

Management of a case of Acute Chest Pain



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Potentially Serious Causes of Acute Chest Pain

Acute coronary ischemia,

- Acute myocardial infarction,
- Unstable angina,
- Stable angina
- Aortic dissection,
- Pulmonary

Pulmonary embolus,

Pneumothorax, Mediastinitis,

Pneumonia, Pleuritis,

- Pericarditis,

,

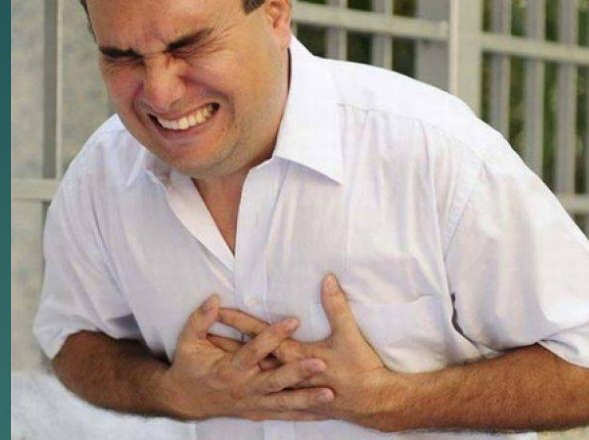


Other causes- Differential Diagnoses

Cardiac- Others	Aortic Stenosis, MVP, Hypertrophic cardiomyopathy
GIT	Esophageal rupture Esophageal tear (Mallory-Weiss), Cholecystitis, Pancreatitis, Esophageal spasm, Esophageal reflux, Peptic ulcer, Biliary colic
Musculoskeletal	Muscle strain, Rib fracture, Costochondritis, Nonspecific chest wall pain
Neurologic	Spinal root compression, Postherpetic neuralgia
Other	Psychologic,

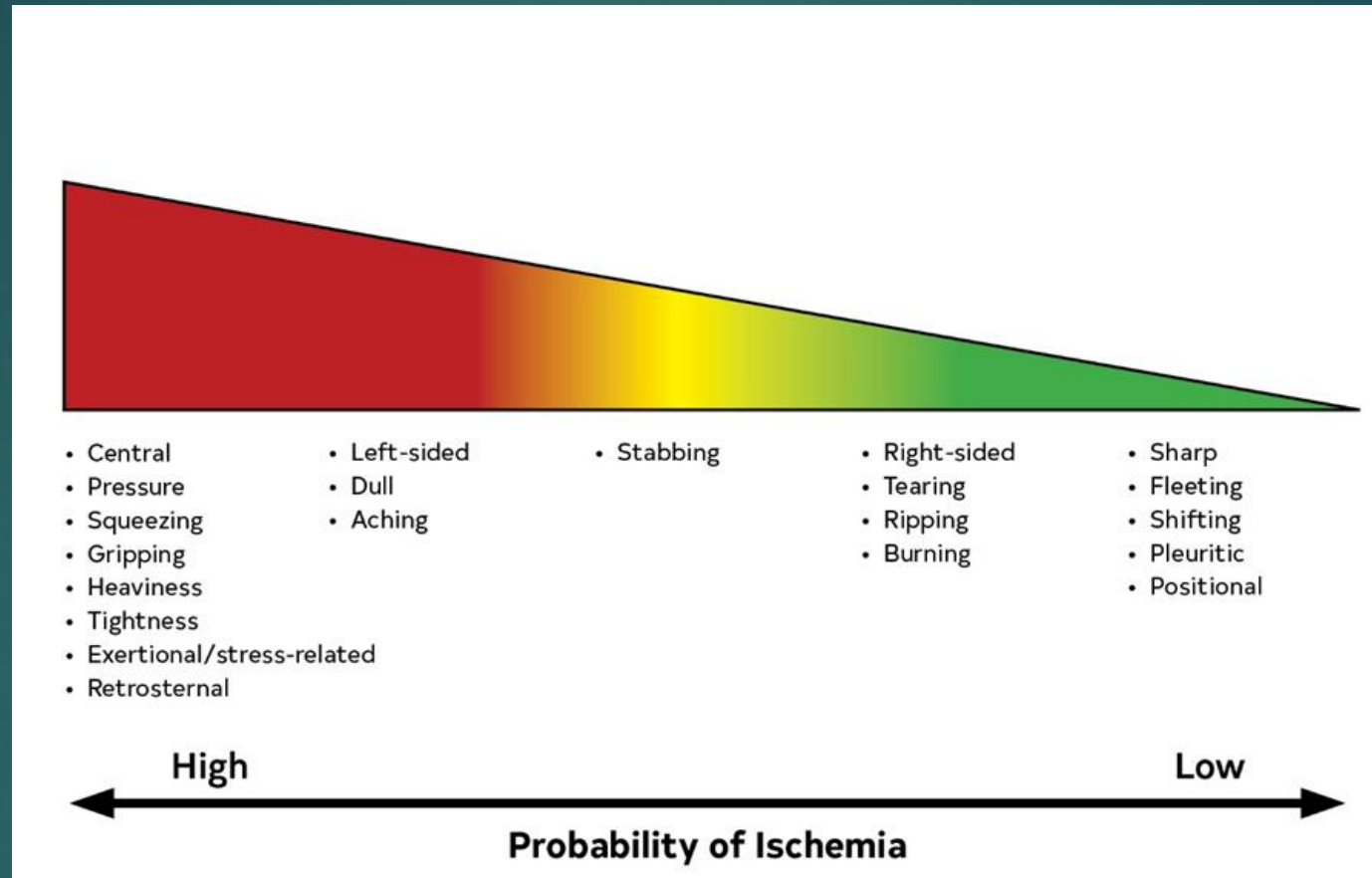


Evaluation of Chest Pain



- ▶ Systematic approach needed!
- ▶ Description of chest pain
 - ▶ Quality of the pain
 - ▶ Region/location of pain
 - ▶ Radiation
 - ▶ Temporal elements
 - ▶ Provocation
 - ▶ Palliation
 - ▶ Severity
- Associated symptoms
- Risk factors
- Physical examination
- Investigations
 - ECG
 - Chest X-ray
 - Blood work
 - Other

Index of Suspicion That Chest “Pain” Is Ischemic in Origin on the Basis of Commonly Used Descriptors.



Pain that can be localized to a very limited area and pain radiating to below the umbilicus or hip are unlikely related to myocardial ischemia.

Examination in Patients With Chest Pain

ACS	Diaphoresis, tachypnea, tachycardia, hypotension, crackles, S3, MR murmur; examination may be normal in uncomplicated cases
PE	Tachycardia + dyspnea—>90% of patients; pain with inspiration
Aortic dissection	Connective tissue disorders (e.g., Marfan syndrome), extremity pulse differential (30% of patients, type A>B) Severe pain, abrupt onset + pulse differential + widened mediastinum on CXR >80% probability of dissection Frequency of syncope >10% (8), AR 40%–75% (type A)
Esophageal rupture	Emesis, subcutaneous emphysema, pneumothorax (20% patients), unilateral decreased or absent breath sounds

