

UPDATE ON THE
MANAGEMENT ACUTE
CORONARY SYNDROME

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INTRODUCTION

The clinical entities that comprise acute coronary syndromes (ACS)-ST-segment elevation myocardial infarction (STEMI), non-STEMI, and unstable angina-have been recognized as widespread causes of death and disability for more than a century. Seminal research in the past 50 years has led to important scientific and medical advances in our understanding of ACS.

INTRODUCTION CONT...

In terms of pathology, ACS is almost always associated with rupture of an atherosclerotic plaque and partial or complete thrombosis of the infarct-related artery.

INTRODUCTION CONT...

Modernization of the developing world has led to a pandemic of coronary artery disease and its manifestation as ACS, with profound implications for personal, societal, and global health. Epidemiological studies have provided insight into the changing demographics of ACS, and highlighted the importance of modifiable risk factors and adherence to guideline-recommended therapy.

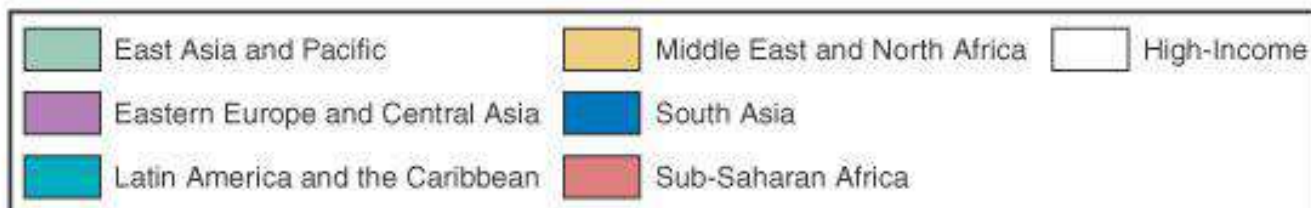
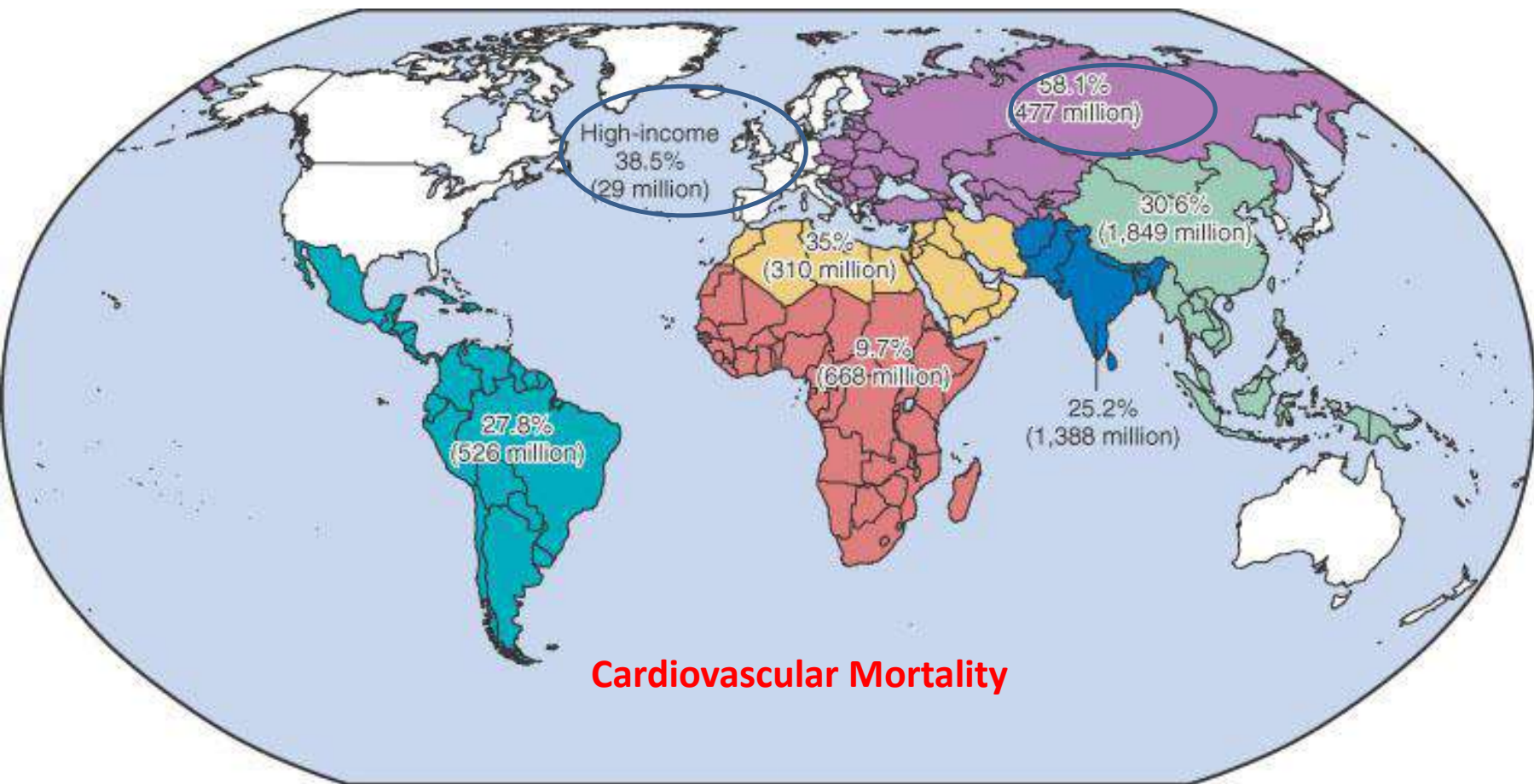
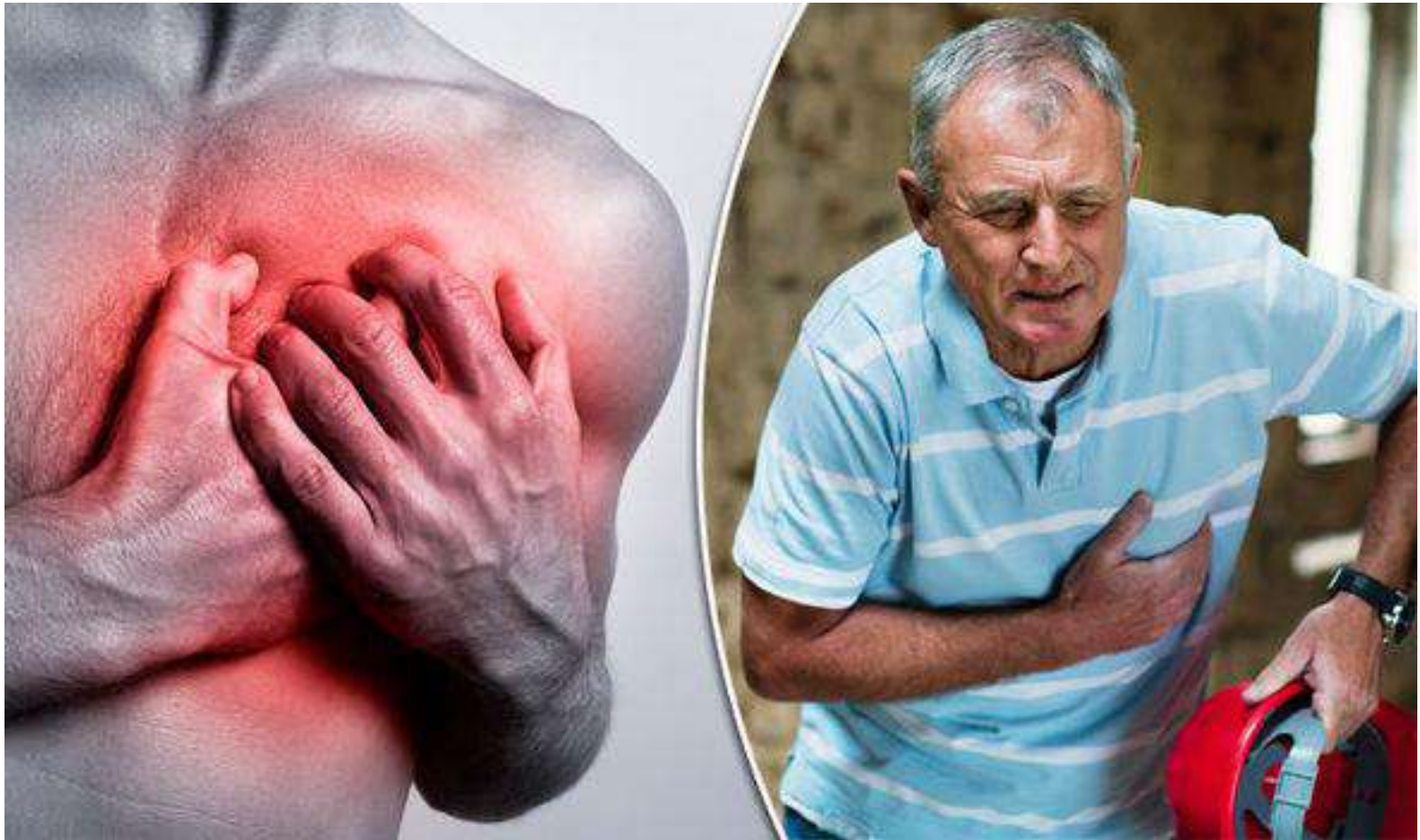


FIGURE 1–2 Cardiovascular disease deaths as a percentage of all deaths in each region and total regional population—2001.

