



ACUTE CORONARY SYNDROME

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Definition

- ✦ The spectrum of acute ischemia related syndromes ranging from Unstable Angina to Myocardial Infarction with or without ST elevation that are secondary to acute plaque rupture or plaque erosion.
- ✦ A constellation of symptoms related to obstruction of coronary arteries with chest pain being the most common symptom in addition to nausea, vomiting, diaphoresis.

- **CORONARY ARTERY DISEASE**

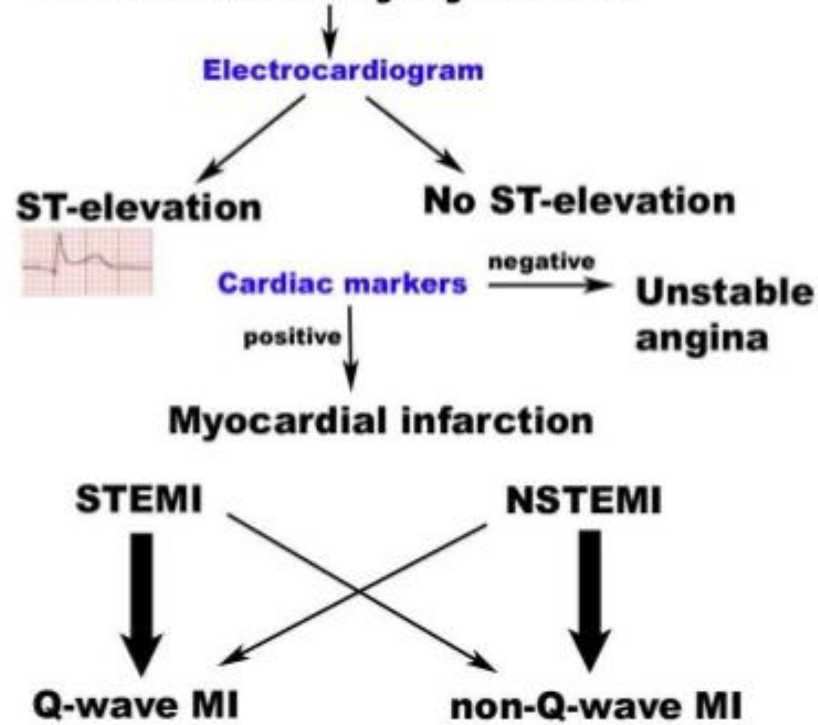
Chronic stable
Angina

Acute coronary syndrome

Unstable angina
NSTEMI

STEMI

Acute Coronary Syndrome



Symptoms

- ☛ Symptoms may include:

- Chest discomfort (tightness, pressure, heaviness) at rest or for a prolonged period (> 10 minutes, not relieved by sublingual nitrates).

- ☛ Recurrent chest discomfort .

- ☛ The pain may spread to other parts of the upper body, including :

- Back, neck, jaw, arm(s), shoulder(s) or epigastric pain.

- ☛ The person may also experience:

- Dyspnoea (shortness of breath), diaphoresis (profuse perspiration), dizziness, nausea or vomiting, Sudden loss of consciousness(Syncope).

- ☛ Women, the elderly and people with diabetes are less likely to experience chest pain as a symptom.

Signs

- ☀ Pallor
- ☀ Sweating
- ☀ Tachycardia
- ☀ Bradycardia
- ☀ Hypotension
- ☀ Raised JVP
- ☀ Diffuse Apical Impulse
- ☀ Third heart sound
- ☀ Lung crepitations

STEMI

- Definition of STEMI : New ST elevation at the J point in two contiguous leads of >1 mm in all leads in absence of left ventricular hypertrophy or left bundle branch block, other than leads V2-V3.
- For leads V2-V3 the following cut points apply:
 - ≥2 mm in men ≥40 years,
 - ≥1.5 mm in women.