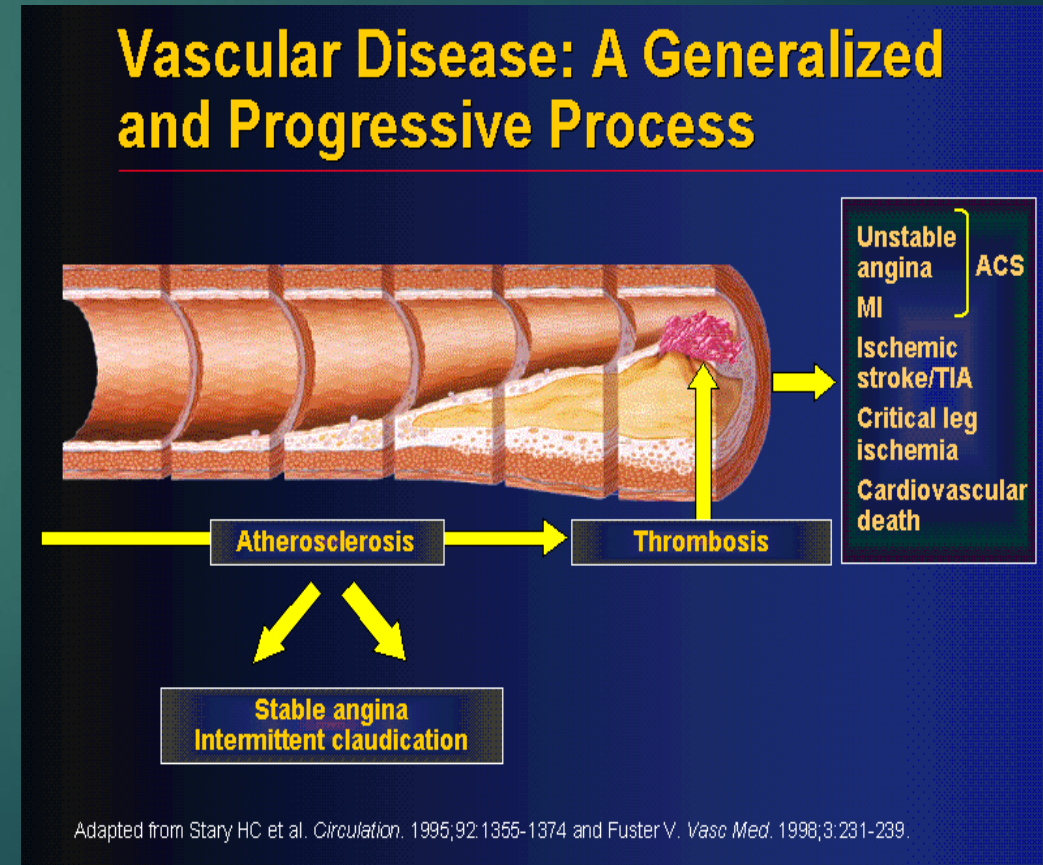
Ischemic Heart Diseases

▶ Stable Angina Pectoris

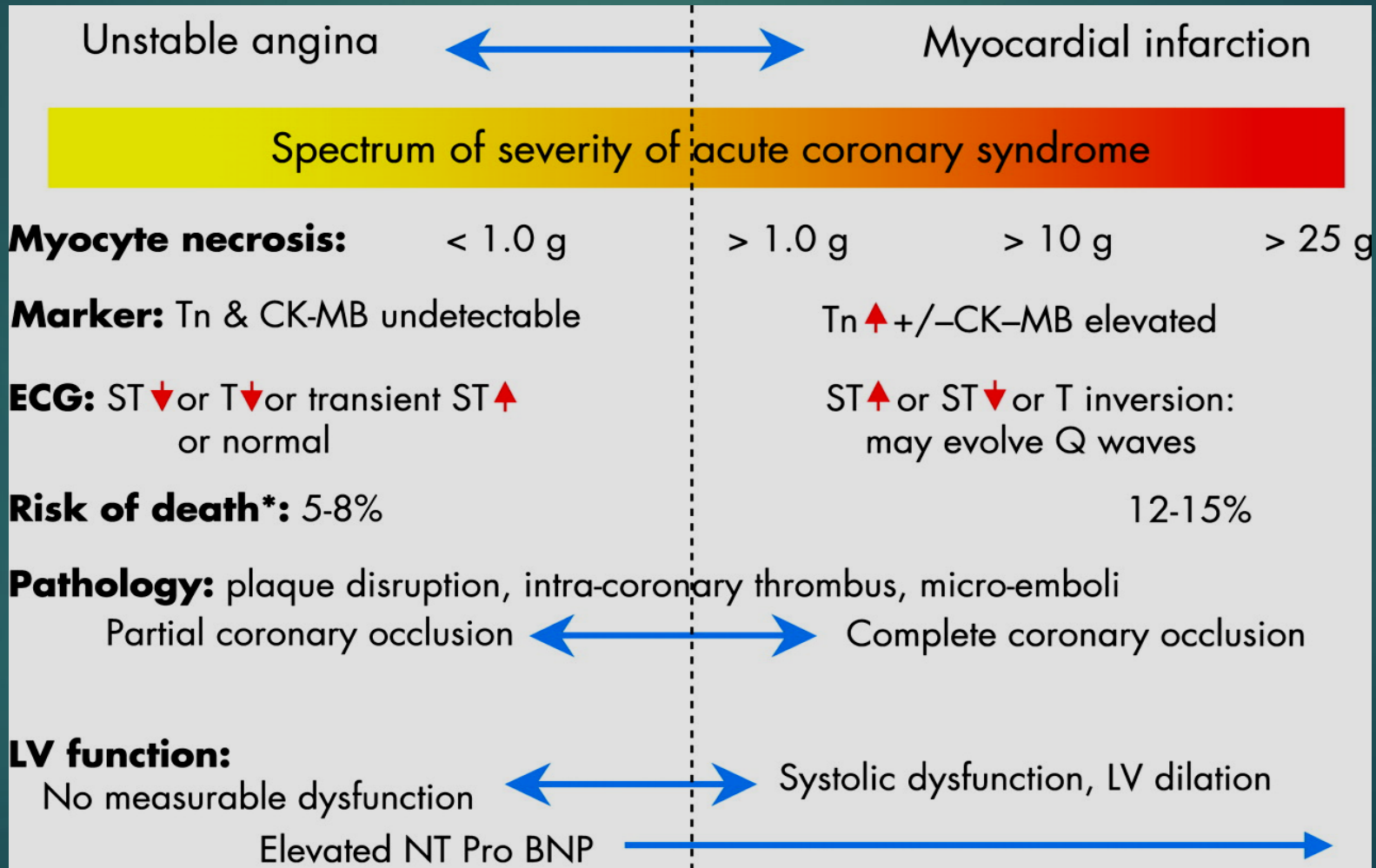
▶ ACS

-UA/NSTEMI

-STEMI

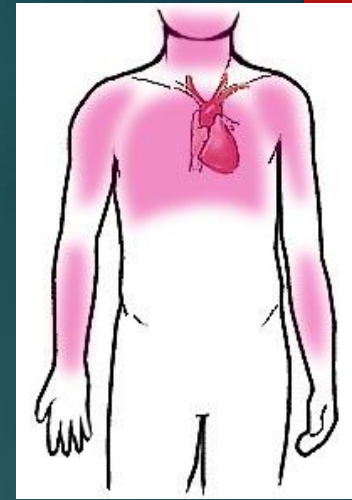


How to Differentiate the Spectrum ?



Unstable Angina & non-ST elevation MI

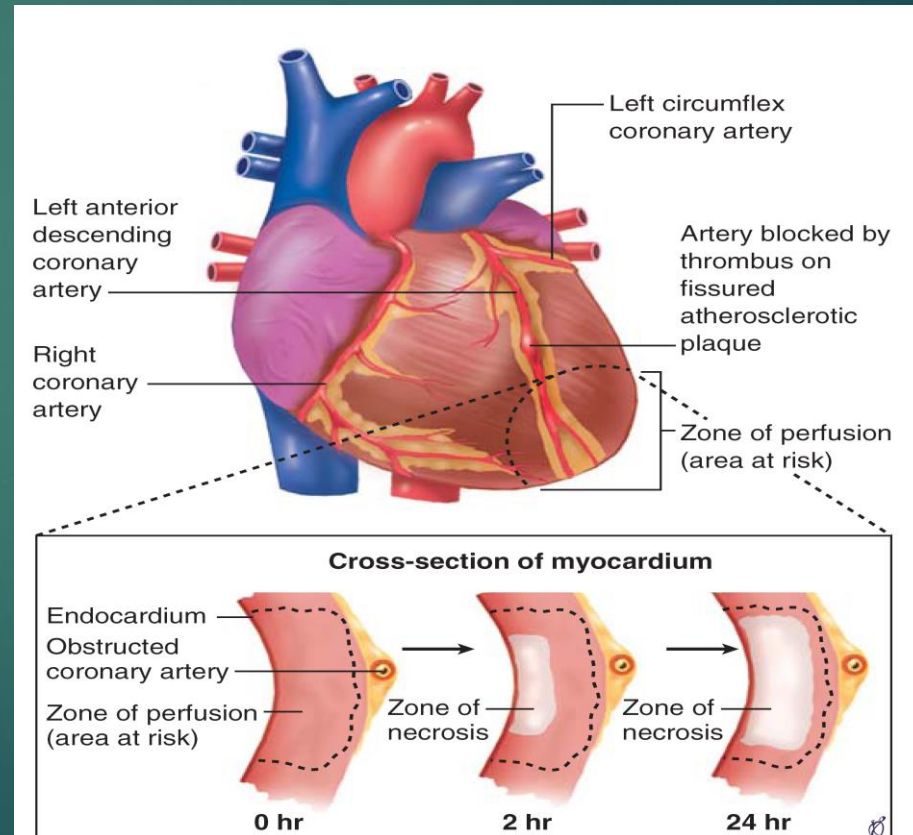
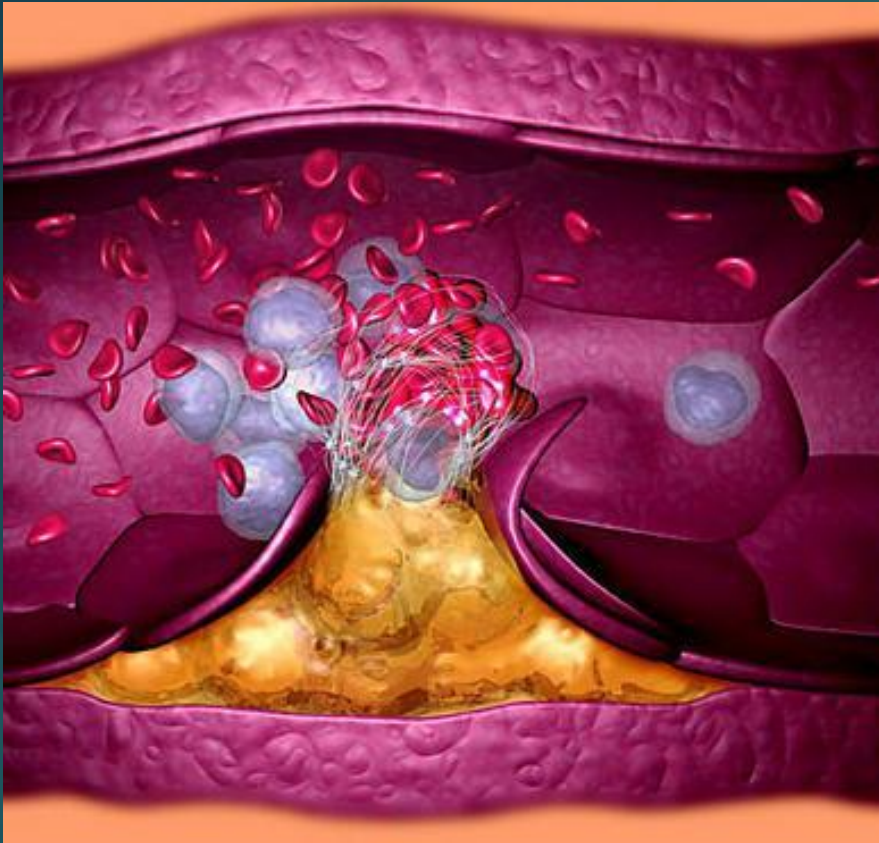
- Syndrome between stable angina & AMI
- White platelet-rich partially occlusive thrombus
- 6-8% have nonfatal or fatal MI in 12 months
- Higher long term risk of death and MI than pts of STEMI



3 Presentations of UA:

- ▶ **Rest Angina:** Prolonged, usually > 20min
- ▶ **New-onset Angina:** at least CCS class III in severity
- ▶ **Crescendo Angina:** previously diagnosed angina that is distinctly more frequent, longer in duration or lower in threshold

STEMI



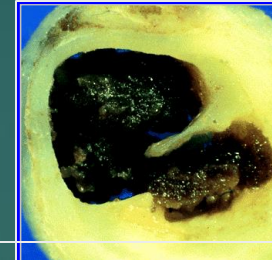
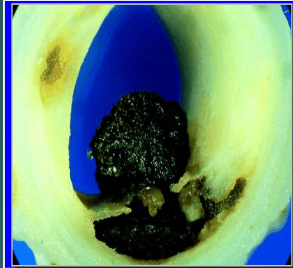
Algorithm for diagnosis...