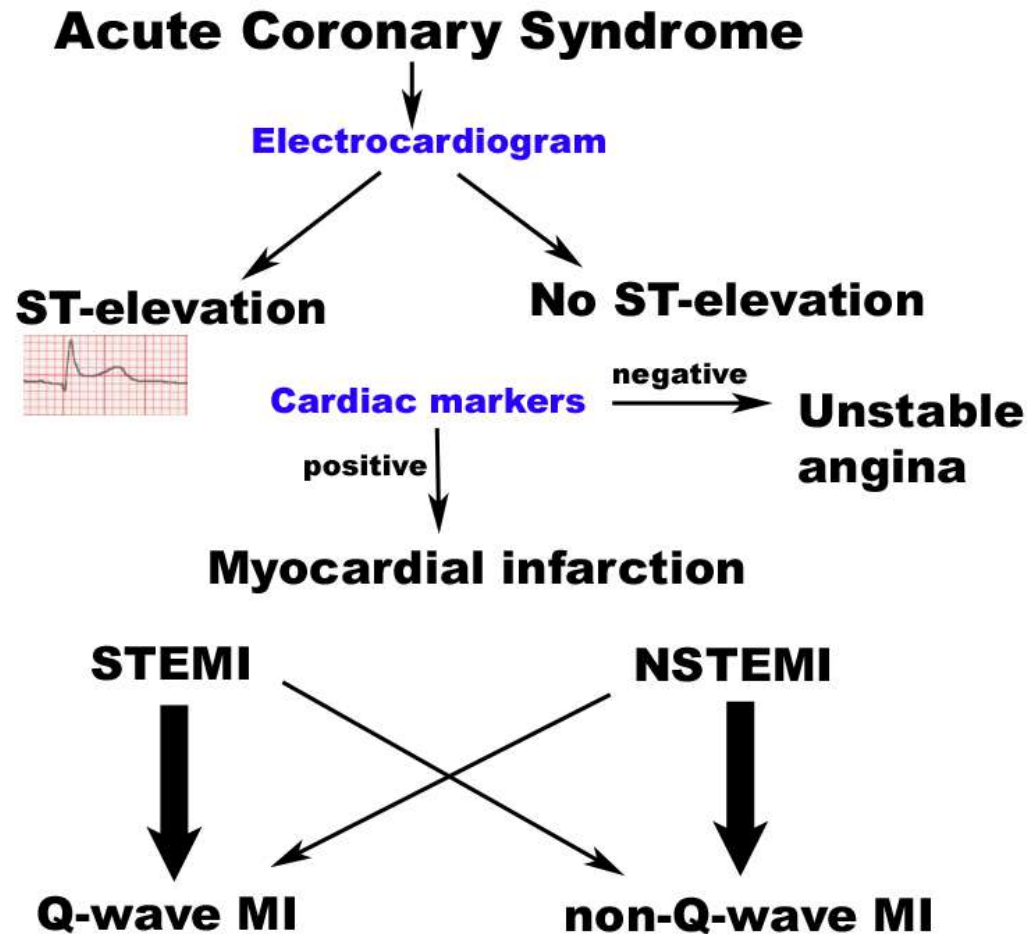
(Based on data from Mathers CD, Lopez A, Stein D, et al: Deaths and disease burden by cause: Global burden of disease estimates for 2001 by World Bank Country Groups. Disease Control Priorities Working Paper 18. April 2004, revised January 2005.)



LEAVEN SIGN



ACUTE CORONARY SYNDROMES



STEMI ECG Criteria

- ≥ 2 mm of ST segment elevation in 2 contiguous precordial leads in men (1.5 mm for women)
- ≥ 1 mm in other leads (2 contiguous)
- An initial Q wave or abnormal R wave develops over a period of several hours to days.
- Within the first 1-2 weeks (or less), the ST segment gradually returns to the isoelectric baseline, the R wave amplitude becomes markedly reduced, and the Q wave deepens. In addition, the T wave becomes inverted.

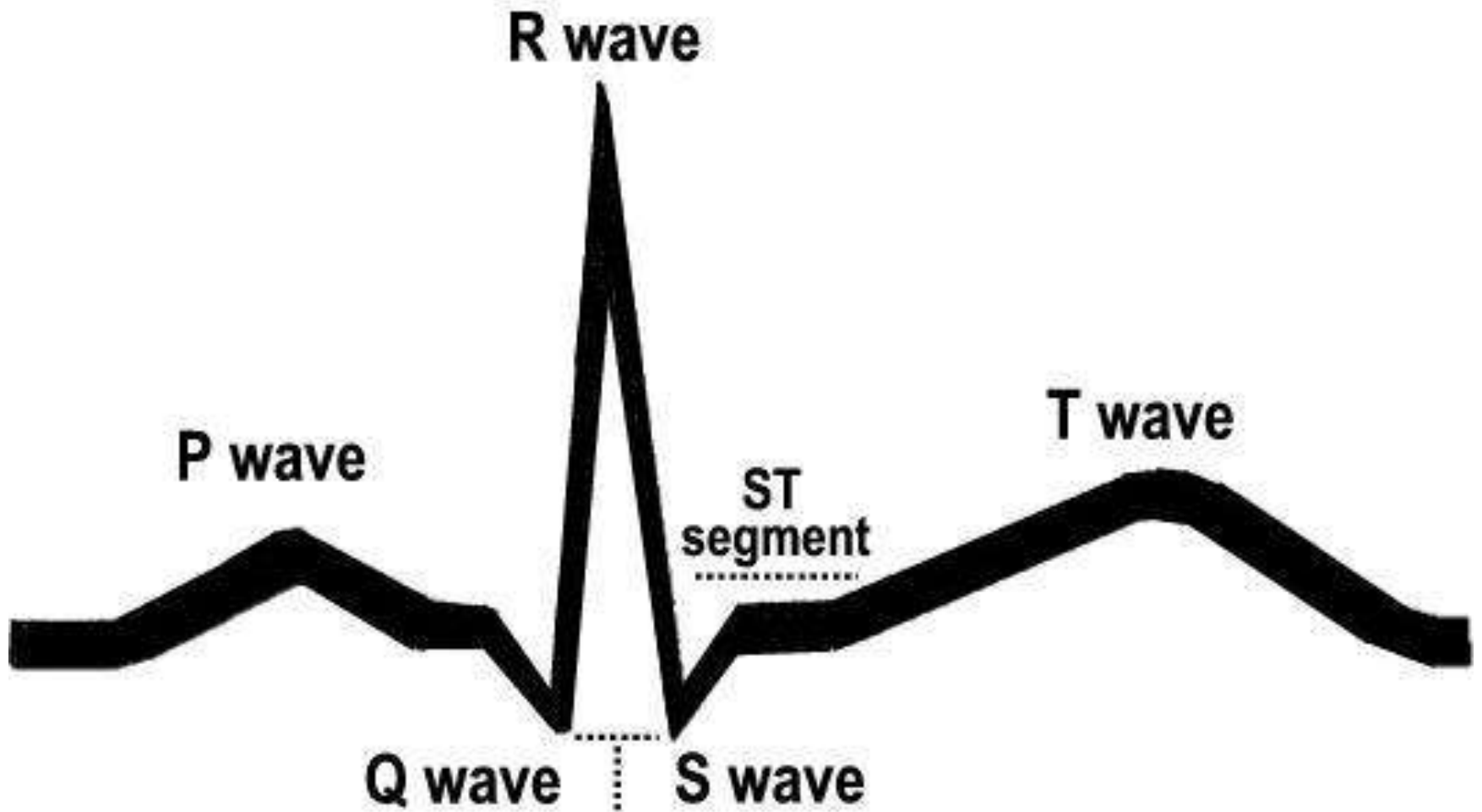
STEMI ECG Criteria

- In addition to patients with ST elevation on the ECG, two other groups of patients with an acute coronary syndrome are considered to have an STEMI:
 - those with new or presumably **new left bundle branch block**
 - those with a **true posterior MI**
- An elevation in the concentration of troponin or CK-MB is *required* for the diagnosis of acute MI

