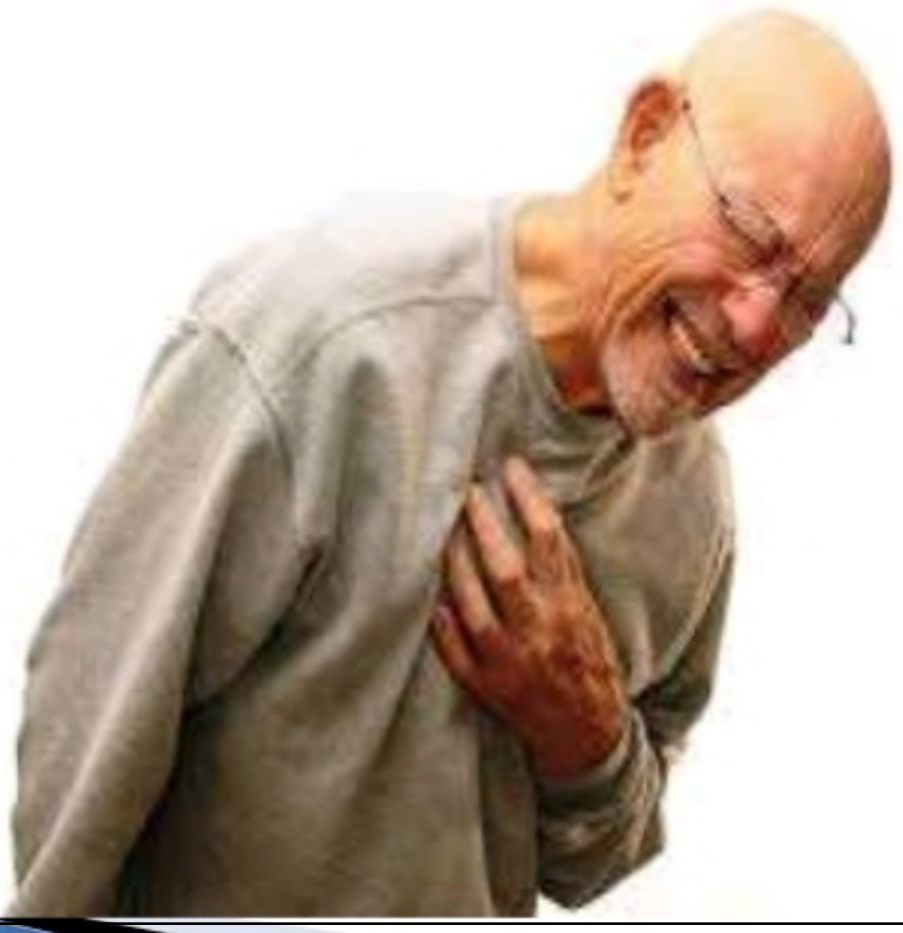
MYOCARDIAL INFARCTION.

- *Myocardial infarction (MI),*
- *or acute myocardial infarction (AMI).*
- *commonly known as a heart attack, occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle.*
- *Most common symptom is chest pain or discomfort which may travel to the shoulder, arm, back , neck or jaw. Often it occurs in centre or left side of the chest and last for more than a few minutes.*
- *other symptom may include shortness of breath, nausea, feeling faint, feeling tired.*

CHEST PAIN(MI).



WHAT is heart attack ?

- Occurs when the coronary arteries that supply the heart muscle become blocked.

  Partially blocked is called angina.

  When fully blocked it causes a myocardial infarction or a heart attack.

CAD.

- ***Ischemic heart disease(IHD) or coronary artery disease(CAD) :***

Heart attack:

A heart attack occurs when the blood flow to a part of the heart is blocked by a blood clot. If this clot cuts off the blood flow completely , the part of the heart muscle supplied by that artery begins to die.

MI.

- ***Myocardial infarction(MI)*** is a disease condition which is caused by reduced blood flow in a coronary artery due to atherosclerosis and occlusion of an artery by an embolus or thrombus.
- Most myocardial infarction occur due to coronary artery disease.
- The complete blockage of a coronary artery caused by a rupture of an atherosclerotic plaque.

Blockage of coronary artery.