- **Step 1 (Evaluate need for emergent care)**
 - **Consider potentially life-threatening causes of chest pain**
 - **If acute coronary syndrome suspected start emergent care**
 - **If emergent and not ACS, start appropriate emergent care**

Plaque disruption or erosion



ACUTE CORONARY SYNDROME



No ST elevation

ST elevation

Trop T-

Trop T+

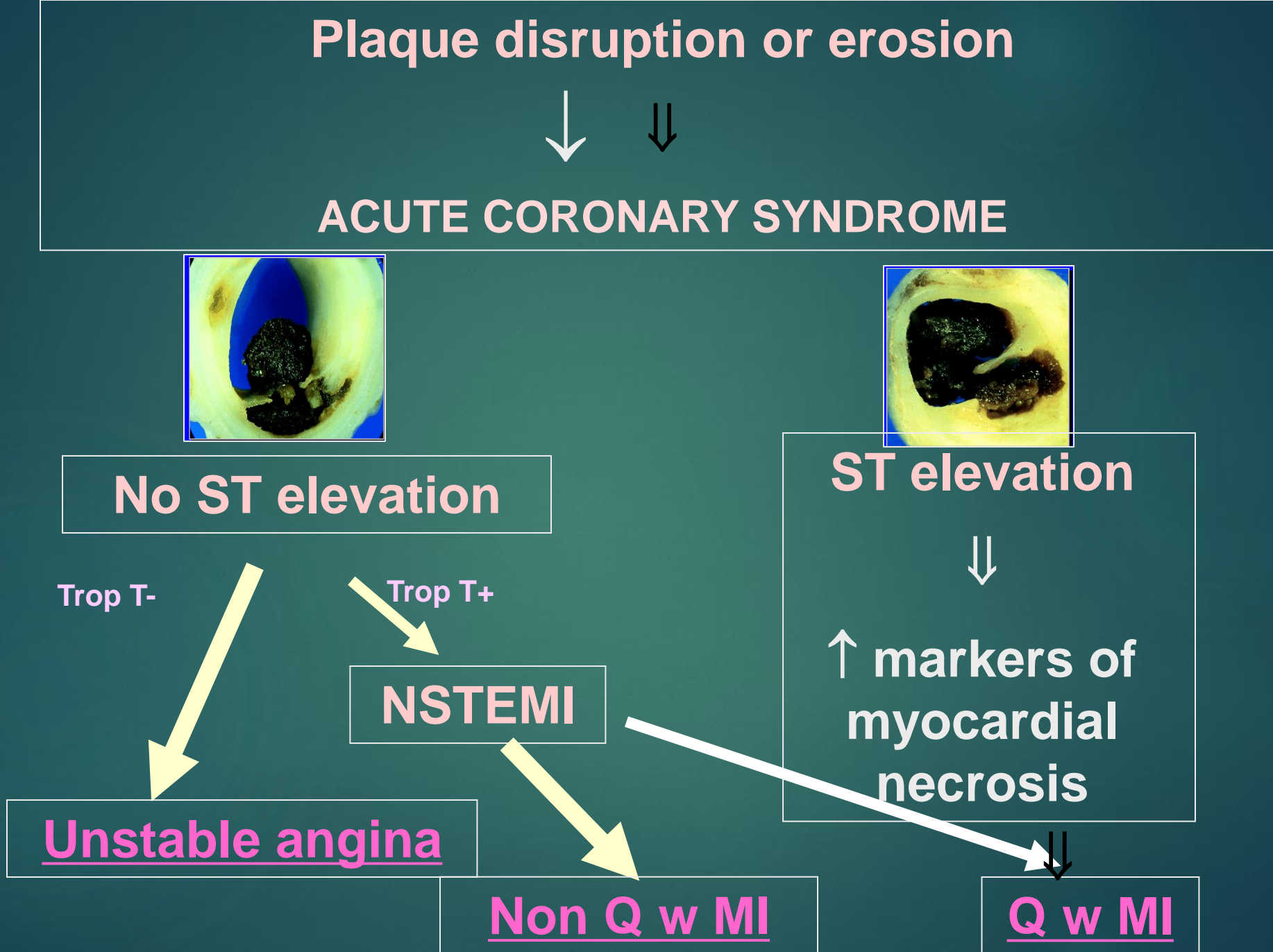
