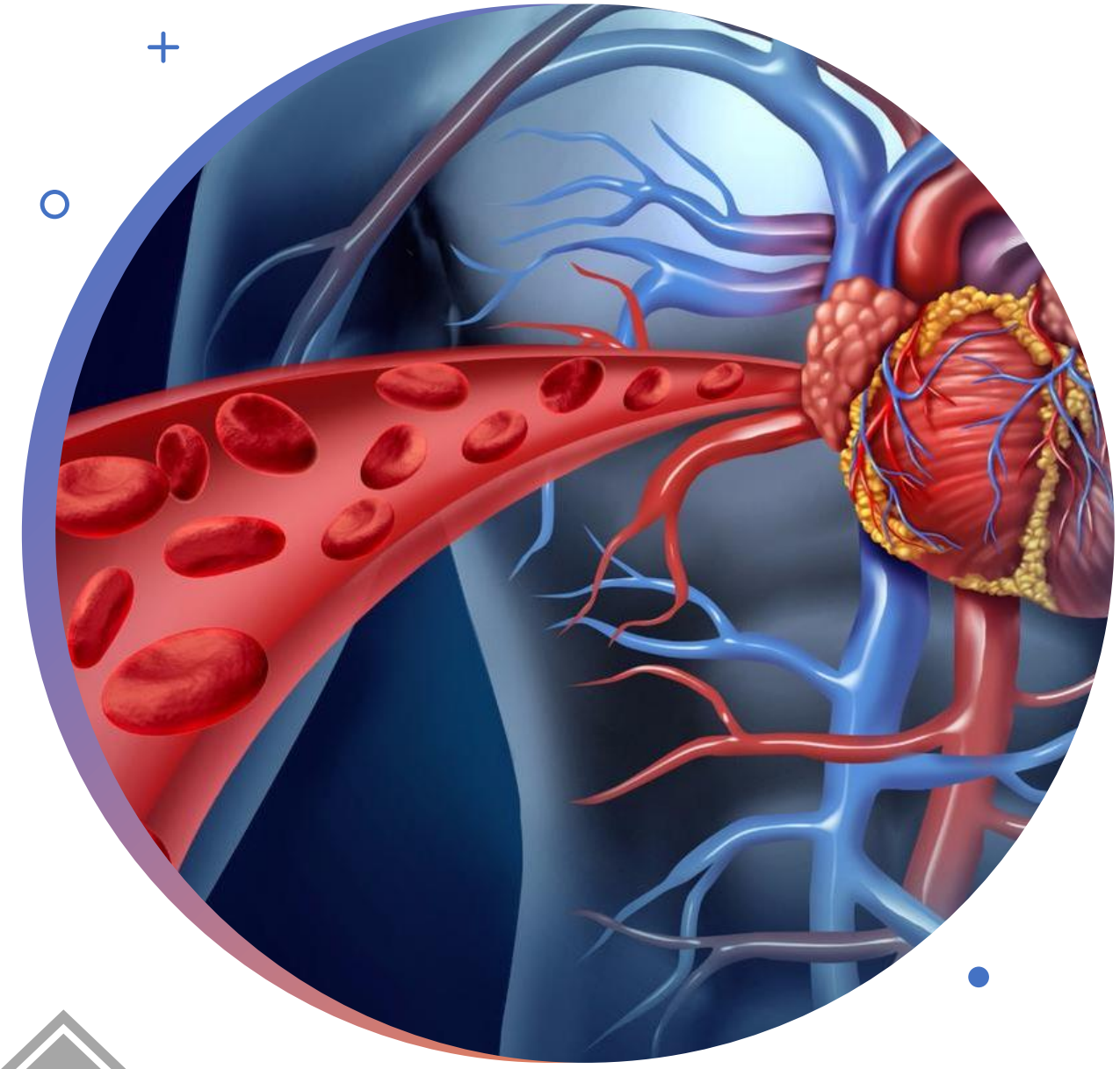


NSTEMI

- Symptoms characteristic of myocardial ischemia
  - Perform ECG within 10 minutes of presentation
- No ST elevation on EKG
- Increased *cardiac biomarkers*

UA

- Symptoms characteristic of myocardial ischemia
  - Perform ECG within 10 minutes of presentation
- No ST elevation on EKG
- No increase in *cardiac biomarkers*