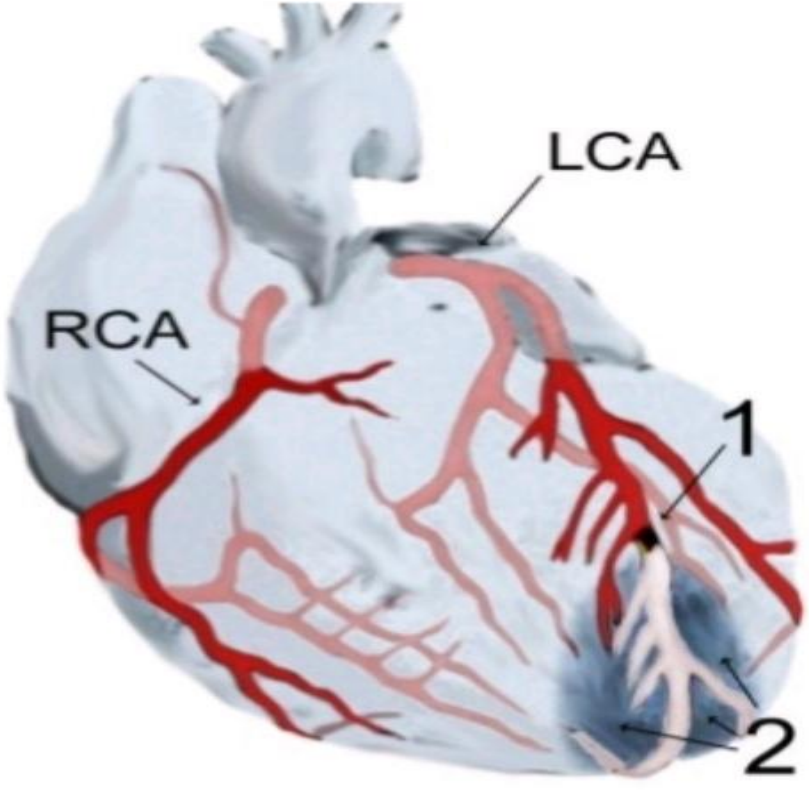


Diagram showing the blood supply to the heart by the two major blood vessels, the left and right coronary arteries (labelled LCA and RCA). A myocardial infarction (2) has occurred with blockage of a branch of the left coronary artery (1).

COMPLICATION OF MI.

- About 30% of people have atypical symptoms.
- Women more often have atypical symptoms than men.
- An MI may cause : -
- Heart failure, an irregular heart beat, cardiogenic shock, or cardiac arrest.

SYMPTOM ANGINA/MI.

Warning Signs

- Chest pain (angina)
- Heaviness, tightness, pain, burning, pressure or squeezing
  - behind the breastbone or in the arms, neck, or jaws
- Perhaps no pain

RISK FACTORS.

- ***Unchangeable risk factor*** :--

  Age- the older you get, the greater the chance.

  Sex----males have a greater rate aven after women pass menopause.

  Family history--if family members have had CHD, there is a greater chance.

Changeable risk factors.

- Hypertension
- Serum cholesterol
- Obesity
- Diabetes mellitus
- Physical inactivity
- Cigarette smoking
- Alcohol intake

CHOLESTEROL.

- Waxy fat substance in the blood.
- Liver makes all the cholesterol it need to survive, other source of cholesterol come from food.
- ***GOOD CHOLESTEROL***---
- HDL---it does not tendency to clog arteries.
- Level should be > 35.

Cholesterol.

- LDL—
- bad cholesterol.
- Tendency to increase risk of CHD.
- Major component of the atherosclerotic plaque that clogs arteries.
- Levels should be < 130.

DIABETES.

- 2-4 fold risk for CHD.
- Asymptomatic CHD~ 30-40 %.
- Painless AMI,arrythmias, CCF.
- CHD- A major (60%) cause of mortality.

- *PHYSICAL INACTIVITY—*

- Increasing physical activity has been shown to decrease blood pressure.
- Moderate to increase physical activity for 30-45 minutes on most days of the week is recomended.

SMOKING.

- SMOKING-
- Contribute to development of atherosclerosis.
- Lowers levels of HDL.
- Female smokers have a higher risk than male smokers.

- ***ALCOHOL not too good either!***
- ***Alcohol kills brain cells***
- ***Damage liver***
- ***Increases BP***
- ***Increases risk of heart attack.***

PATHOPHYSIOLOGY.

- Coronary artery cannot supply enough blood to the heart in response to the demand due to CAD.
- |
- Within 10 seconds myocardial cells experience ischemia.
- |
- Ischemic cells cannot get enough oxygen or glucose.
- |
- Cells convert to anaerobic metabolism, and produces Lactic as waste---Pain develops from lactic acid accumulation.
- |
- ***Patient feels anginal symptoms until receiving demand increeases O2 requirements of myocardial cells.***
-

RISK OF HIGH CHOLESTEROL.

Most important

High cholesterol does not have any symptoms.
If neglected, it can produce serious problems like

- Angina
- Heart attack
- Stroke

Tackle the cholesterol now

Tomorrow it might be too late

Criteria of MI.