NSTEMI

↑ markers of myocardial necrosis

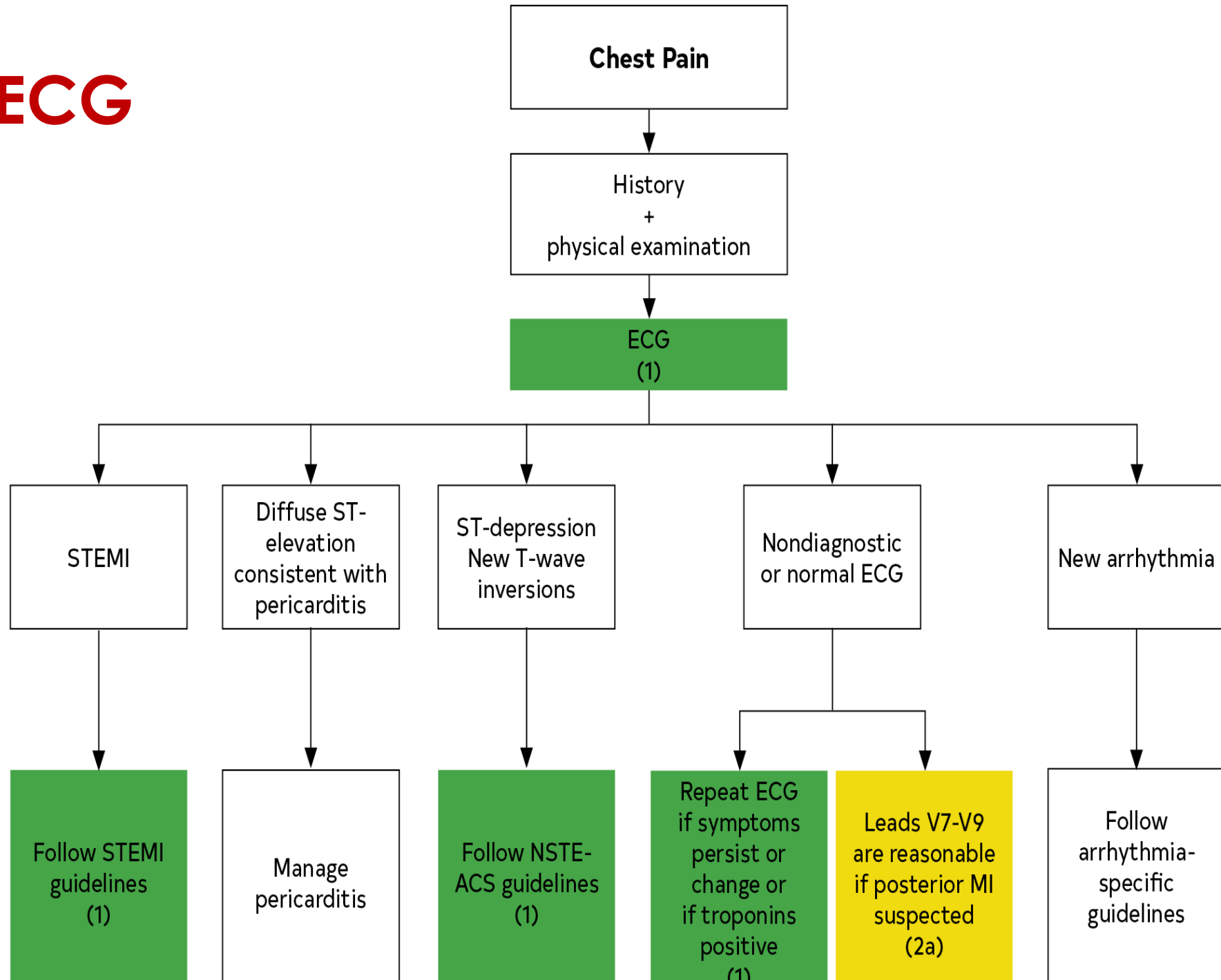
Unstable angina

Non Q w MI

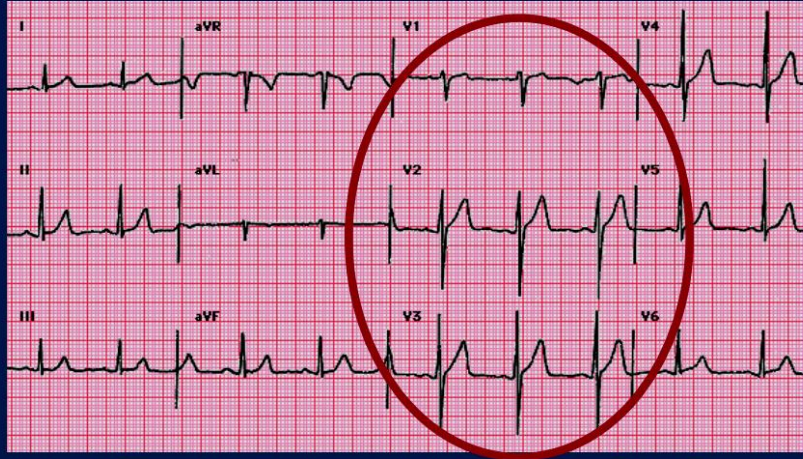
Q w MI



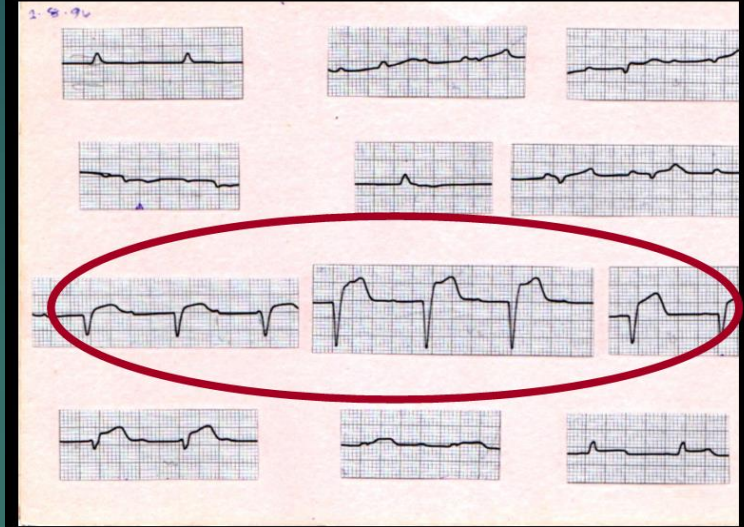
ECG



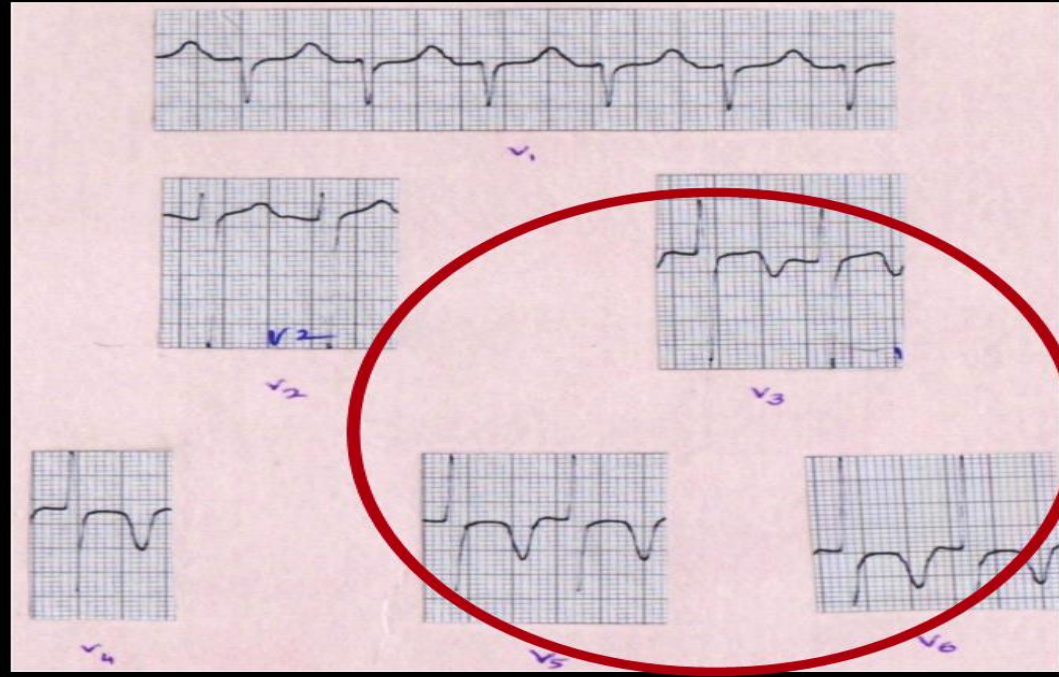
Normal ECG



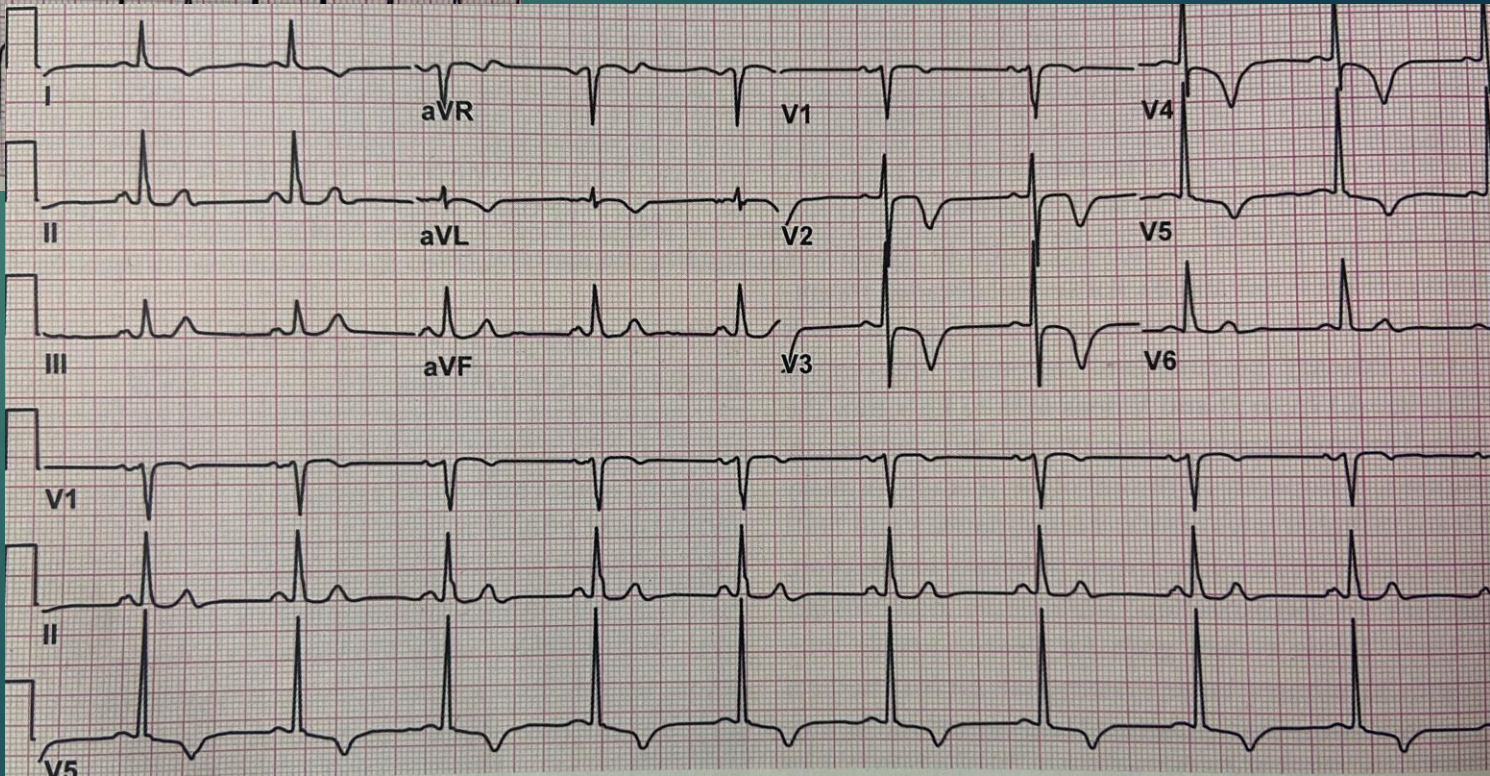
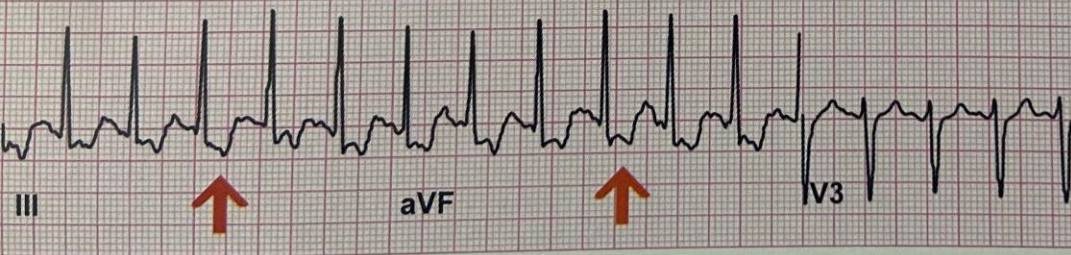
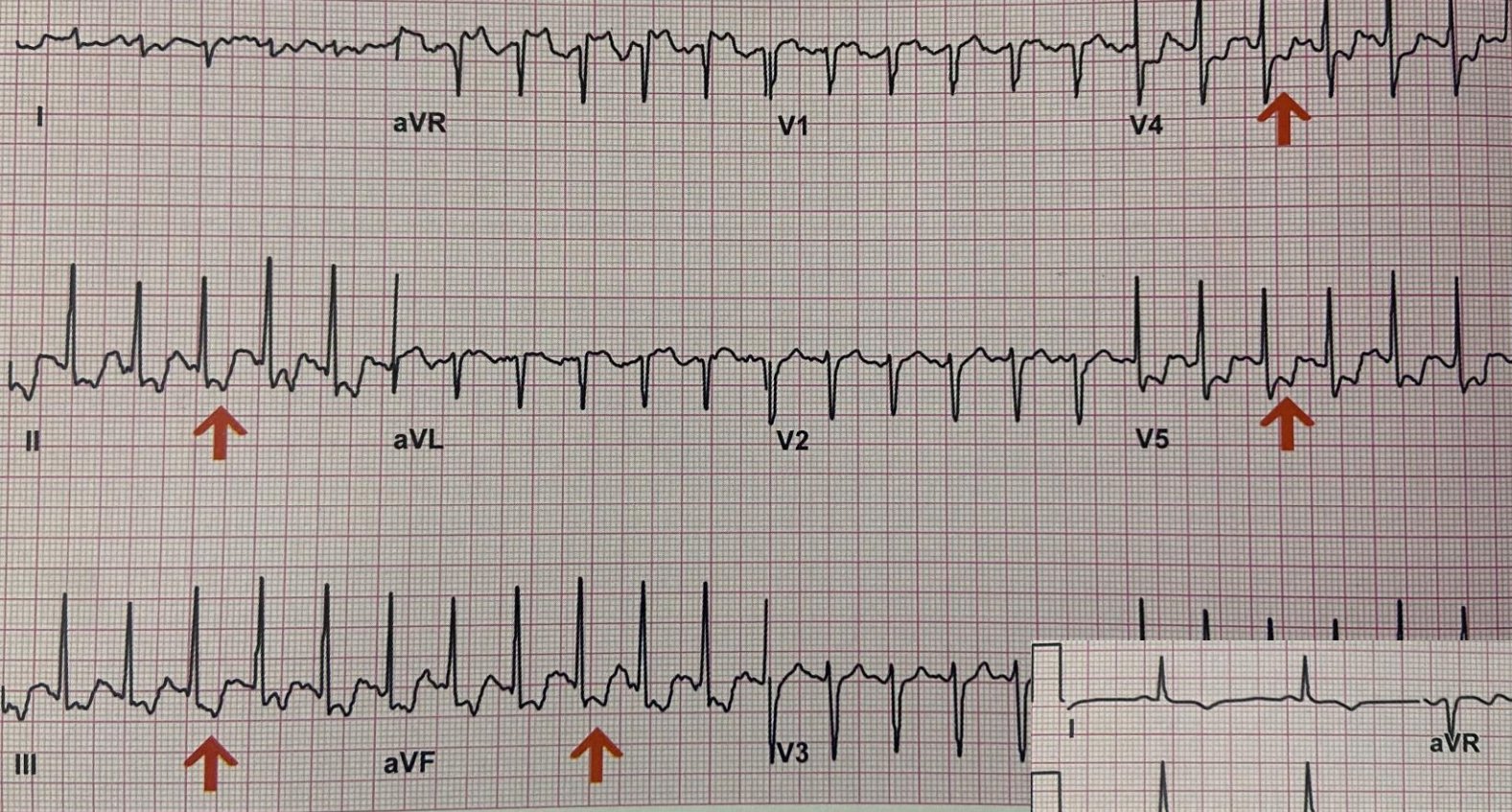
STEMI