✦ Diagnosis requires;

A rise and/or fall in serum levels of cardiac markers (preferably troponin) together with

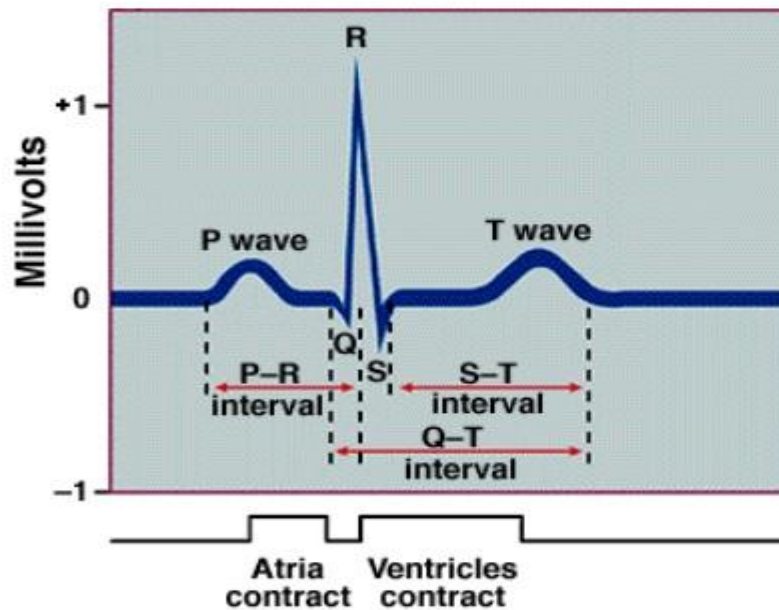
– Defined clinically by patient history

– ECG Changes

– Imaging evidence of new regional wall motion abnormality.

Normal ECG

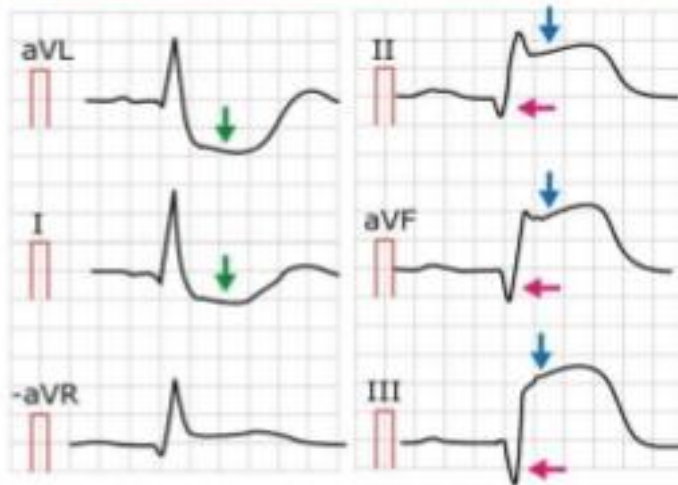
Waves and Intervals of ECG



- P wave:**
atrial depolarization
- QRS complex:**
ventricular depolarization
- T wave:**
ventricular repolarization

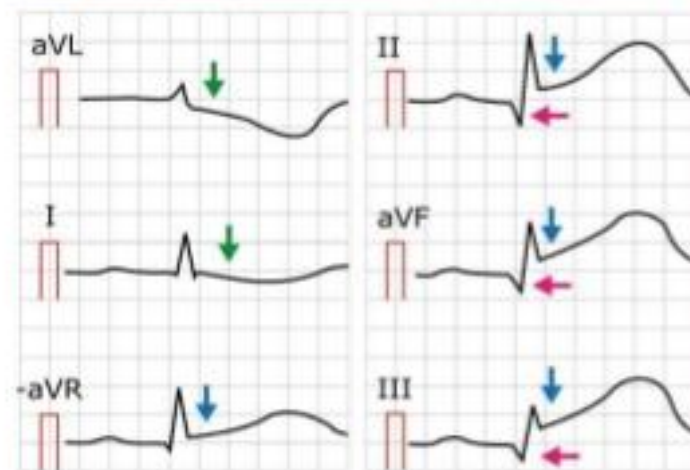
STEMI...ECG

A Acute STE-ACS (STEMI) example 1



60 year old male with retrosternal chest pain. ECG shows ST segment elevations in inferior leads (II, aVF and III). There are reciprocal ST segment depressions in aVL and I. There are also pathological Q-waves in the inferior leads.