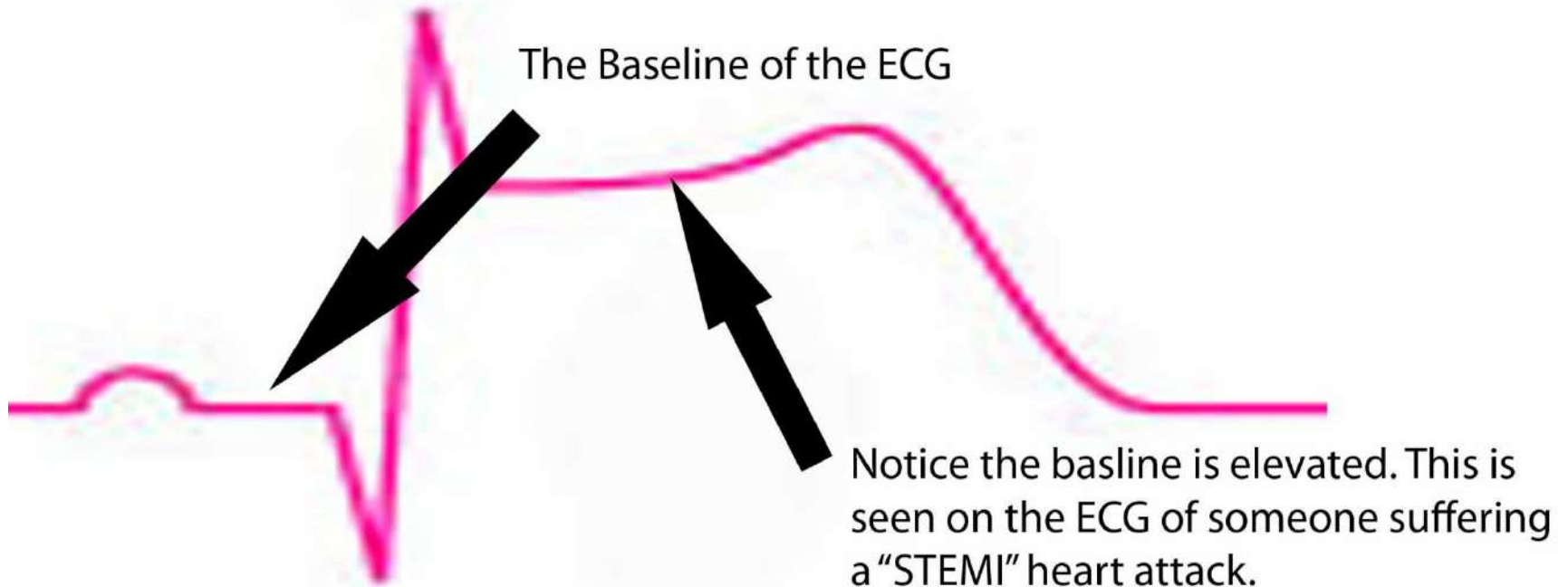
STEMI ECG Criteria

- **Anterior STEMI:** ST elevation in the precordial leads + I and aVL (LAD territory)
- **Posterior STEMI:** reciprocal ST depressions in V1-V3 (ST elevation in post leads), may have component of inferior ischemia as well (ST elevations in II, III and aVF)
 - ✓ Often occurs w/ inferior MI (L Cx)
- **Inferior STEMI:** ST elevation in II, III and aVF (+ ST elevation in R-sided precordial leads), reciprocal changes in I and aVL (R coronary or L Cx)

REVIEW OF ECG INTERPRETATION

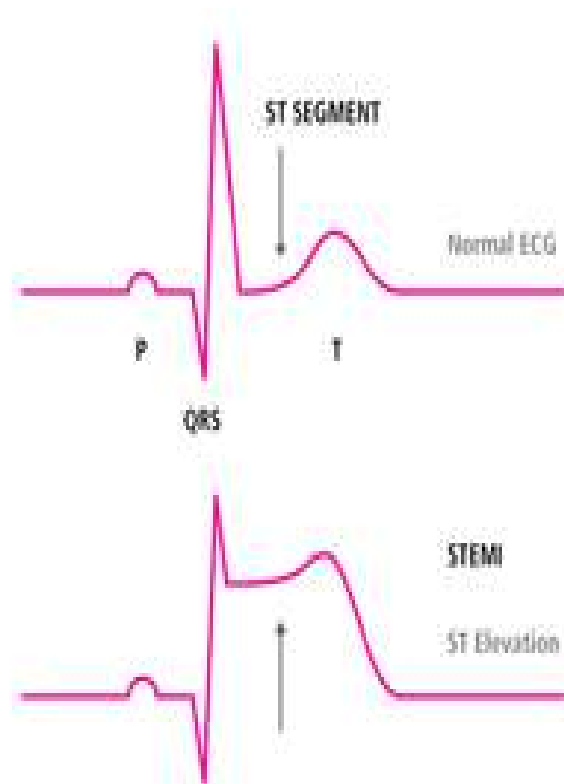


STEMI ON ECG



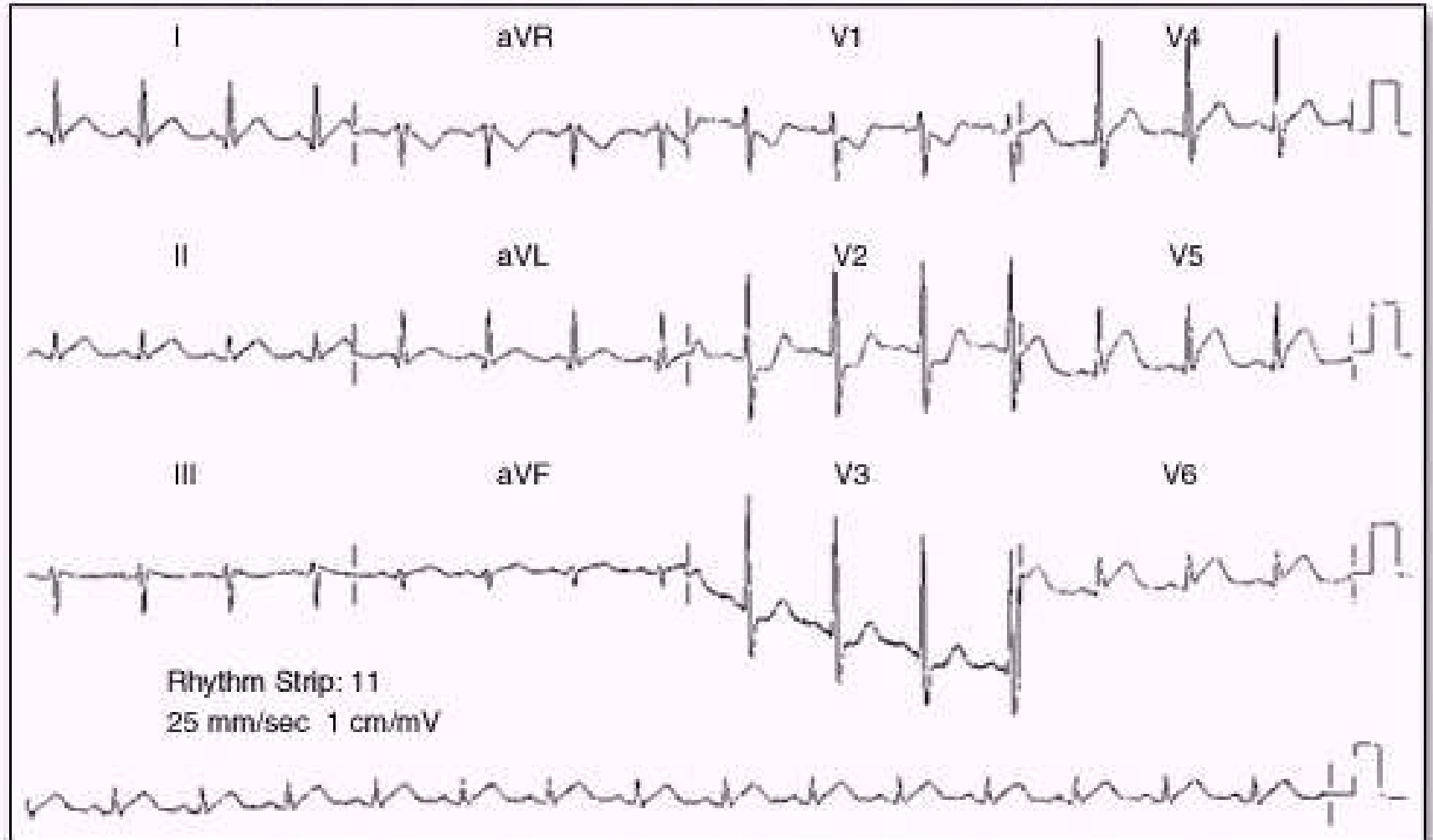
- http://www.virtualmedstudent.com/links/cardiovascular/acute_coronary_syndromes.html&docid=I6WHDB796CITfM&imgurl=http://www.virtualmedstudent.com/images/stemi.jpg&w=2558&h=1105&ei=zB3GUGdDeBR2QWIGoCA&zoom=1&iact=rc&dur=494&sig=100654779536327798686&page=2&tbnh=107&tbnw=248&start=8&ndsp=16&ved=1t:429,r:12,s:0,i:189&tx=128&ty=57