NSTEMI



ECG – Chest Pain

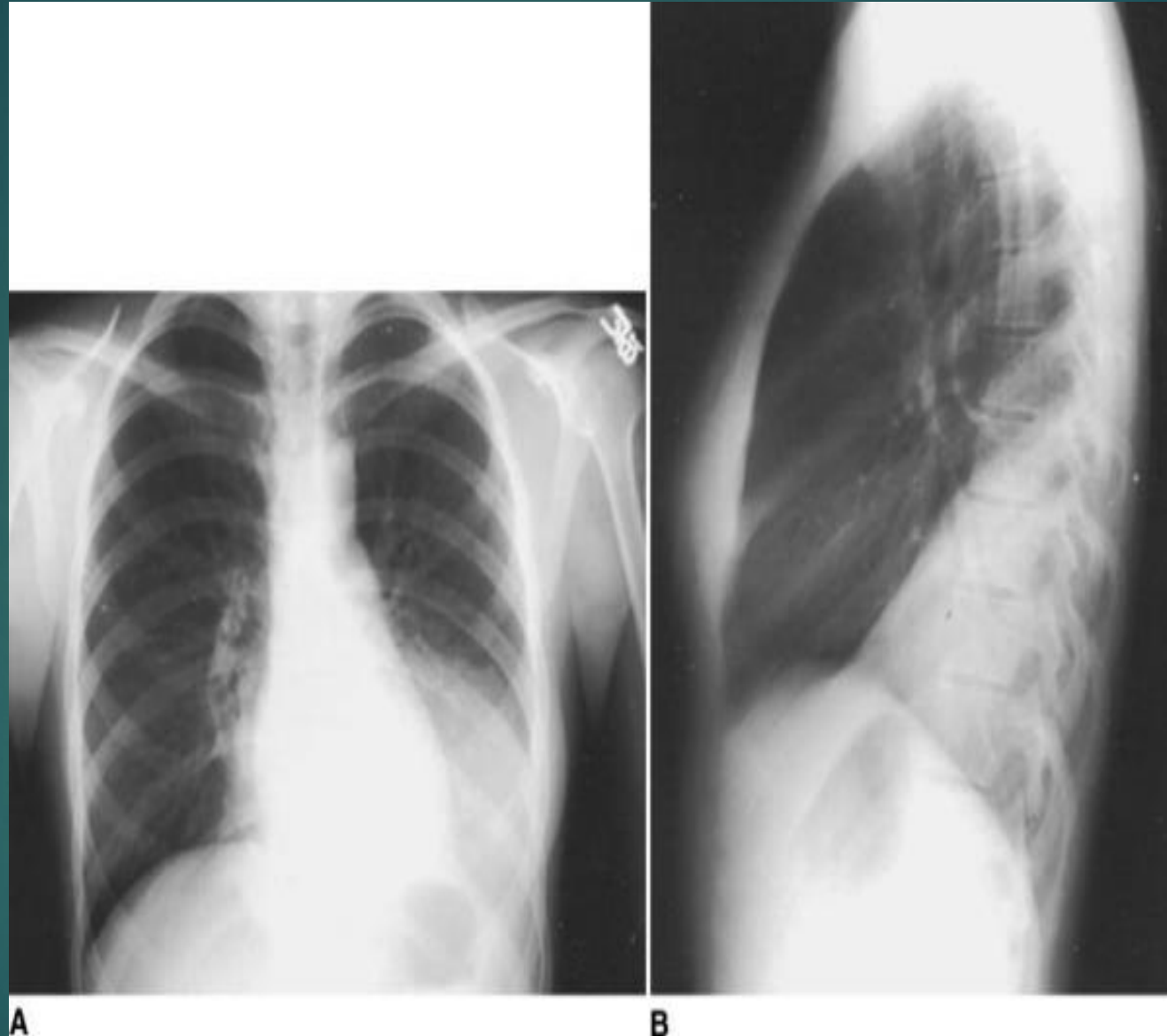


Points to remember for ECGs

- ▶ Initial ECG may NOT be diagnostic in patients with ACS
 - ▶ In patients who ended up with an MI, initial ECG was nondiagnostic in 45 percent and normal in 20 percent
- ▶ Don't assume a normal ECG obtained while patient having chest pain rules out ACS

Other Investigations

- Echocardiography
- Chest x-ray
 - Usually non-diagnostic in ACS
 - Helps to identify other important conditions
 - Congestive heart failure
 - Pneumonia
 - Pneumothorax
 - Pleural effusion
 - Widened mediastinum (aortic dissection)



Left lower lobe pneumonia

Cardiac Enzymes

- Cardiac Troponins
 - Blood levels rise after 2-6 hours (can be negative at initial assessment!)
 - Peak at 12-20 hours
- Creatine Kinase (CK)
 - May rise earlier than troponin, but less specific for cardiac muscle
- ALWAYS repeat in 6-8 hours if suspicious for acute cardiac event (ie, non-STEMI)

Diagnosis of AMI

- ▶ Clinical symptoms consistent with AMI
- ▶ Rise and fall in Troponin (or CK-MB) to values greater than 99% of a normal population
- ▶ ECG changes
 - ▶ ST elevation $\geq 0.2\text{mV}$ in leads V1-V3 or $\geq 0.1\text{mV}$ in other leads
 - ▶ ST depression consistent with posterior MI
 - ▶ Established MI defined by presence of Q waves of $\geq 0.3\text{ s}$ in leads V1-V6 or II, aVL, aVf

Aims in Management of STEMI

- ▶ Establish rapid early diagnosis
- ▶ Treat acute arrhythmias and hemodynamic complications including cardiac arrest
- ▶ Prompt pain relief and arterial O₂ conc.
- ▶ Initiate reperfusion therapy
- ▶ Treat complications of AMI
- ▶ Provide risk stratification for long term management & sec. prevention

Urgent management should not be delayed awaiting results of biomarkers

Decide

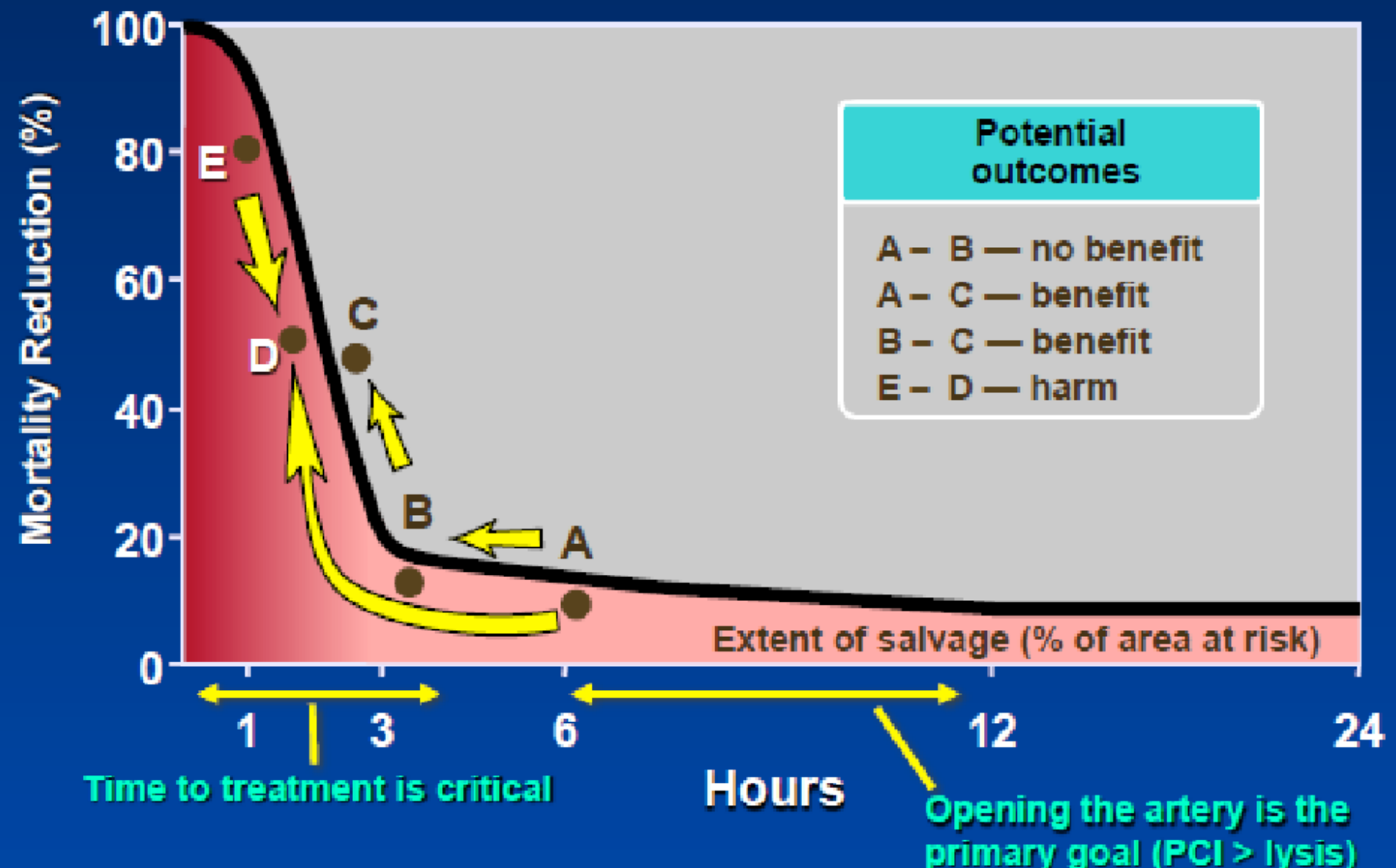
- ▶ ACS or not based on clinical & ECG(\pm Echo)
- ▶ Candidate for emergency reperfusion or not-ST \uparrow ,

Post MI, LBBB

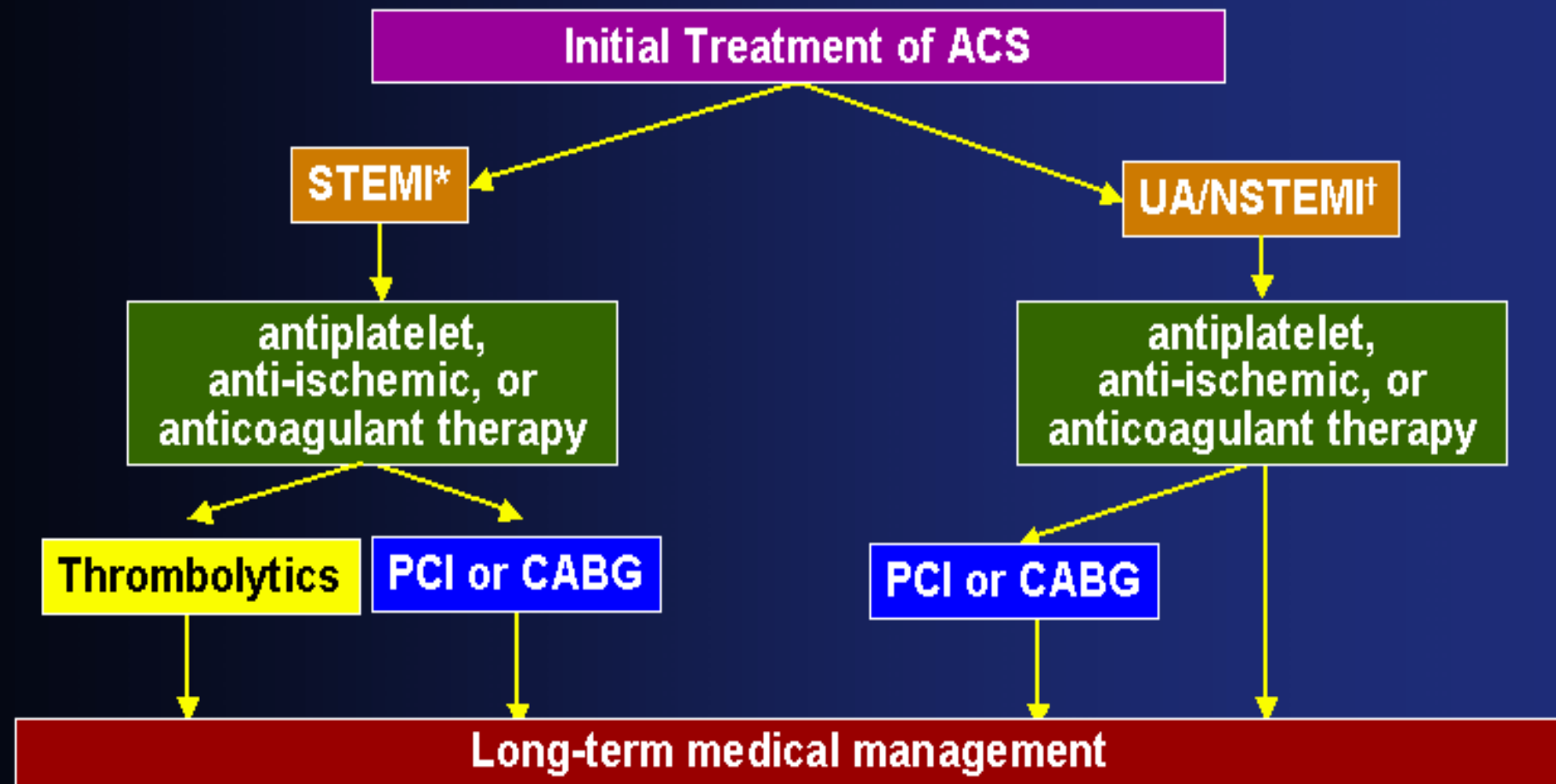
- ▶ Low or high risk non ST elevation ACS