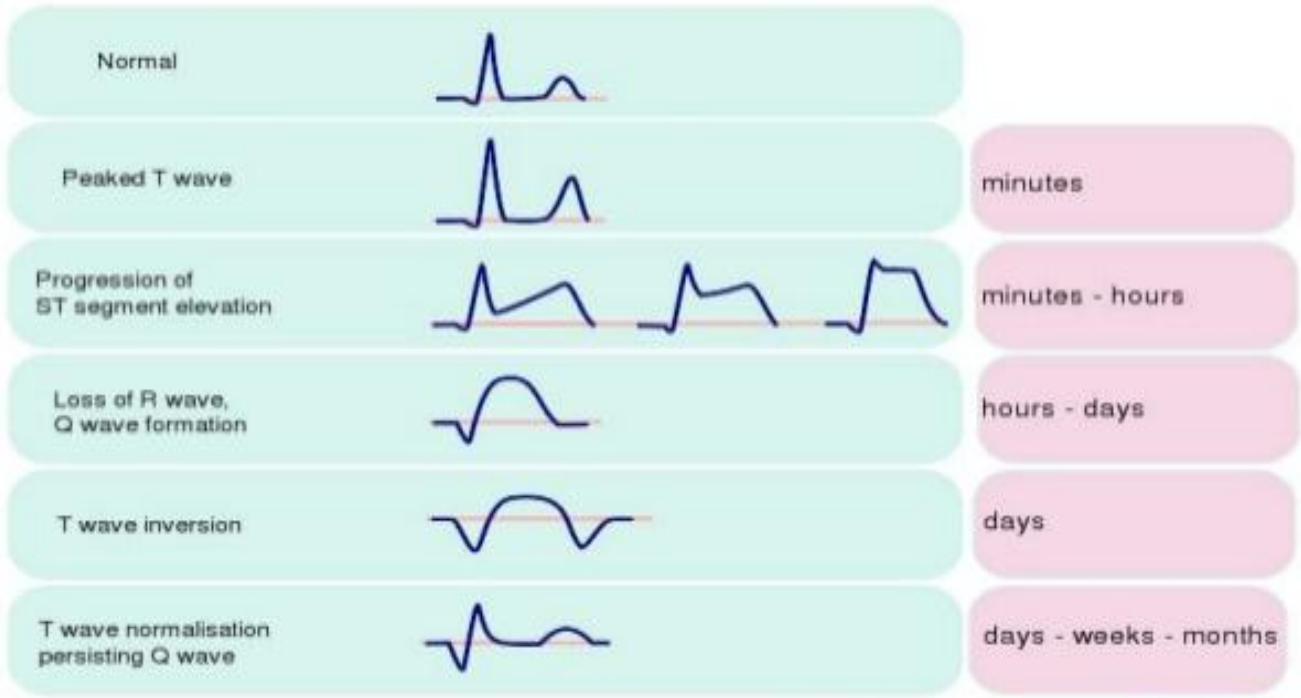
B Acute STE-ACS (STEMI) example 2



65 year old diabetic with 3 hours duration of chest pain. ECG shows ST-segment elevations, reciprocal depressions and pathological Q-waves.

- ST segment elevation
- Pathological Q-waves
- Reciprocal ST-segment depression

ECG evolution in non-reperfused myocardial infarction



Cardiac Biomarkers

✚ **CK-MB :**

- ✚ Rapid, cost-efficient, accurate assays
- ✚ Ability to detect early reinfarction

✚ **Troponins : (Troponin I and Troponin T.)**

- ✚ Powerful for stratification.
- ✚ Greater sensitivity and specificity than CK-MB.
- ✚ Detection of recent MI up to 2 weeks after onset.
- ✚ Useful for selection of therapy

Echocardiography

- ✚ Echocardiography may reveal wall motion abnormality and LV dysfunction.
- ✚ It may also detect RV infarction, Ventricular aneurysms, pericardial effusion and LV Thrombus.

Treatment

- ☛ Patients should be placed at bed rest with continuous ECG monitoring (ST-segment deviation and cardiac arrhythmias).