- ***Troponin or CK-MB*** *increased with one of these:*

  Chest pain

  Positive ischemic change in ECG(ST segment elevation and T wave changes)

  Pathological Q wave presence in ECG Newly.

MI DIAGNOSIS.
WHO CRITERIA.

History of ischemic type of chest discomfort.

Evolutionary ECG changes.

Rise and fall in serum cardiac marker.

LAB.DIAG :

Best marker: Troponins.

Next test : CK-MB.

Predictive

CRP > 3mg/L(highest risk).

CLINICAL DIAGNOSIS OF MI.

Silent MI-

in diabetes mellitus, elderly, cardiac transplantation recipients.

Typical features-

profuse sweating, dyspnea, chest pain, rapid, weak pulse etc.

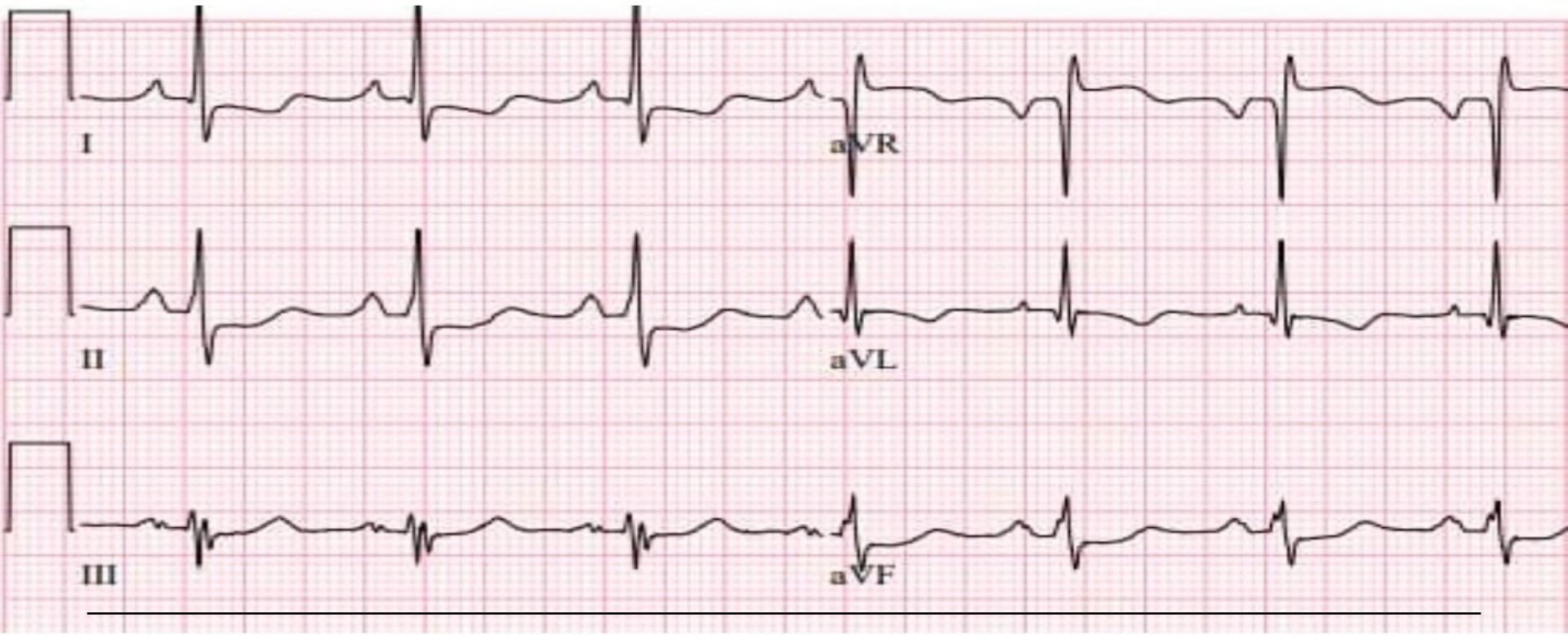
TESTES USEFUL FOR DIAGNOSIS OF MI.

1. *Electrocardiograms(ECG).*
2. *Blood tests.*
3. *Coronary angiography.(CAG).*

- *An ECG which is a recording of the heart's electrical activity, may confirm an elevation MI(STEMI), if ST elevation is present.*
  - *Commonly used blood test include **troponin** and less often creatne kinase MB.*

STEMI.

Which lead shown below has the greatest ST-segment elevation?



CARDIAC BIOMARKERS.

- ***Cardiac biomarkers*** are used to detect cardiac diseases.
- Acute coronary syndrome resulting from myocardial ischemia.
- Congestive heart failure.