Time and Myocardial Salvage

An Essential Fact Regardless of Mode of Reperfusion



Treatment of Acute Coronary Syndrome



Current Medical Management of Unstable Angina and NSTEMI*

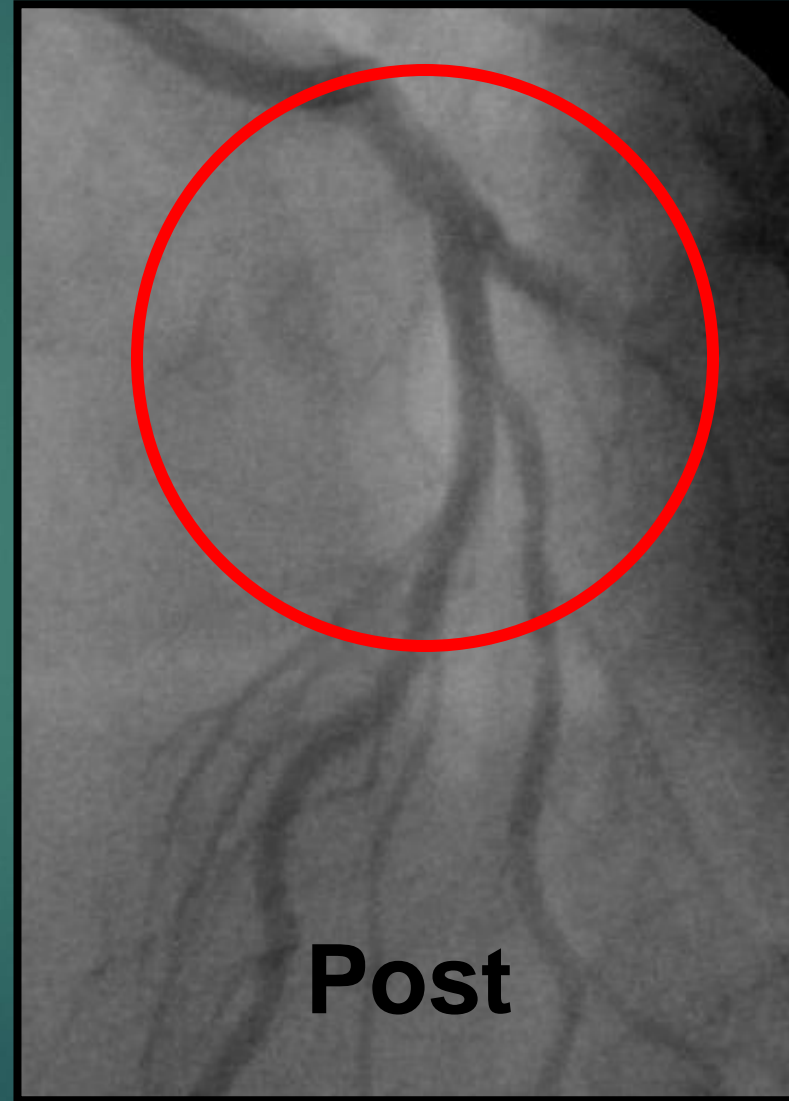
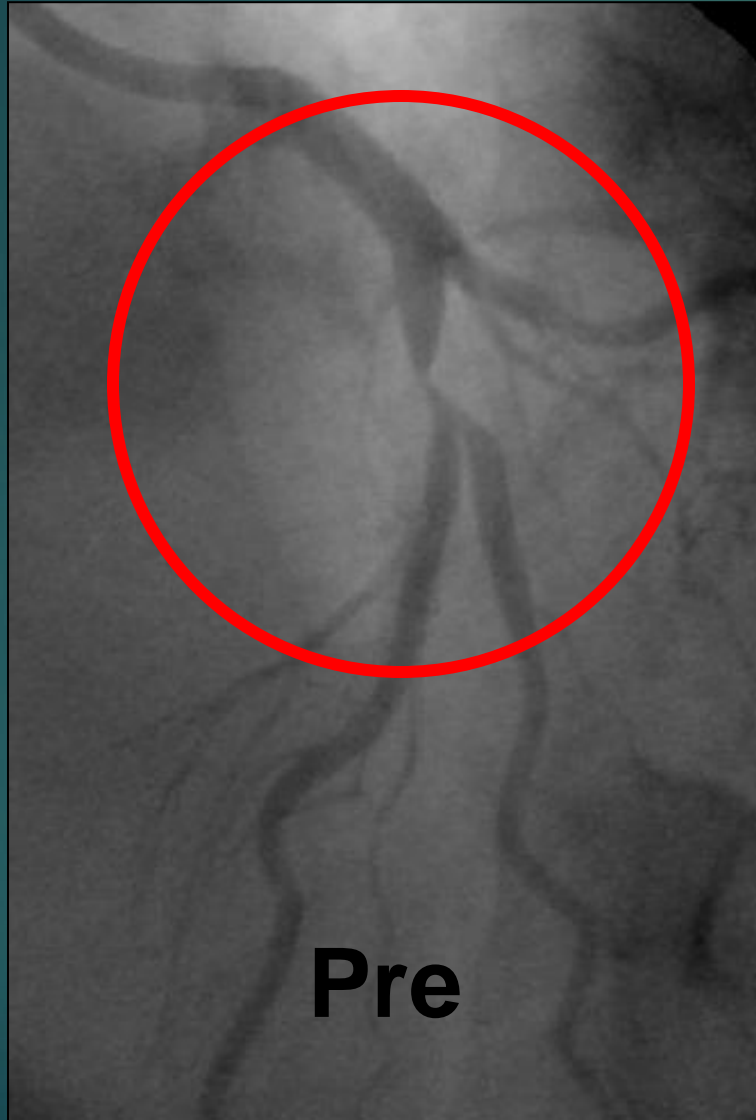
Acute Therapy

- Oxygen, bed rest, ECG monitoring
- Nitroglycerin
- Beta Blockers
- ACE Inhibitors
- Antiplatelet Therapy
- Anticoagulant Therapy

Maintenance Therapy

- Antiplatelet Therapy
- Beta Blockers
- Calcium Channel Blockers
- Lipid-lowering Agents
- ACE Inhibitors