STEMI

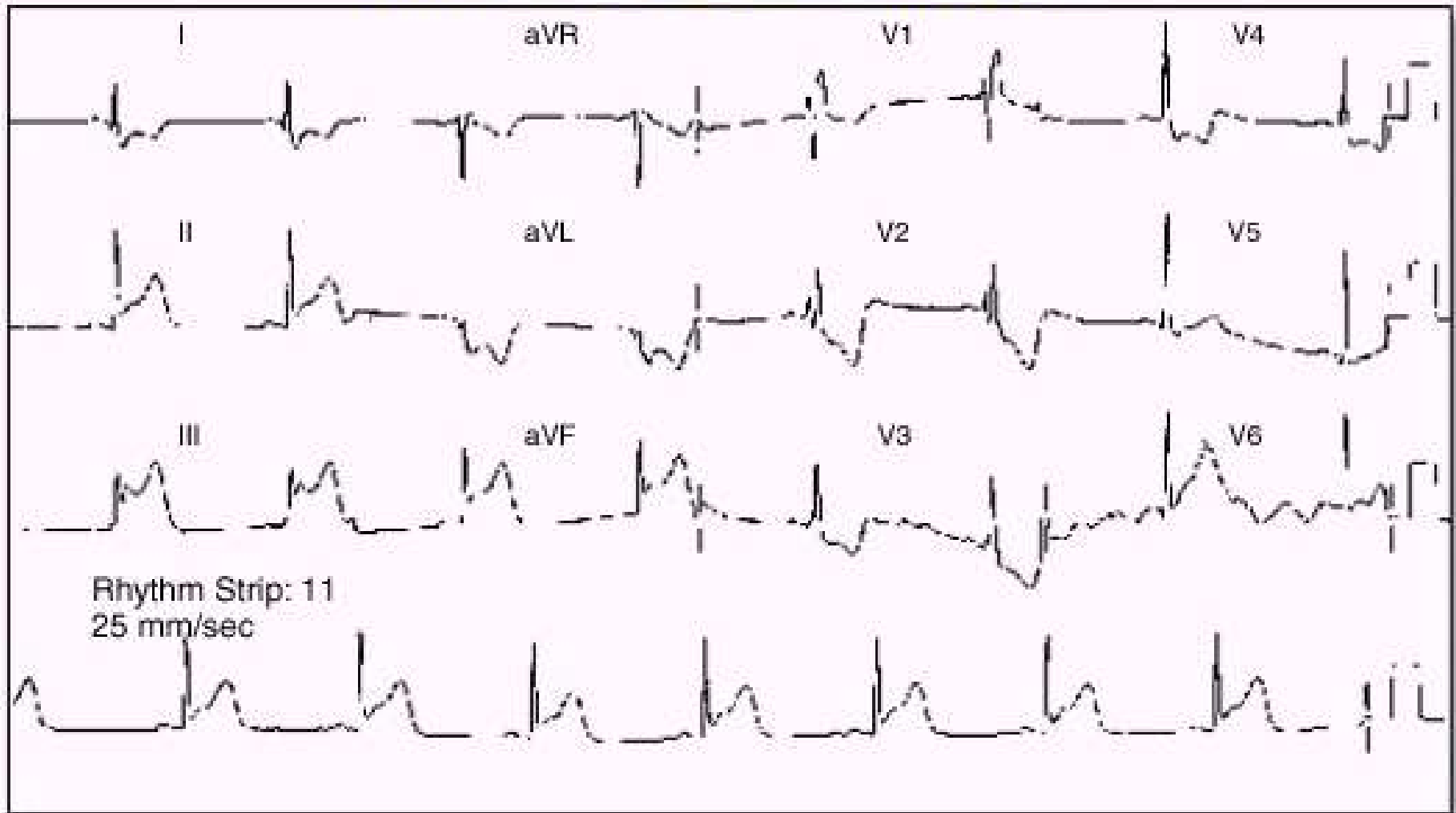


- <http://www.thrombosisadviser.com/html/images/library/atherothrombosis/stemi-and-nstemi-ecg-illustration-PU.jpg>

Anterior ST Depression Indicative of a Posterior Myocardial Infarction



Inferior ST Elevation Infarction



CHARACTERISTICS OF UNSTABLE ANGINA

- The traditional term of unstable angina was first used 3 decades ago and was meant to signify the intermediate state between myocardial infarction and the more chronic state of stable angina.
- Unstable angina is considered to be an acute coronary syndrome in which there is no release of the enzymes and biomarkers of myocardial necrosis.

UNSTABLE ANGINA

Non occlusive
thrombus

Non specific
ECG

Normal cardiac
enzymes

NSTEMI

Non-occlusive
thrombus
sufficient to cause
tissue damage & mild
myocardial necrosis