CARDIAC MARKERS TESTED IN

ACUTE CHEST PAIN

UNSTABLE ANGINA

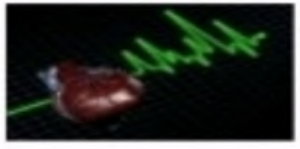
SUSPICIOUS ECG CHANGES

HISTORY SUGGESTIVE OF MYOCARDIAL INFARCTION.

CARDIAC MARKERS.

A.	CARDIAC MARKERS FOR ACUTE CORONARY SYNDROME
1.CREATINE KINASE (CK-MB)	
2.CARDIAC TROPONINS (cTnT)	
3.HIGH SENSITYVITY TROPONIN	
4.BNP and NTproBNP	
B.	RISK MARKER FOR CARDIAC DISEASE (PREDICTION)
1.PLASMA hsCRP	
2.TOTAL CHOLESTEROL LEVEL IN SERUM	
3.LDL- CHOLESTEROL and Apo-B100 level	
4.HDL level and ApoA1 level	
5.Lp(a) level	
6.Serum homocysteine level	

ELECTROCARDIOGRAM.



CONTD.....

- Electrocardiogram-
  ECG provides information that assists in diagnosing acute MI.
- The classic ECG changes are-
  - T wave inversion
  - ST segment elevation
  - Abnormal Q wave

ACUTE ANTERIOR MI.

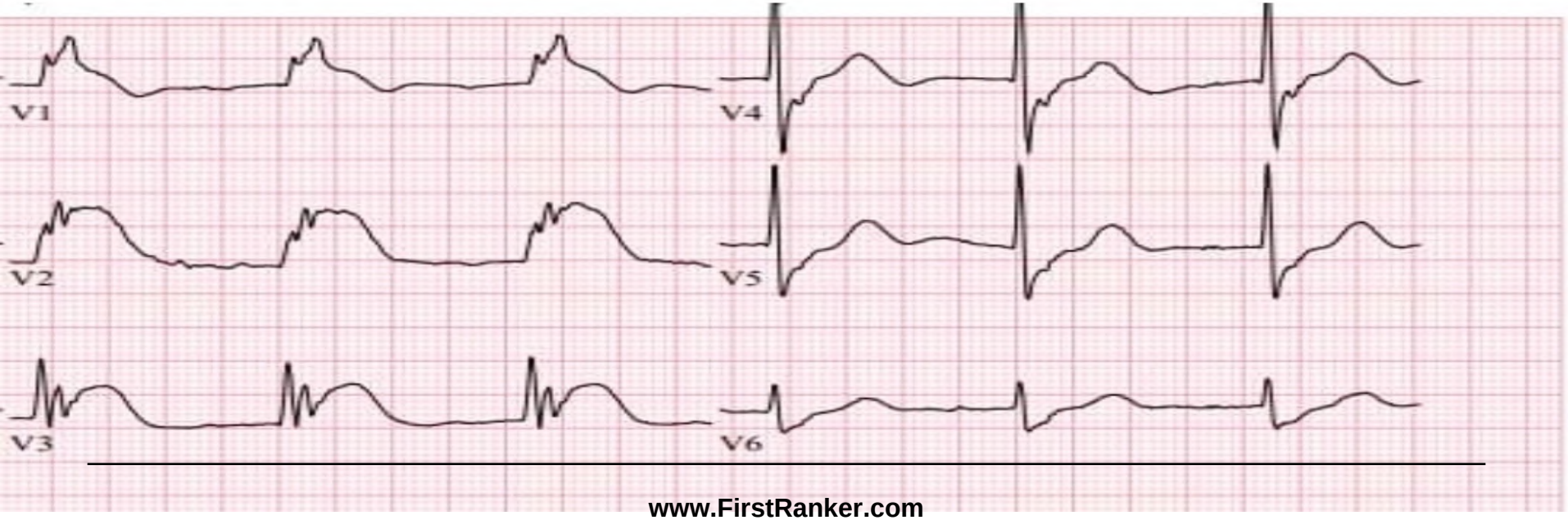
Which of the following is(are) present?

A. Right bundle branch block

B. Acute anterior STEMI

C. Both A and B

D. None of the above



MI-Management.

Pre-Hospital management

IMMEDIATE TREATMENT OF AN M.I.

- Chest pain
- Dyspnea
- Restless

M Morphine

O Oxygen

N Nitroglycerine

A ASA or Plavix

MEDICAL management MI.

Pre-Hospital care

Aspirin /ASA/

- 162-325 mg by chew
- If contraindicated:
  Clopidogrel

Fibrinolytic therapy

- Anistreplase/Streptokinase/ Urokinase
- Slowly ejecting by IV />5 minutes/
- If Carrying to hospital requires >30 minutes