ACS Management

Aspirin (indefinitely)

- Loading dose 162 – 325mg
- Maintenance dose 75-162

Clopidogrel (12 months)

- Loading dose 300mg
- Maintenance dose 75mg

Enoxaparin (2-8 days)

- <75yo 30mg IV bolus
  - Followed in 15 minutes by 1mg/kg SQ x12 hours (max 100mg for first two doses)
- >75yo 0.75mg/kg SQ q12 hours

Carvedilol 6.25mg bid titrated to 25mg bid as tolerated

- Contraindications: signs of heart failure, low output state, risk of cardiogenic shock

ACE-I/ARB (if LVEF <40%, HTN, DM, CKD)

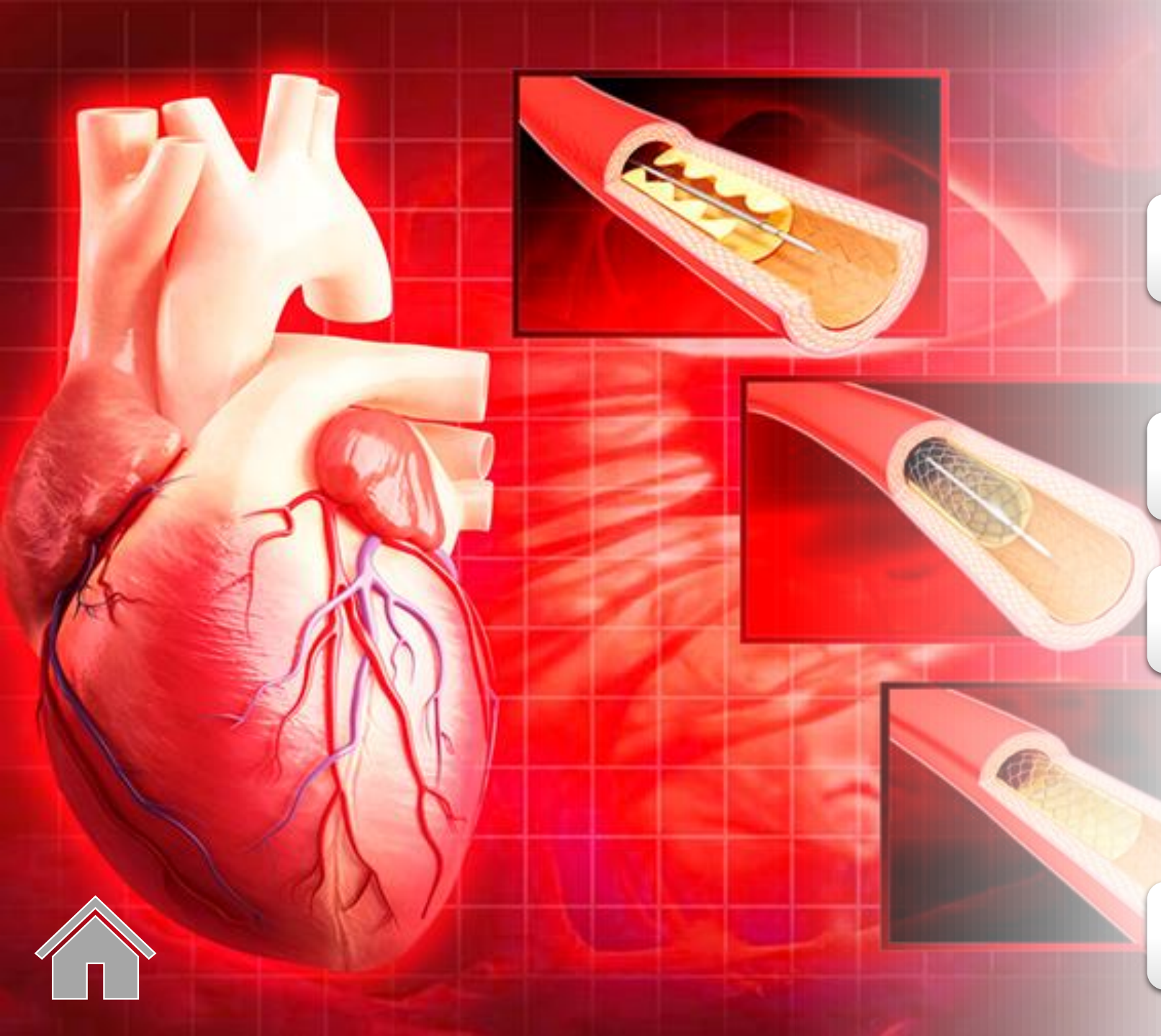
Atorvastatin 40-80mg

Nitroglycerin 0.4mg sublingual q5 minutes for pain

Oxygen 2 - 4L ONLY if O2 sat < 90%

Morphine

- 4-8mg IV q5-15 minutes for pain if pain persists despite all other therapy



STEMI Management

All ACS measures (with *dose differences*) plus reperfusion therapy as early as possible

- Ideally within 90 minutes of presentation
- Can be implemented within 12-24 hours of symptoms
- Clopidogrel loading dose is 600mg

Transfer to a facility that can perform percutaneous coronary intervention (PCI)

- If > 120 minutes to PCI give fibrinolytics

Fibrinolytics decrease mortality by 50% if administered within 1 hour

- Streptokinase 1.5MU infusion over 30 - 60 minutes
- Alteplase 15mg bolus + 0.75mg/kg for 30 min + 0.5mg/kg for 60 minutes
- Reteplase 10-U + 10-U IV boluses given 30 minutes apart
- Tenecteplase 30mg (<60mg), 35mg (60-69kg), 40mg (70-70kg)