ST depression +/-
T wave inversion on
ECG

Elevated cardiac
enzymes

STEMI

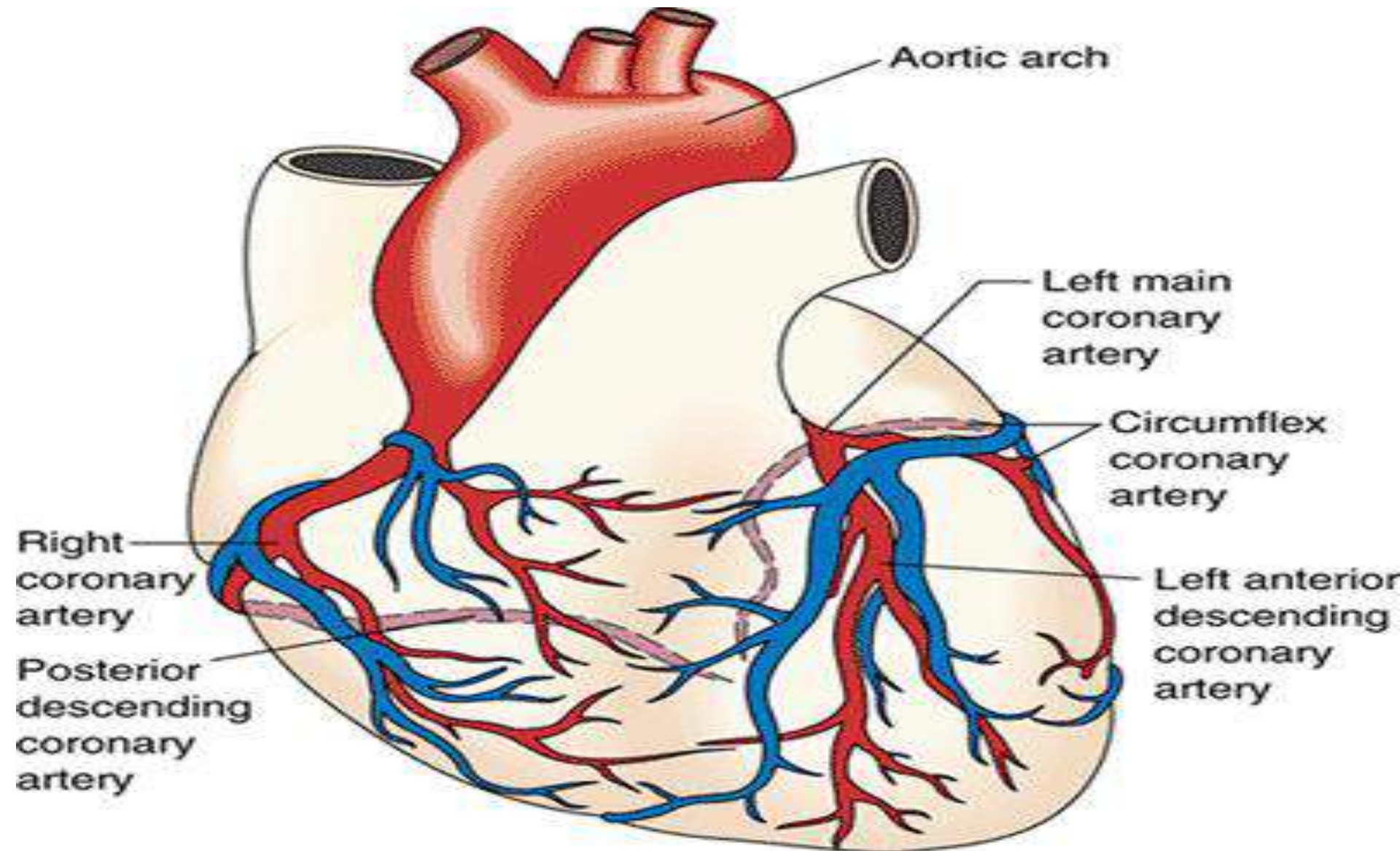
Complete thrombus
occlusion

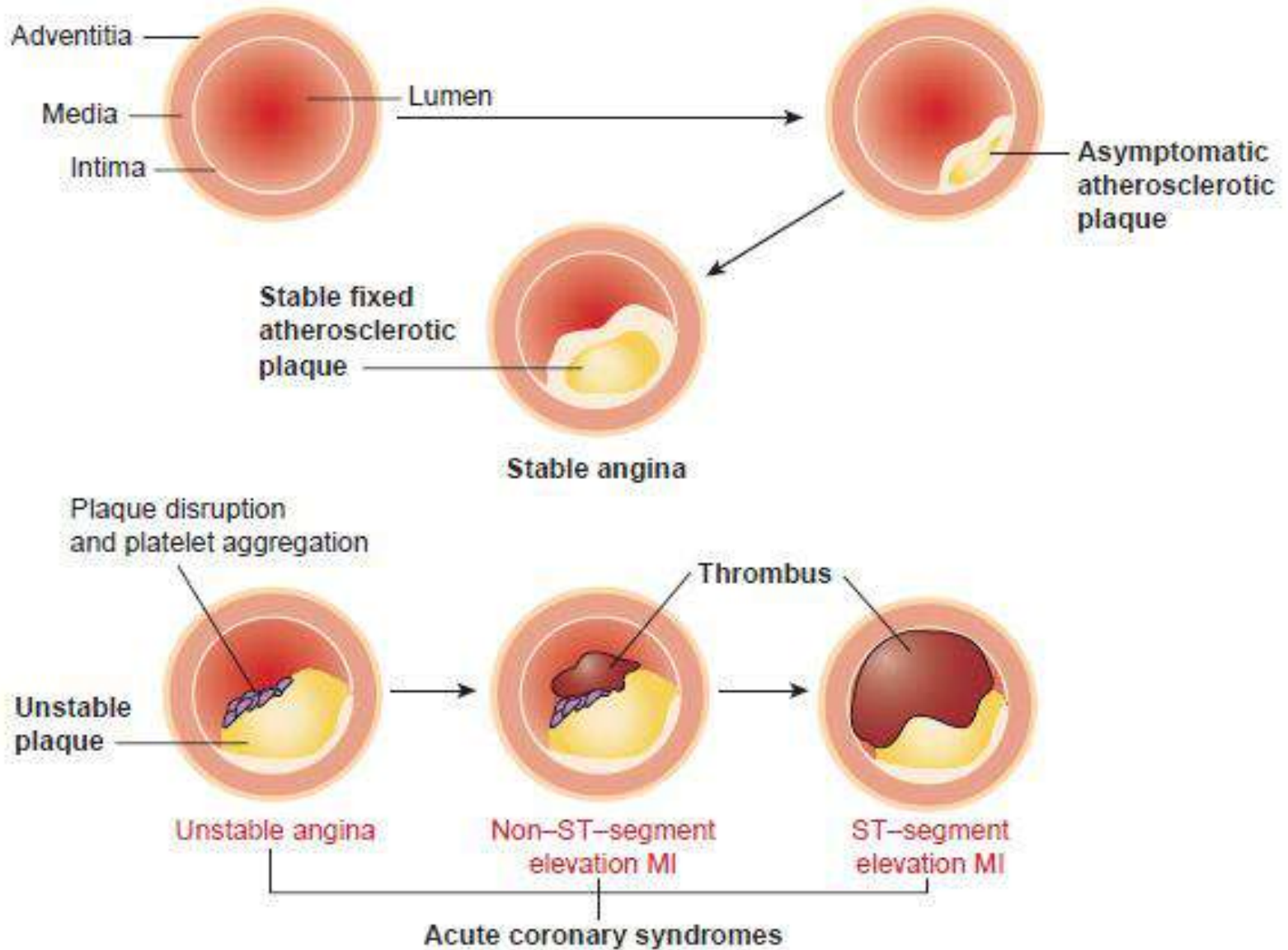
ST elevations on
ECG or new LBBB

Elevated cardiac
enzymes

More severe
symptoms

Diagram of the coronary arteries arising from the aorta and encircling the heart. Some of the coronary veins also are shown.





Diagnosis of acute MI

➤ **Clinical symptoms**

- Chest pain

➤ **ECG changes**

- ST elevation or depression
- negative T wave

➤ **Elevated cardiac biomarkers**

- Troponin I or T
- CK-MB
- myoglobin

RISK FACTORS

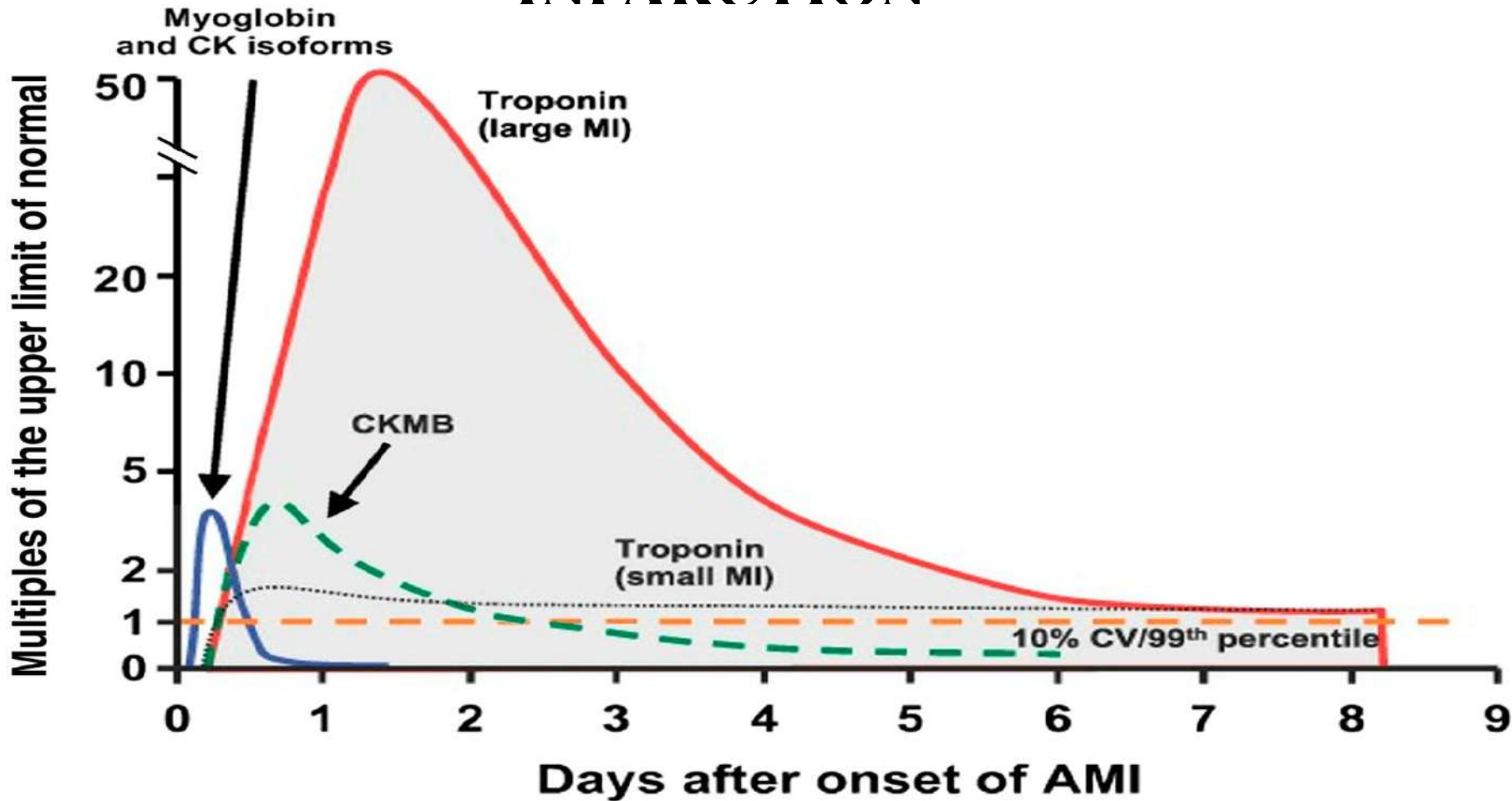
MODIFIABLE

- ✓ Smoking
- ✓ Obesity
- ✓ Diet
- ✓ Lack of exercise
- ✓ High serum cholesterol
- ✓ Hypertension
- ✓ ? Diabetes