- ☛ **Analgesics :**

- ☛ Sublingual Nitroglycerin and Morphine

- ☛ **Antiplatelet Agents :**

- ☛ Aspirin

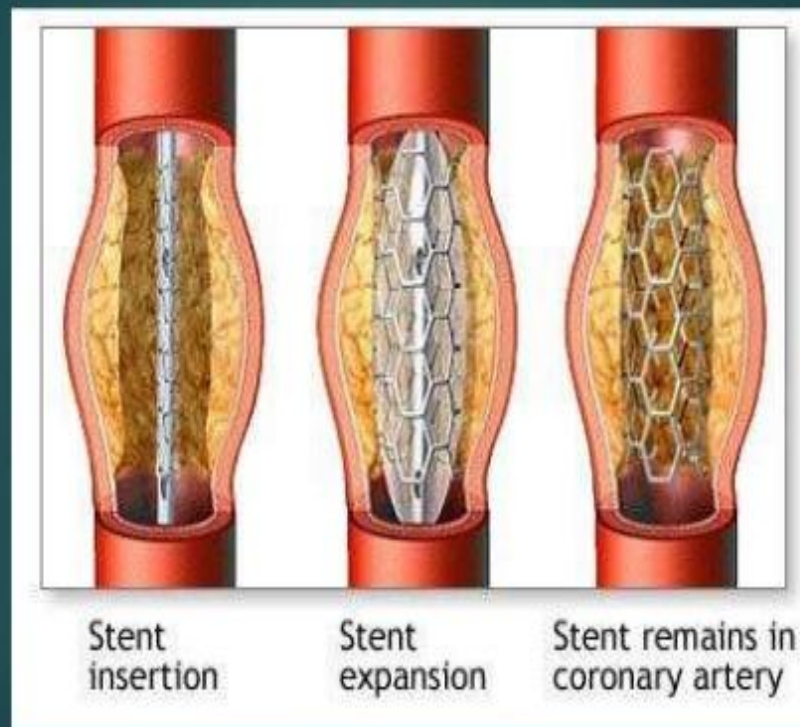
- ☛ Thienopyridines: (P2Y Inhibitors), Clopidogrel , Prasugrel.

- ☛ Glycoprotein IIb/ IIIa Inhibitors : Tirofiban, Eptifibatide, Abciximab.

Reperfusion Therapy

- ✚ **Percutaneous coronary intervention** : It includes angioplasty, with or without deployment of an intracoronary Bare-metal or Drug-eluting stent, with support of pharmacological measures to prevent thrombosis.
- ✚ **Fibrinolytic therapy:**
 - ✚ Streptokinase 1.5 million intravenous over 30-60 min.
 - ✚ Alteplase (tPA)
 - ✚ Reteplase (rPA)
 - ✚ Tenecteplase (TNK-tPA).

PTCA





Anticoagulant Therapy

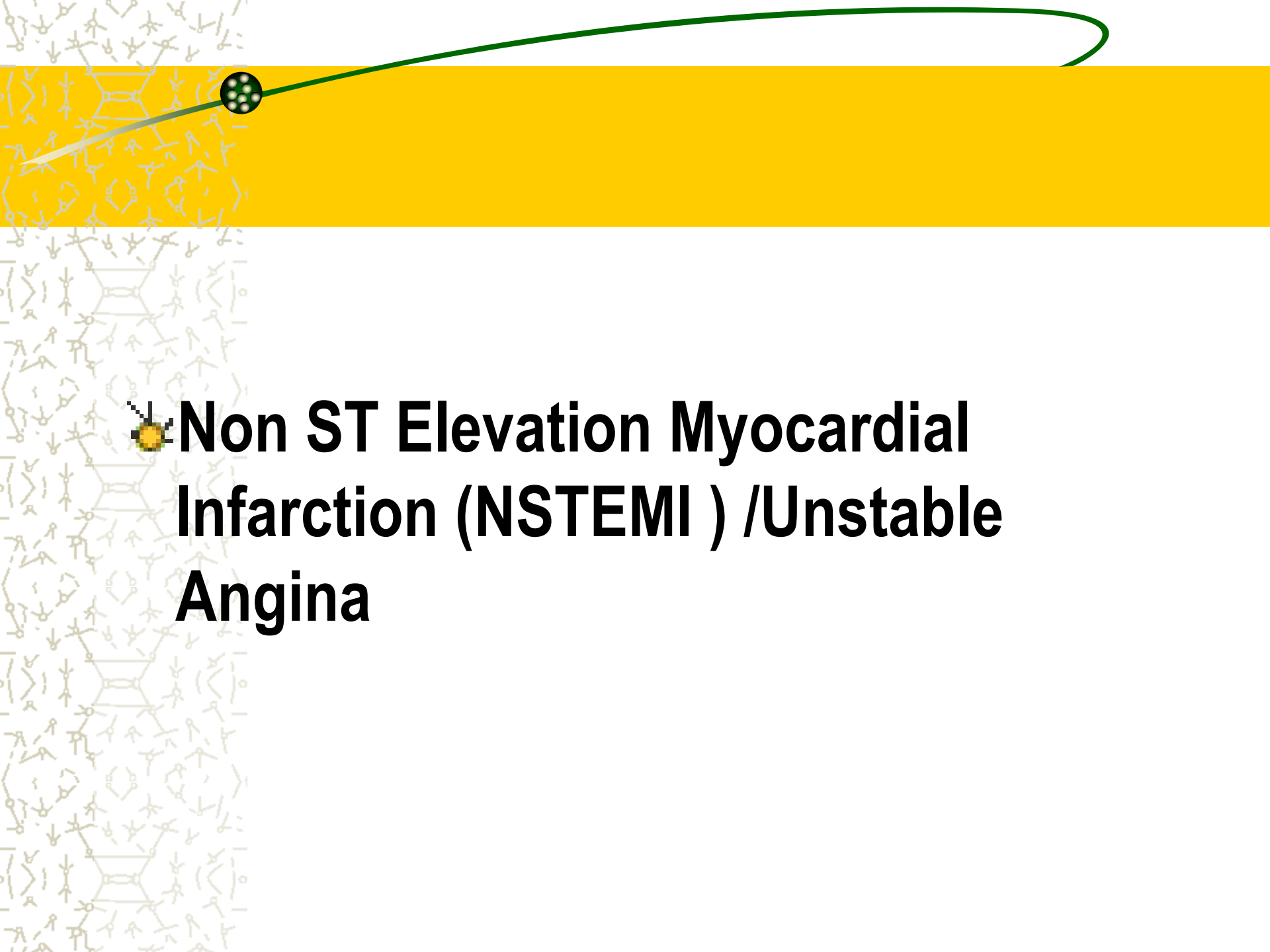
- ✦ Unfractionated Heparin
- ✦ Lower molecular weight Heparin (Enoxaparin)
- ✦ Fondaparinux (Factor Xa Inhibitor)