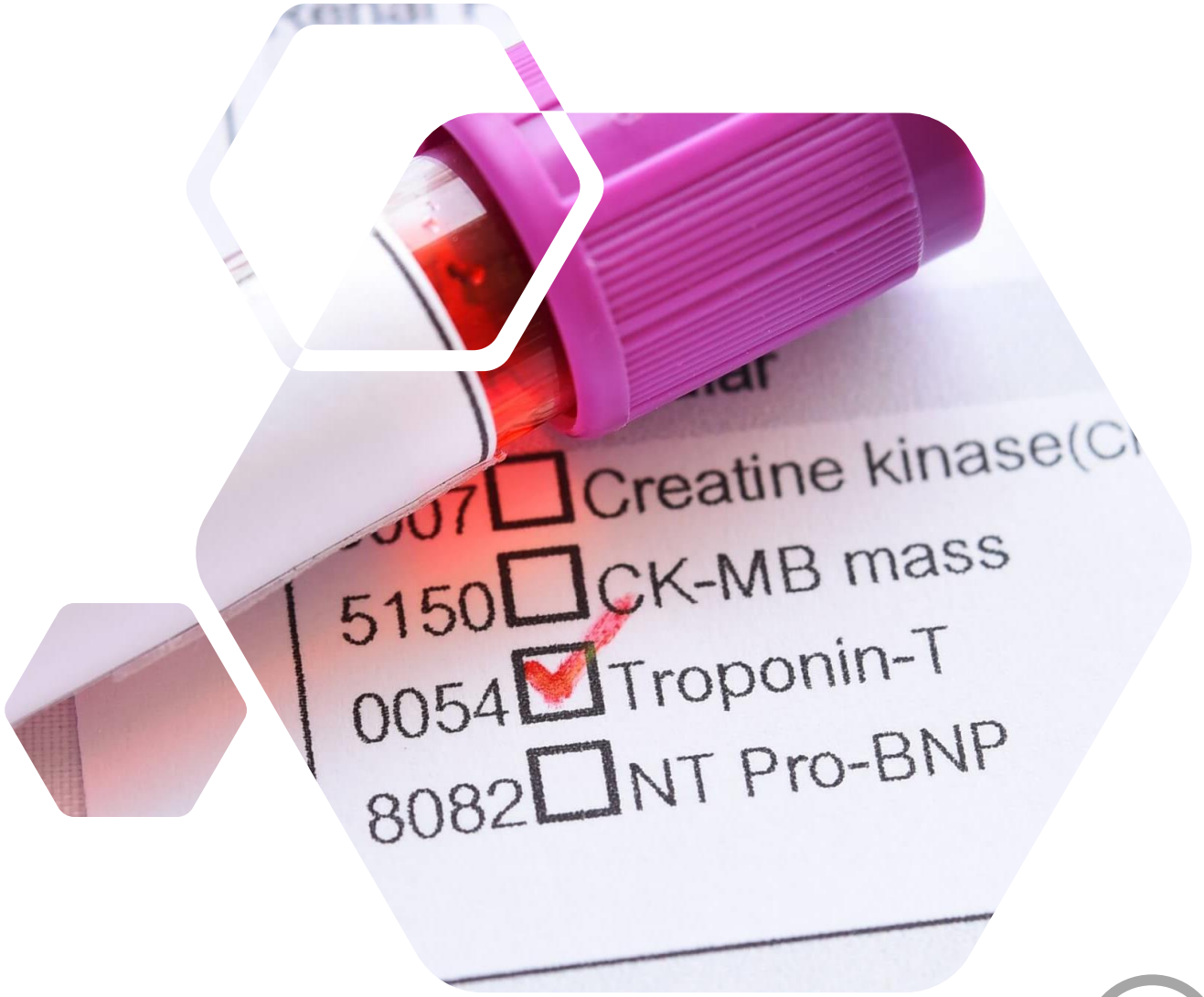
Contraindications to fibrinolysis

Discharge planning

- Perform echocardiography to assess LV function
- Dual antiplatelet therapy for 12 months
- Beta blocker
- ACE-I
- Spironolactone if LVEF<40% (DM or HF)
- High dose statin
- Nitroglycerin as needed
- Cardiac rehab
- Dietary counseling
- Physical activity prescription
- Tobacco cessation

Cardiac biomarkers

High-sensitivity Troponin	•cTnI, CTnT (*recommended*) •Sensitivity 79-83%, Specificity 93-95% •Measured at presentation and 3-6 hours after symptom onset •May take up to 6 hours to become positive
Causes of non-ischemic rise in troponin	•CHF, infiltrates, malignancy, myocarditis, pericarditis, trauma, viral cardiomyopathy, drug toxicity, pulmonary embolism, renal failure, sepsis, stroke, subarachnoid hemorrhage
Creatinine Kinase Myocardial Band (CK-MB)	•Peaks more rapidly than troponin and decreases faster •*Not recommended*
Myoglobin	•Earliest peak and decrease •*Not recommended*



Atypical

- Older age
- Dementia
- Diabetes
- Women

- Epigastric pain
- Indigestion

Less likely

- Right sided
- Tearing
- Ripping
- Burning
- Sharp
- Pleuritic
- Shifting
- Positional
- Fleeting