Percutaneous Coronary Intervention in UA/NSTEMI

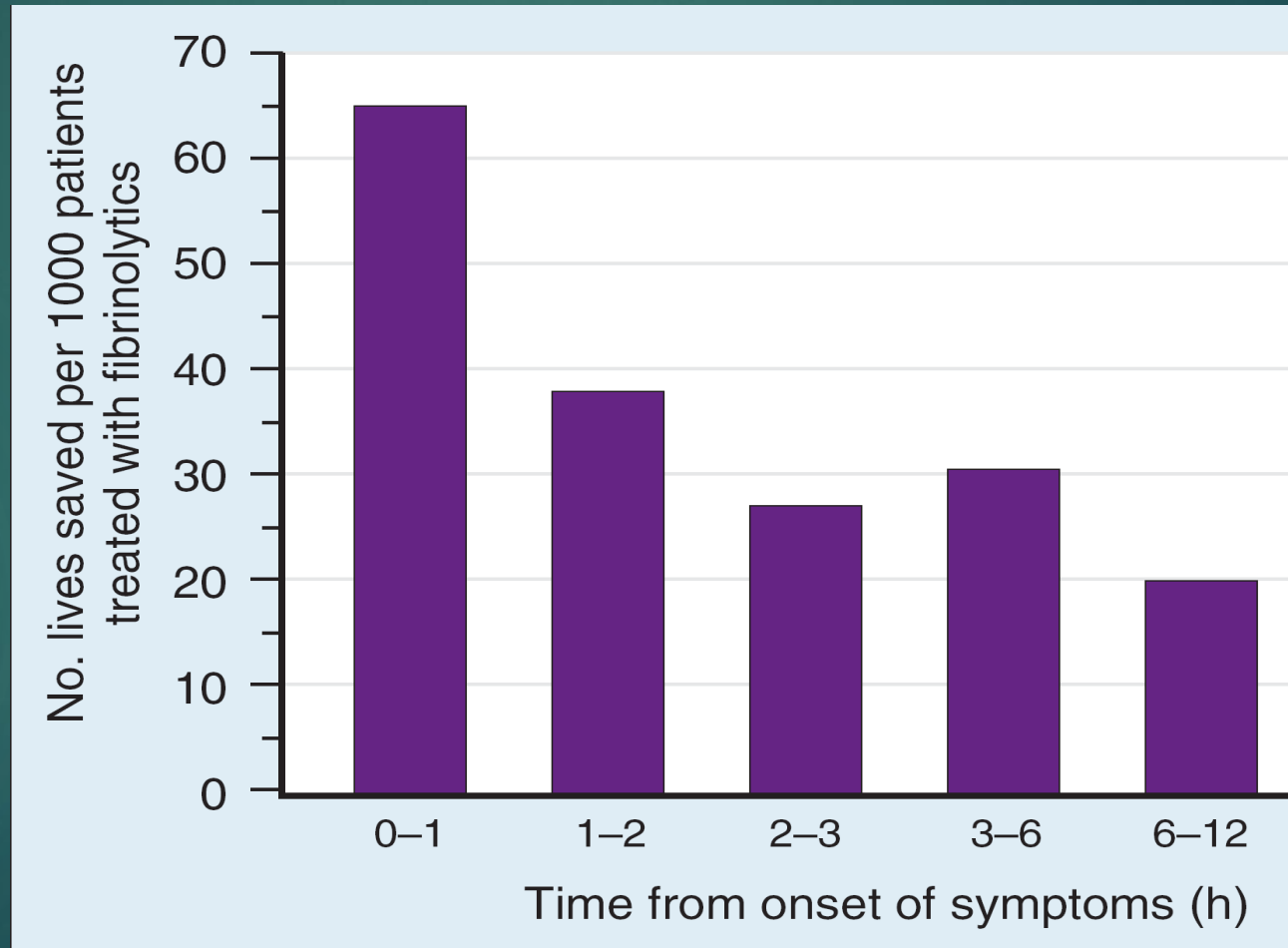


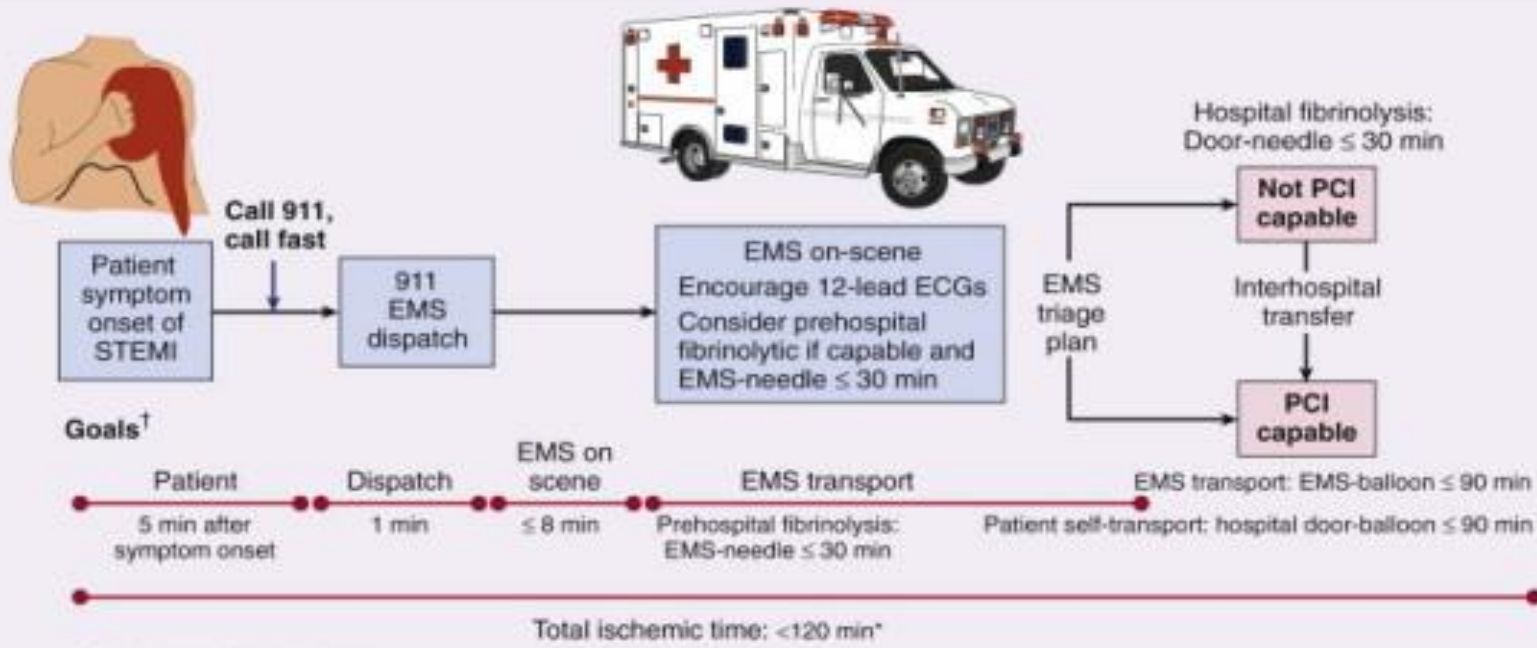
Treatment of Acute MI-Objectives

- ▶ **Control of pain**- Morphine 1-2 mg IV, Max 10-15 mg in adult
- ▶ **Aspirin**- 160-325 mg chewable/Clopidogrel 300 mg
- ▶ **Reopening of the occluded artery**- Thrombolytic/Primary PCI
- ▶ **Arrhythmia management-VT/VF/Heart blocks**
 - ▶ **Drugs**
 - ▶ **Defibrillators /Pacemakers**
- ▶ **Control of heart failure, shock and hypotension**
- ▶ **Statins**

Fibrinolysis

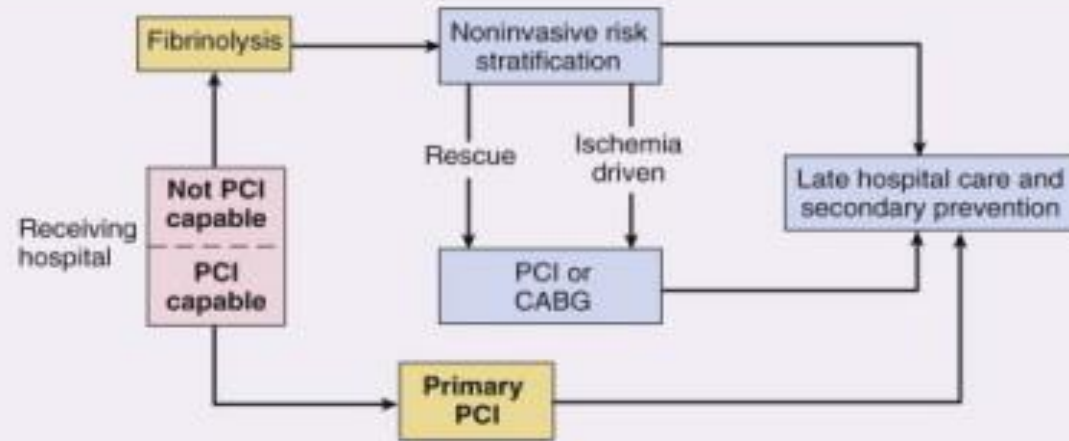
“The golden hour”