NON-MODIFIABLE

- ✓ Increasing age
- ✓ Gender (male)
- ✓ Ethnicity
- ✓ Family History
- ✓ ?Diabetes

TIMING OF RELEASE OF VARIOUS BIOMARKERS AFTER ACUTE MYOCARDIAL INFARCTION



BIOCHEMICAL MARKERS

Markers of **myocardial injury**:

- **cardiac troponins (I and T)**
 - creatinine kinase (CK)
 - CK isoenzyme MB (CK-MB)
 - Myoglobin
-
- **repeated blood sampling** and measurements are required 6–12 h after admission and after any further episodes of severe chest pain

NON-INVASIVE MYOCARDIAL IMAGING

➤ **Echocardiography**

- to evaluate LV systolic function, aortic stenosis, aortic dissection, pulmonary embolism, or hypertrophic cardiomyopathy
- should be **routinely used in emergency** units for the risk stratification

➤ **Stress echocardiography, stress scintigraphy** - evidence of ischaemia or myocardial viability (in stabilized patients)

IMAGING OF THE CORONARY ANATOMY

- The imaging of the coronary anatomy **is the most important diagnostics method** in evaluation of acute coronary syndrome
- The **gold standard** of patients with ACS is conventional invasive **coronary angiography**

DIFFERENTIAL DIAGNOSIS

Cardiac

- MI
- Angina
- Pericarditis
- Aortic dissection

Respiratory

- Pulmonary embolism
- Pneumothorax
- Pneumonia

Chest pain

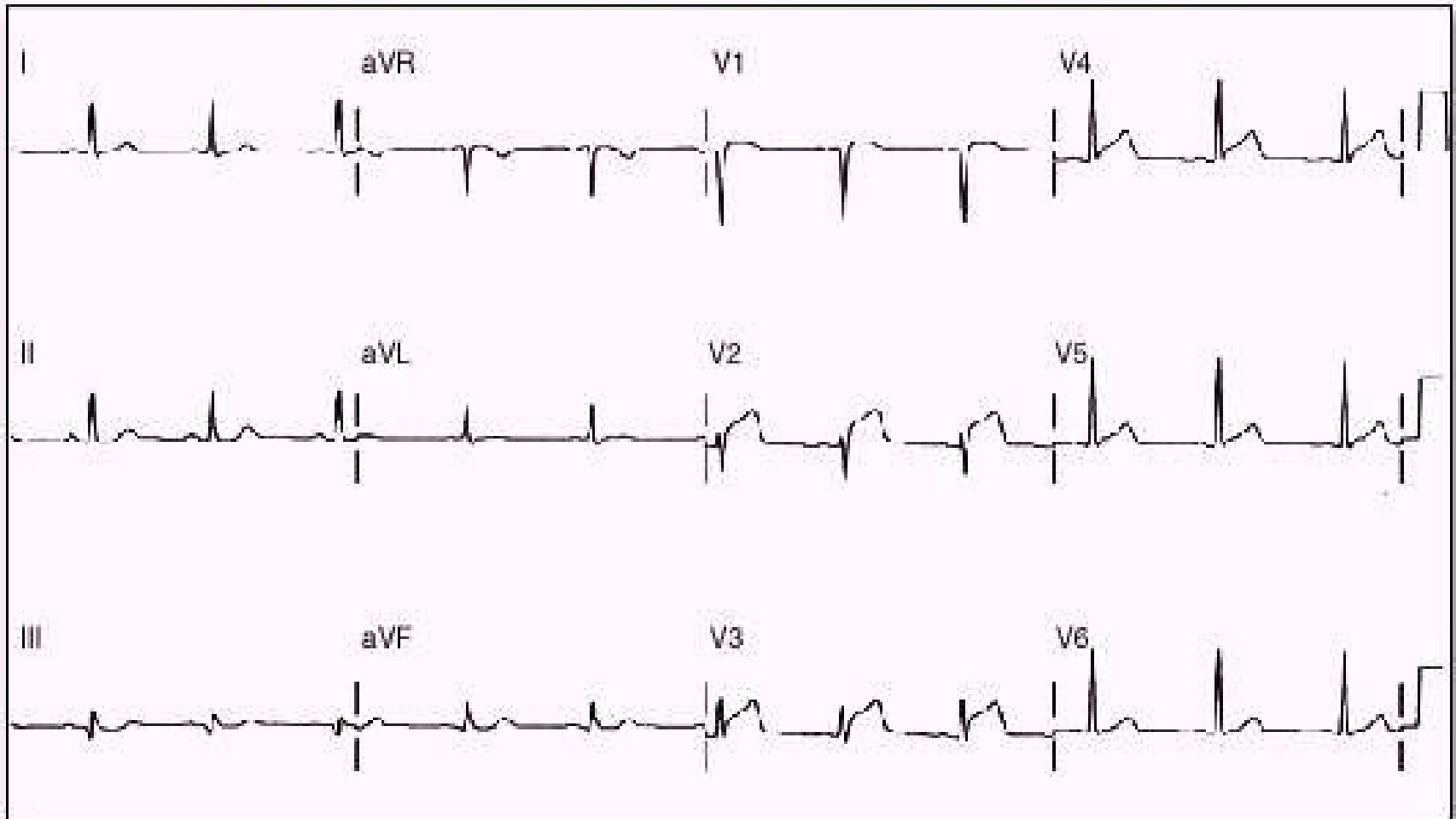
GI

- Oesophageal spasm
- GORD
- Pancreatitis

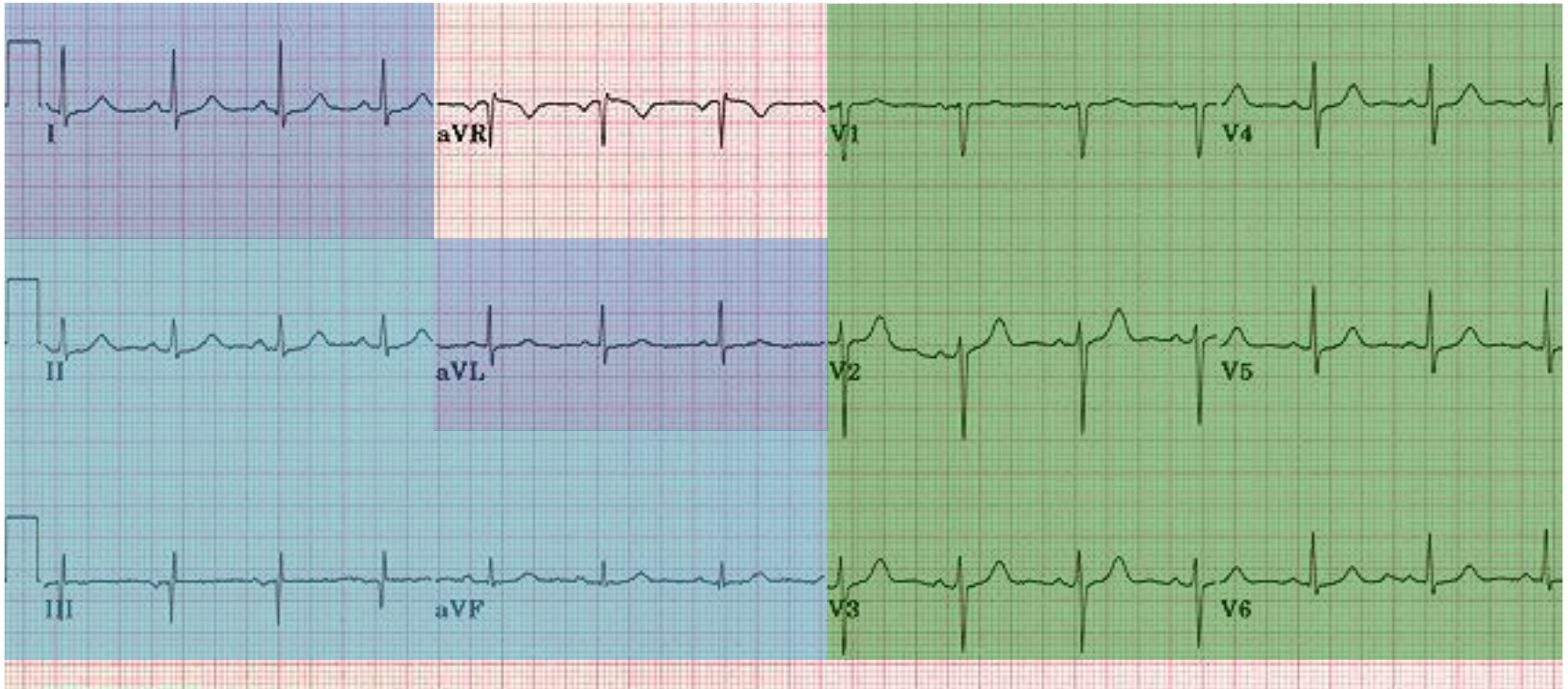
Musculoskeletal

- Costochondriasis
- Trauma

Typical Anterior ST Elevation Infarction

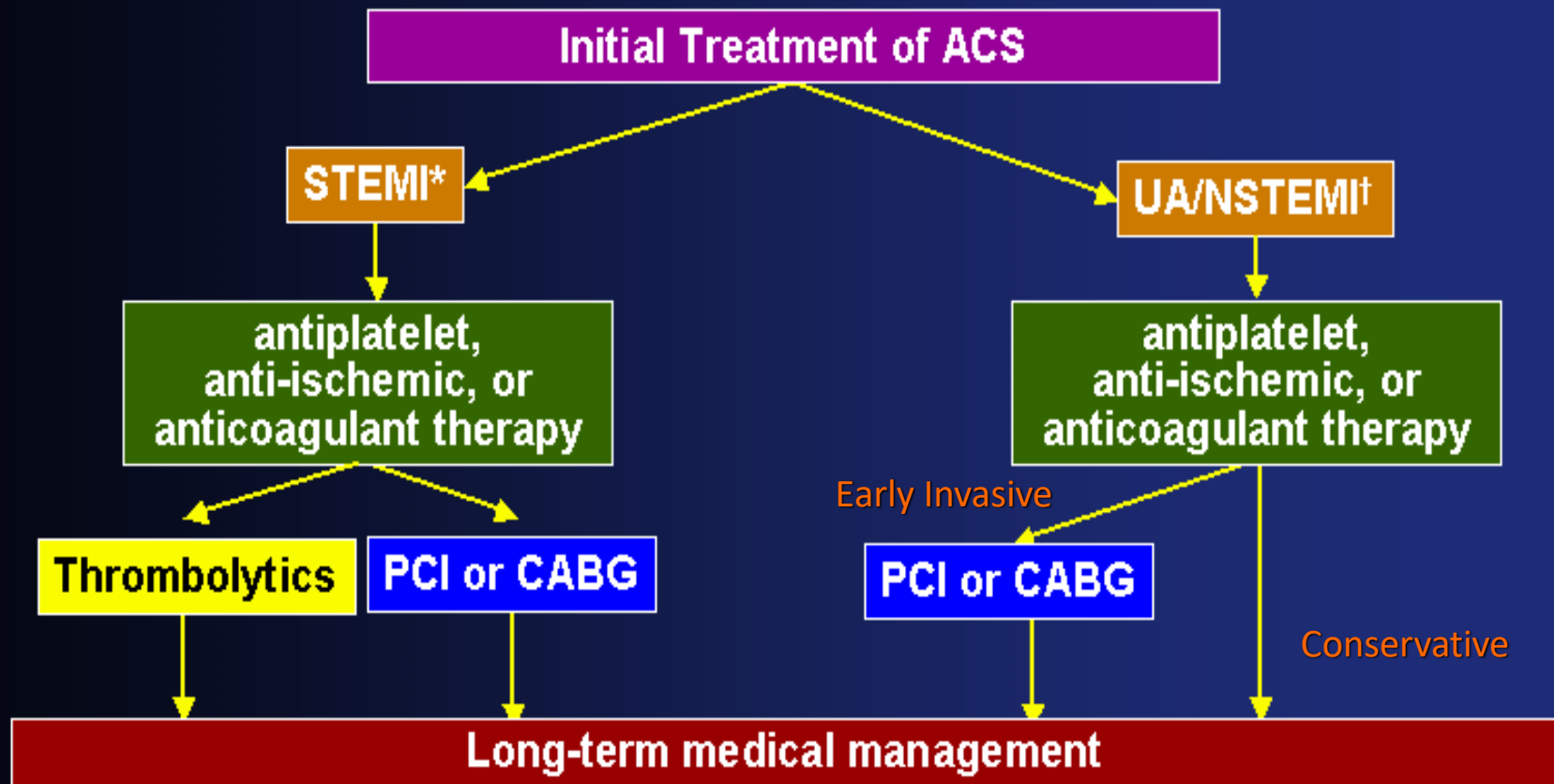


Where is the problem?



Inferior	II, III, aVF	Right coronary
Lateral	I, aVL (+V5-6)	Left circumflex (or LAD)
Anterior	V1-2 septum, V3-4 apex, V5-6 ant/lat	LAD
Posterior	ST depression in V1-3	Left circumflex or right coronary

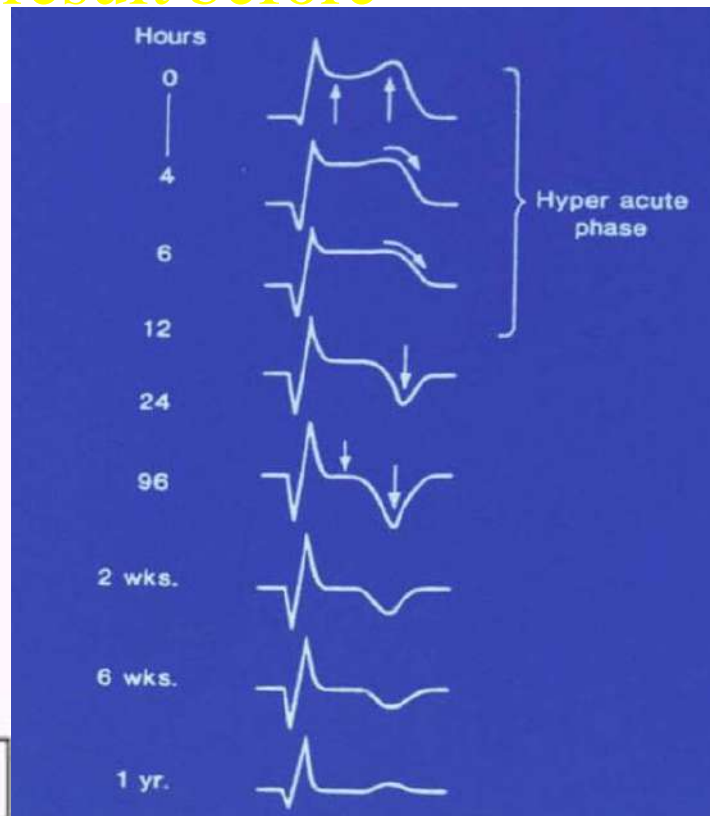
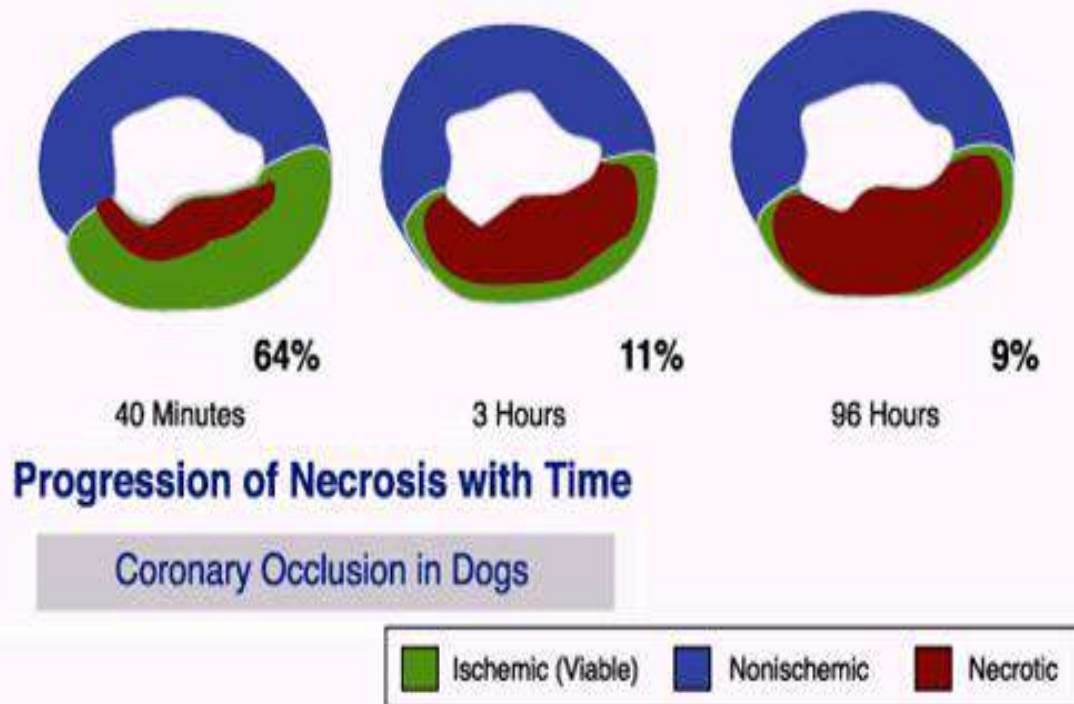
Treatment of Acute Coronary Syndrome