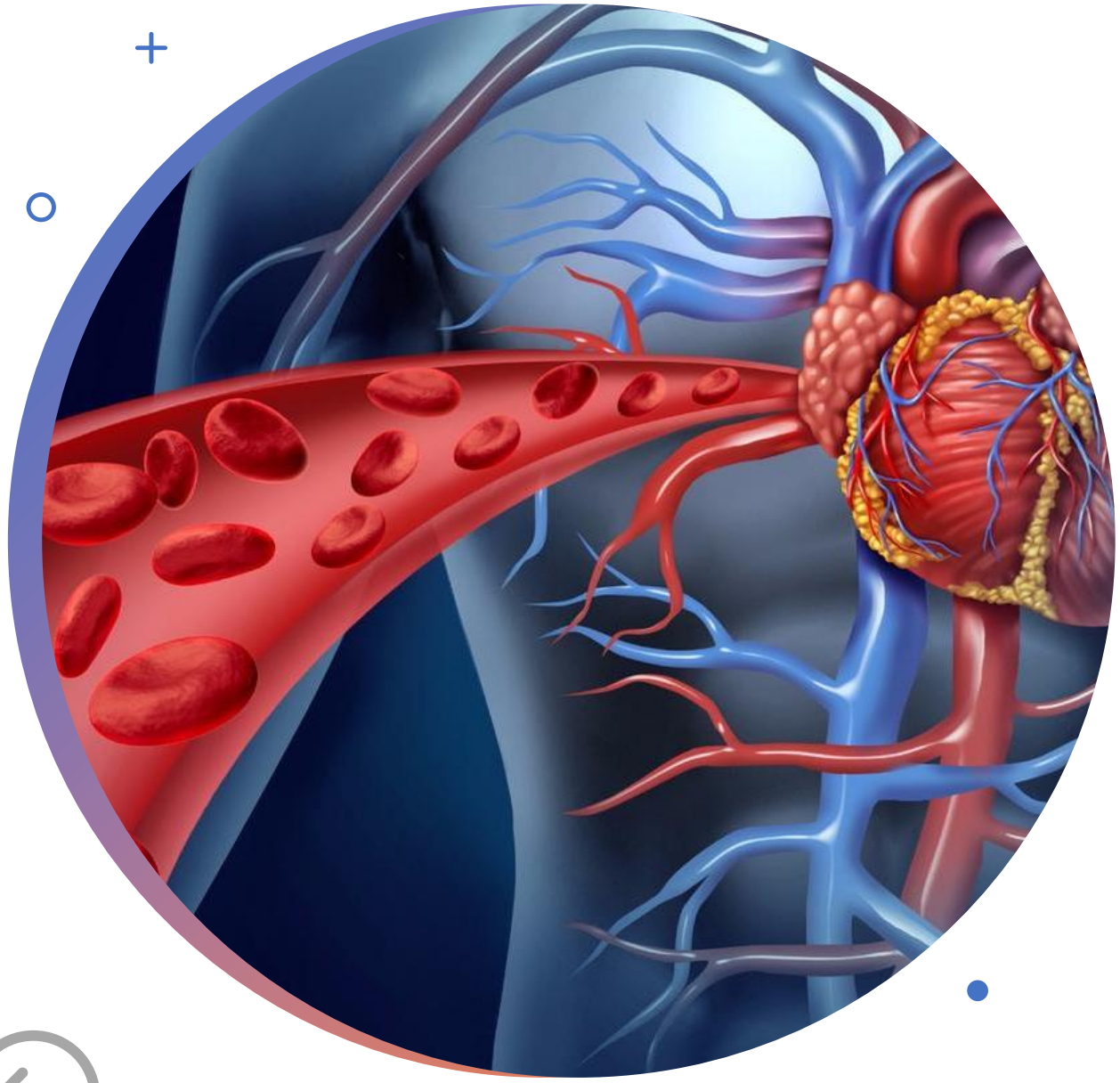
Contraindications to fibrinolysis

Contraindications to fibrinolysis

- Prior ICH, known cerebral vascular lesion, known malignant intracranial neoplasm, ischemic stroke within 3 months, suspected aortic dissection, active bleeding/diathesis, significant closed head or facial trauma within 3 months, intracranial or spinal surgery within 2 months, severe uncontrolled hypertension unresponsive to emergency therapy, risk for cardiogenic shock

Relative contraindications

- History of poorly controlled hypertension, SBP>180, DBP>110, ischemic stroke > 3months, dementia, known intracranial pathology, major surgery < 3weeks, internal bleeding <2-4 weeks, noncompressible vascular punctures, pregnancy, active peptic ulcer, oral anticoagulant therapy



STEMI Doses

Aspirin (indefinitely)

- Loading dose 162 – 325mg
- Maintenance dose 75-162

Clopidogrel (12 months)

- Loading dose **600mg**
- Maintenance dose 75mg

Enoxaparin (2-8 days)

- <75yo 30mg IV bolus
  - Followed in 15 minutes by 1mg/kg SQ x12 hours (max 100mg for first two doses)
- >75yo 0.75mg/kg SQ q12 hours

Streptokinase 1.5MU infusion over 30 - 60 minutes

Carvedilol 6.25mg bid titrated to 25mg bid as tolerated

- Contraindications: signs of heart failure, low output state, risk of cardiogenic shock

ACE-I/ARB (if LVEF <40%, HTN, DM, CKD)