Anti Anginal and Ongoing Treatment

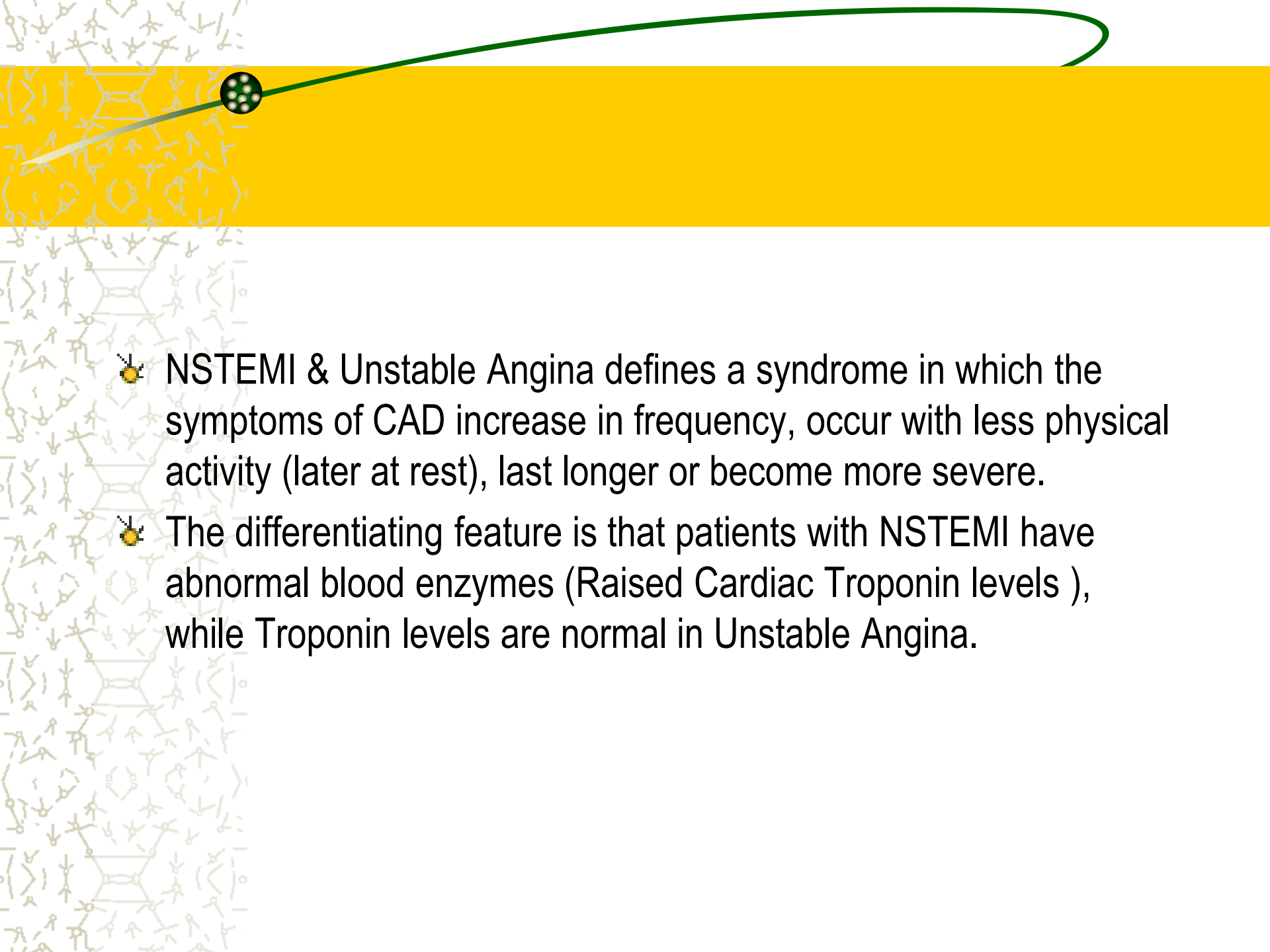
- ✦ **Nitrates:** They reduce myocardial oxygen demand by decreasing preload and afterload, and they may also improve myocardial oxygen supply by increasing sub-endocardial perfusion and collateral blood flow to the ischemic region.
- ✦ **Beta Adrenergic Blocking Agents**
- ✦ **Angiotensin-converting enzyme (ACE) inhibitors.**
- ✦ **Angiotensin receptor blockers** Additional medical therapy.
- ✦ **Early administration of HMG-CoA reductase inhibitors (statins).**
- ✦ **Aldosterone Antagonists (Spironolactone),**