ACS Treatment

- **Revascularization**
 - **Mechanical: PCI, CABG**
 - **Pharmacologic: Thrombolytics**
- **Stabilization of Vulnerable Plaque Aspirin**
 - **Antithrombotics**
 - **Beta-Blockers Aggressive Risk Factors Modifications**
 - **ACE-Inhibitors**
 - **Lipid-Lowering Agents (+statins)**
 - **Antioxidants**

If the clinical picture is consistent with acute STEMI (including True Posterior MI) or new left bundle branch block (LBBB) is present in EKG, select and implement reperfusion therapy, Fibrinolysis or PCI as quickly as possible within 12 hours of symptoms onset to obtain and sustain optimal flow in the infarct-related artery (IRA). **Do not wait for serum cardiac biomarkers result before implementing reperfusion strategy !**

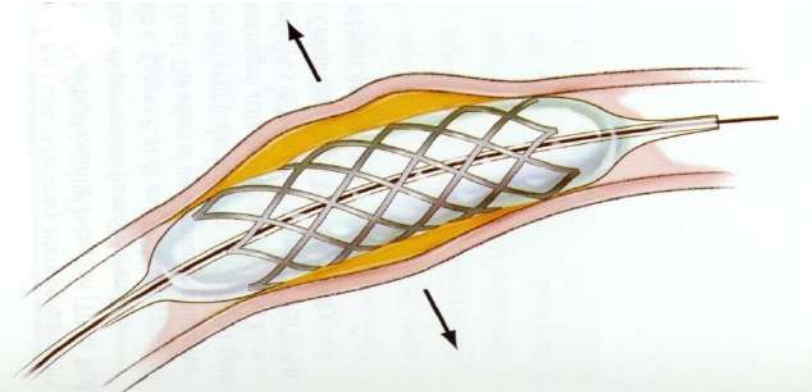
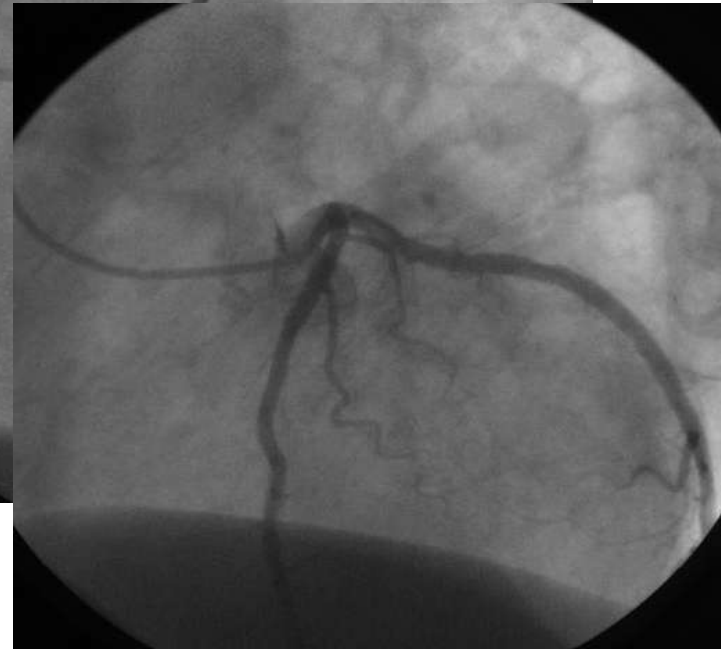
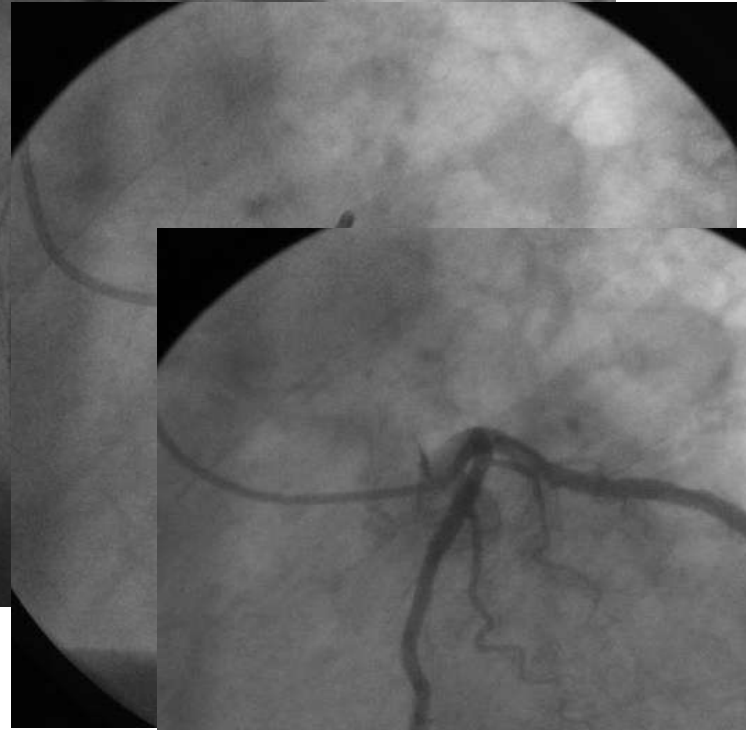
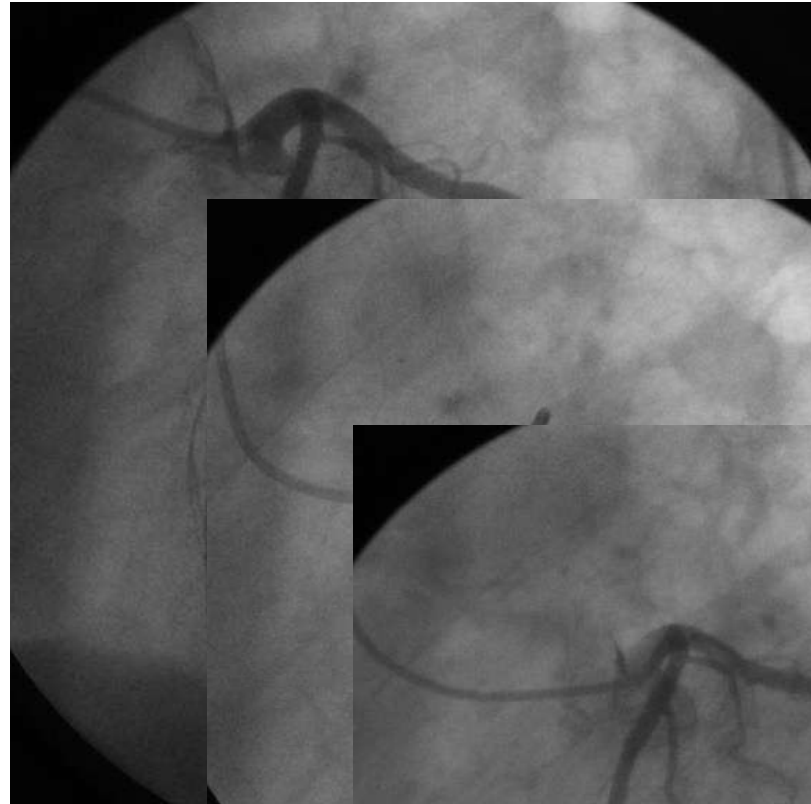
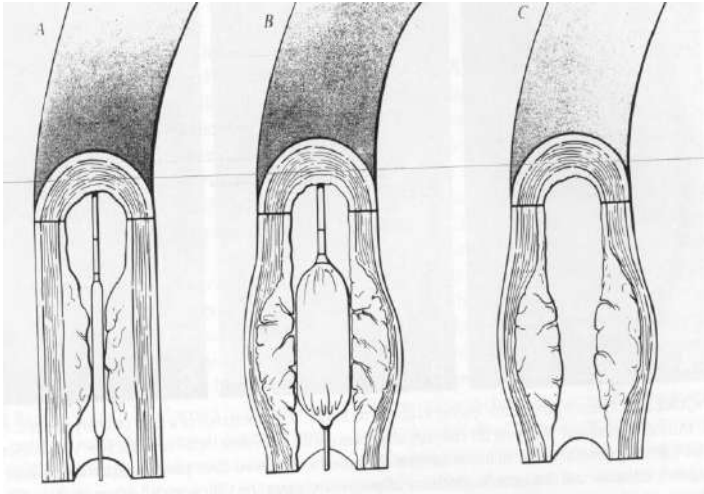


METABOLIC HABITUS



A 54 year old gentleman presents to A&E with chest pain...

Process of the implantation of stent



QUOTE



Listen more to the one who criticizes you and less to the one who praises you. Learn from them and do something about it.

— *Paul Kagame* —

AZ QUOTES

END OF PRESENTATIONS

✓ THANKS FOR YOUR ATTENTION

✓ COMMENTS AND QUESTIONS