Atorvastatin 40-80mg

Nitroglycerin 0.4mg sublingual q5 minutes for pain

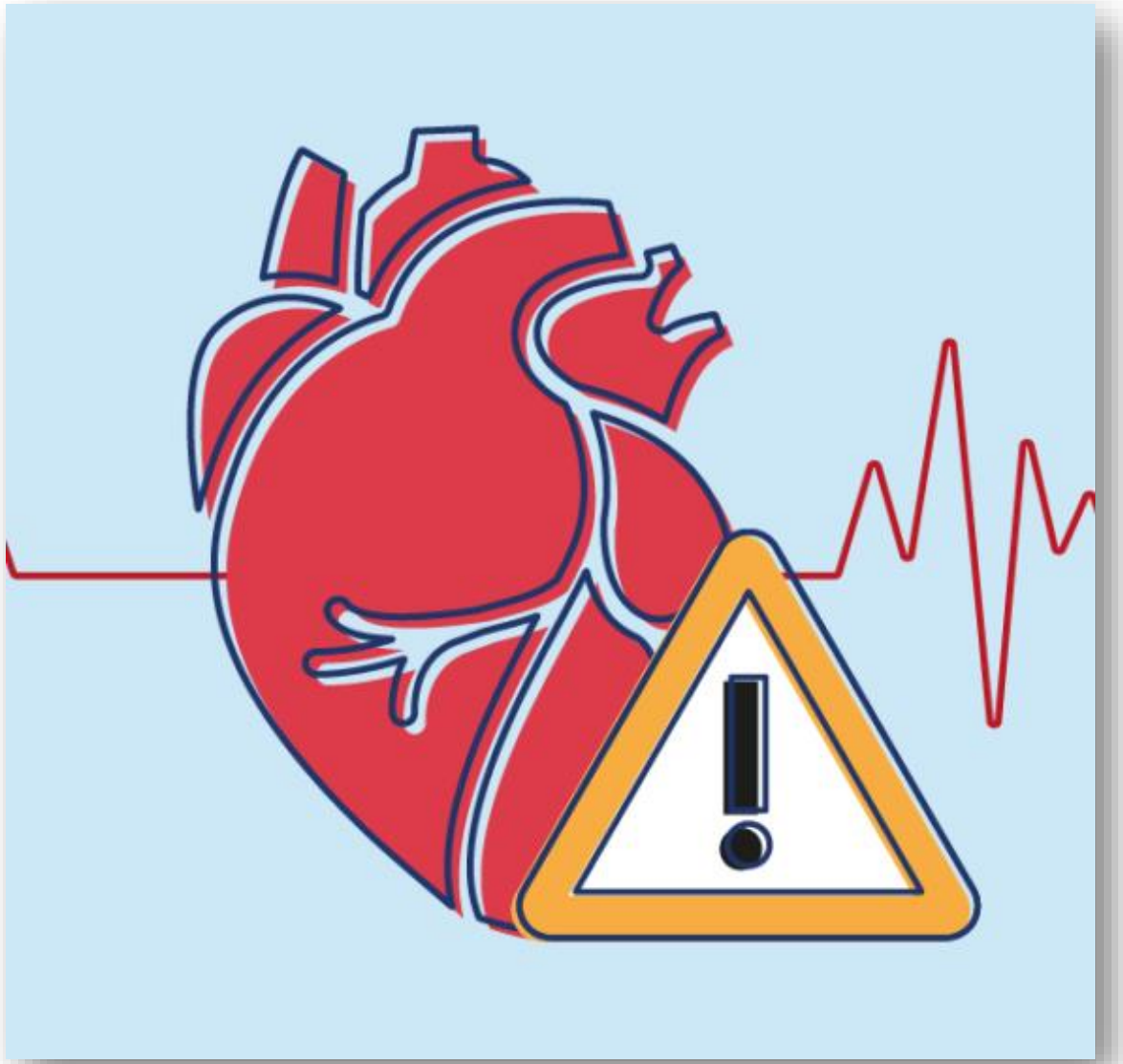
Oxygen 2 - 4L ONLY if O2 sat < 90%

Morphine

- 4-8mg IV q5-15 minutes for pain if pain persists despite all other therapy

Assess risk factors

- A1c
- Lipid
- Renal function
- Urine protein



Summary

- Perform ECG within 10 minutes of suspected ACS
- Give aspirin, clopidogrel and enoxaparin
- Start betablocker if no contraindication
- Start ACE-I and high dose statin
- If pain persists after nitroglycerin and the above, give morphine
- If O_2 saturations are < 90% give oxygen
- Perform echocardiography prior to discharge to assess LV function
- Counsel on diet, exercise and smoking cessation