Complications of STEMI

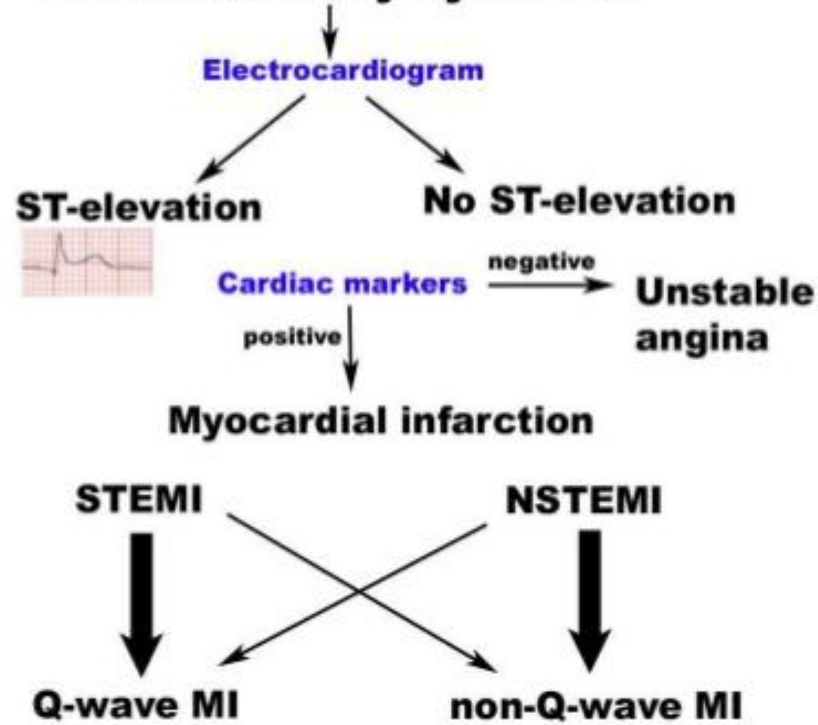
- ✚ Post Infarction Ischemia
- ✚ Arrhythmias (Sinus bradycardia, Supraventricular Arrhythmias. Ventricular Arrhythmias).
- ✚ Myocardial Dysfunction (Acute Heart Failure, Cardiogenic shock)
- ✚ Mechanical Defects (Papillary muscle rupture, Mitral Regurgitation, ventricular septal rupture).
- ✚ RV Infarction
- ✚ Myocardial Rupture
- ✚ LV Aneurysm
- ✚ Pericarditis
- ✚ Mural Thrombus



**• Non ST Elevation Myocardial
Infarction (NSTEMI) /Unstable
Angina**

- 
- ✚ NSTEMI & Unstable Angina defines a syndrome in which the symptoms of CAD increase in frequency, occur with less physical activity (later at rest), last longer or become more severe.
 - ✚ The differentiating feature is that patients with NSTEMI have abnormal blood enzymes (Raised Cardiac Troponin levels), while Troponin levels are normal in Unstable Angina.