A

*Golden hour—first 60 minutes

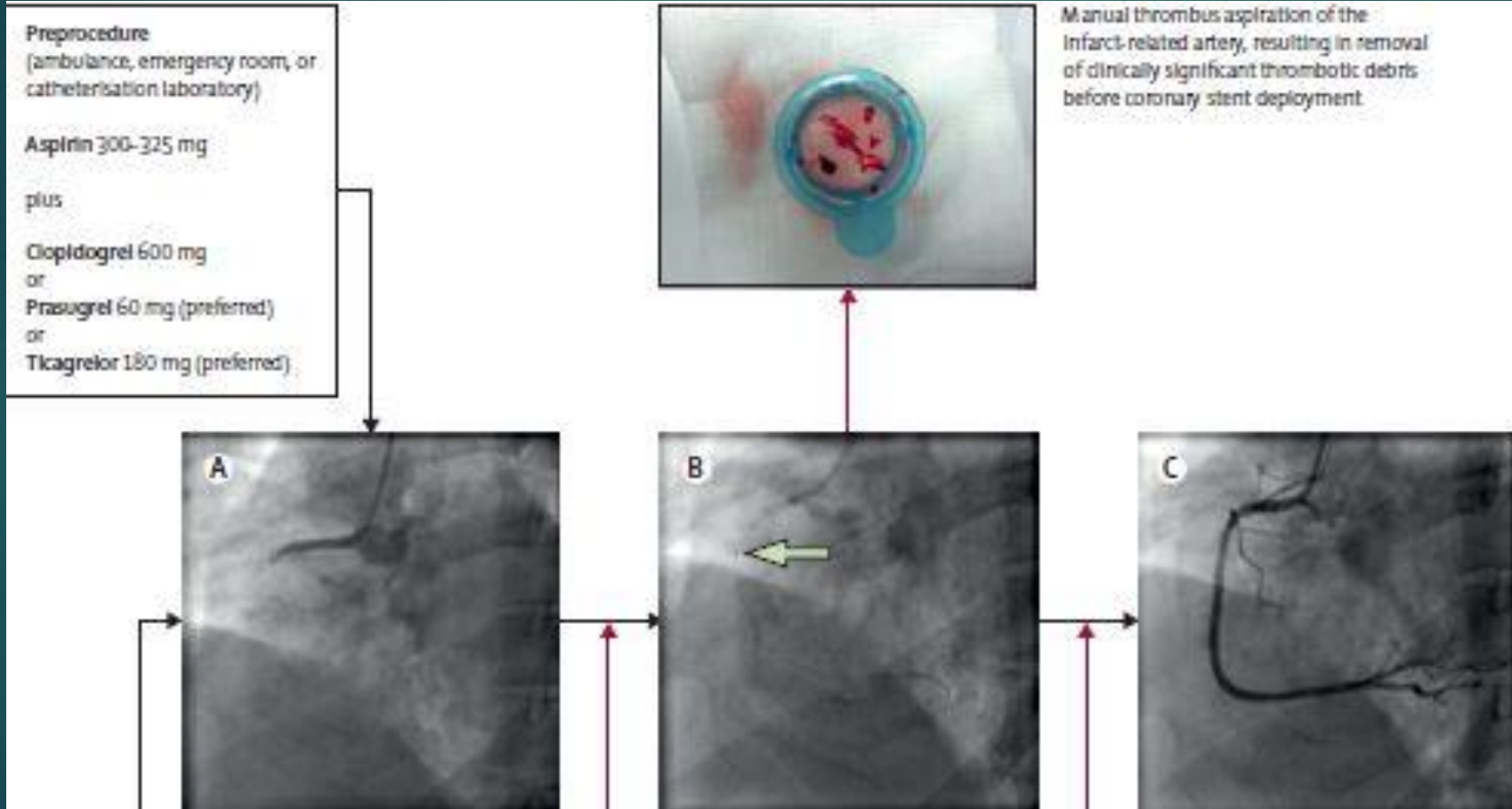


B

Treatment Delayed is Treatment Denied

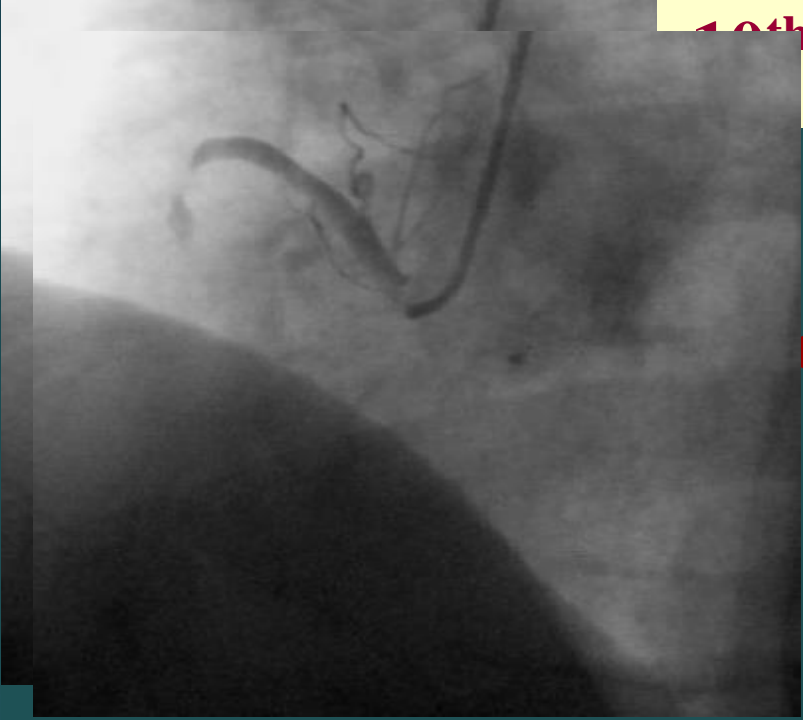
MYOCARDIAL INFARCTION

Time is Muscle

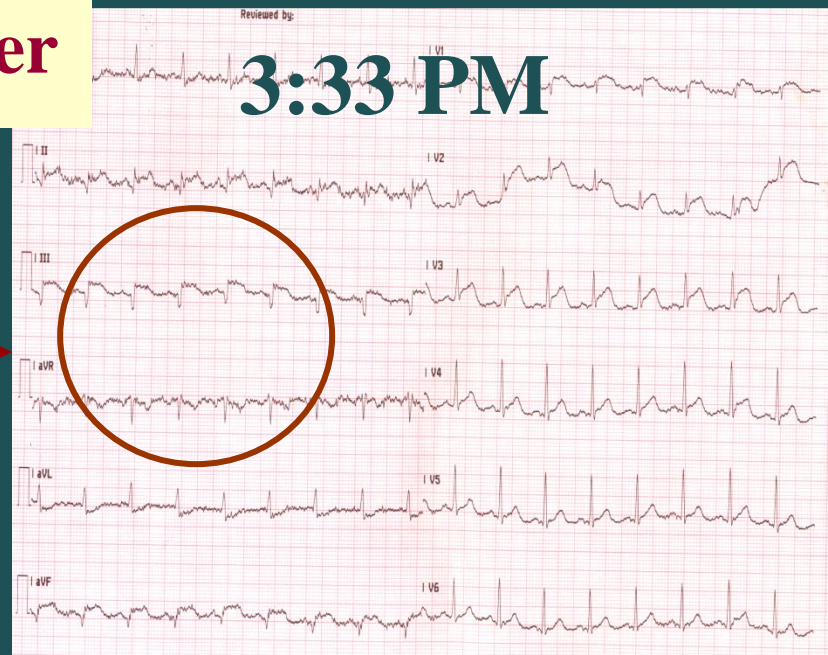


10th December

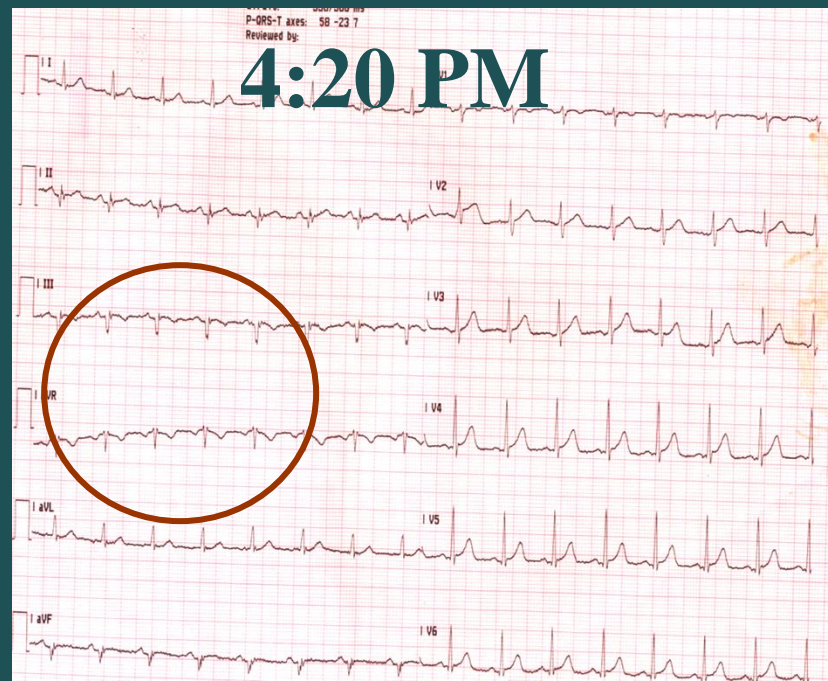
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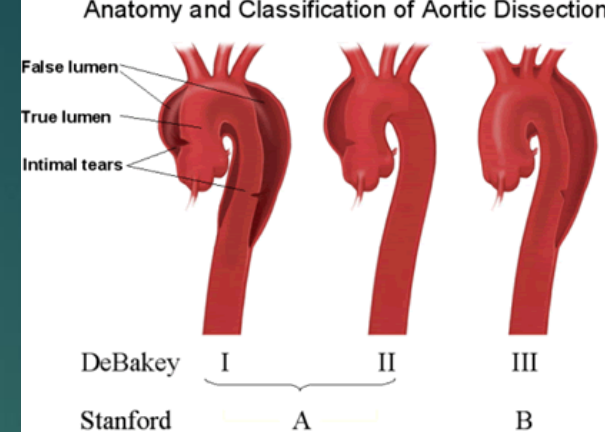
PRE



POST



Aortic Dissection - Diagnosis



- Tearing chest pain radiating to the back
- Risk Factors: HTN, connective tissue disease
- Exam: HTN, pulse differentials, neuro deficits
- Radiology: Wide mediastinum on CXR, CT angio chest, echo

Aortic Dissection



Pericarditis

- ▶ Refers to inflammation of pericardial sac
- ▶ Preceded by viral prodrome, i.e. flu-like symptoms
- ▶ Typically, patients have sharp, pleuritic chest pain relieved by sitting up or leaning forward

Pericarditis

- Diagnosis

Acute pericarditis (at least 2 criteria of 4 should be present)*:

1. Typical chest pain

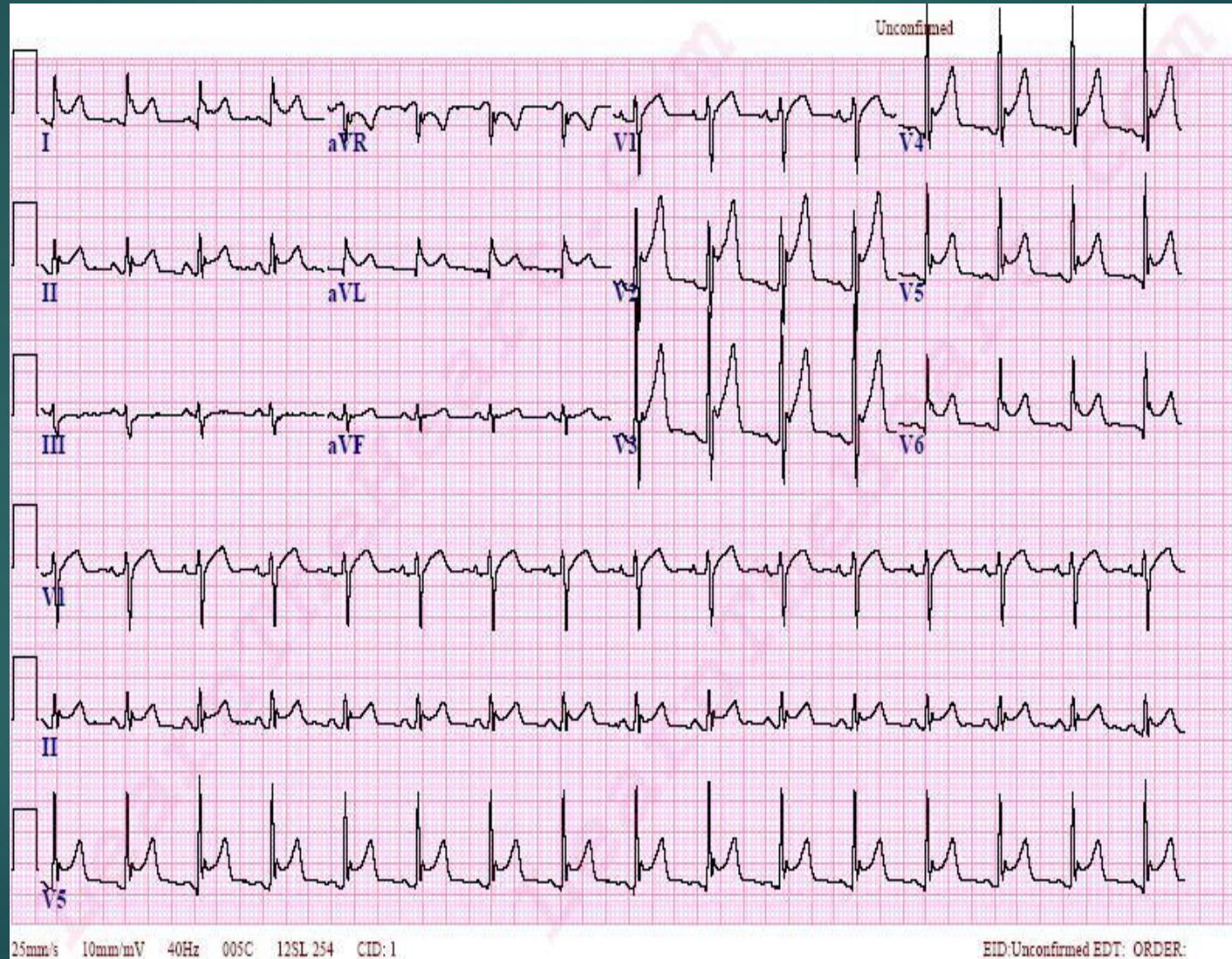
2. Pericardial friction rub

3. Suggestive ECG changes (typically widespread ST segment elevation)

4. New or worsening pericardial effusion

UpToDate
2012

PERICARDITIS-ECG



Take Home Message:

- ▶ **Meticulous History** gives clue to diagnosis & workup of Acute chest pain
- ▶ Remember the life threatening causes of chest pain
 - ▶ Acute coronary syndrome, Aortic dissection
 - ▶ Pulmonary embolism, Tension pneumothorax
- ▶ **ECG** is key to rapid diagnosis of ST –elevation MI – Needs **immediate reperfusion therapy**
- ▶ **Thrombolytic/Primary PCI**

Key Points

- **Plaque disruption leading to thrombosis causes ACS**
- **NSTEMI potentially as lethal as STEMI**
- **Emergency PRIMARY PCI is preferred reperfusion strategy in Ac MI**
- **When unavailable, thrombolysis is a reasonable alternative**
- **Antiplatelets and Antithrombins improve outcome**
- **Death, MI & refractory angina can be reduced with interventional strategy**

Thank
you

Chest Pain Characteristics and Corresponding Causes

Nature

Anginal symptoms are perceived as retrosternal chest discomfort (e.g., pain, discomfort, heaviness, tightness, pressure, constriction, squeezing)

Sharp chest pain that increases with inspiration and lying supine is unlikely related to ischemic heart disease (e.g., these symptoms usually occur with acute pericarditis).

Onset and duration

Anginal symptoms gradually build in intensity over a few minutes.

Sudden onset of ripping chest pain (with radiation to the upper or lower back) is unlikely to be anginal and is suspicious of an acute aortic syndrome.

Fleeting chest pain—of few seconds' duration—is unlikely to be related to ischemic heart disease.