Acute Coronary Syndrome



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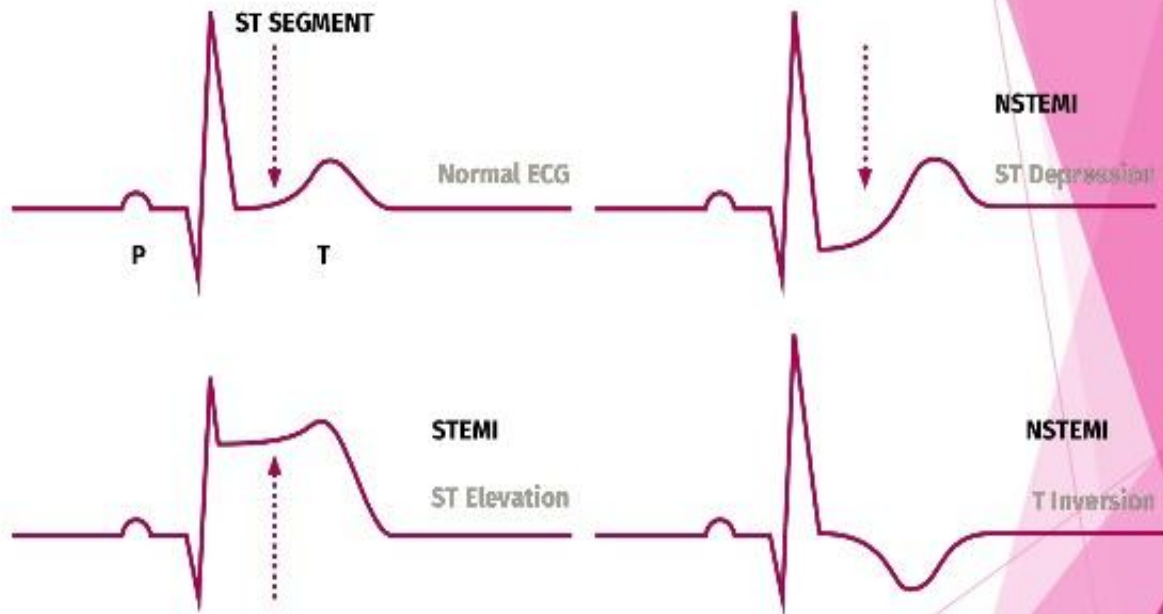
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Cardiac Biomarkers

Commonly measured markers of myocardial damage include:
Troponin I , Creatine kinase (CK), Lactate dehydrogenase (LDH),
Aspartate transaminase (AST).

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- ✦ **Calcium Channel Blockers**
- ✦ **Early administration of HMG-CoA reductase inhibitors (statins).**

Evolving risk stratification...

High-risk NSTEMACS

Presentation with clinical features consistent with ACS and any of:

- repetitive or prolonged (> 10 minutes) ongoing chest pain/discomfort
- elevation of at least 1 cardiac biomarker (troponin or CK-MB)
- persistent or dynamic ST depression ≥ 0.5 mm or new T wave inversion ≥ 2 mm
- transient ST segment elevation (≥ 0.5 mm) in more than 2 contiguous leads
- haemodynamic compromise: systolic blood pressure < 90 mmHg, cool peripheries, diaphoresis, Killip class > 1 and/or new onset mitral regurgitation
- sustained ventricular tachycardia
- syncope
- LV systolic dysfunction (LVEF < 40%)
- prior PCI within 6 months or prior CABG surgery
- presence of known diabetes (with typical symptoms of ACS)
- chronic kidney disease – estimated GFR < 60 mL/min (with typical symptoms of ACS).



Admit to coronary care unit or high dependency unit:

- Estimate ischemic risk, estimate bleeding risk, choose augmented antithrombotic therapy
- refer for angiography to determine surgery/PCI, or medical therapy.



THANK YOU