ISCHAEMIC HEART DISEASE

I – IHD-chronic ischaemic heart disease

Ischaemic heart disease

Definition

myocardial ischaemia occurs when there is imbalance between the supply of oxygen (and other essential myocardial nutrients) and the myocardial demand for these substances

The coronary blood flow may be reduced by a mechanical obstruction

- atheroma

- thrombosis

-embolus -

-DISSECTING AORTIC ANEURYSM

coronary ostial stenosis

-VASCULITIS- inflammation-

coronary arteritis-

-SLE- BEHCHET S - KAWASKI

- NON-OBSTRACTIVE CORONARY- prevalence 7%- angina- common in F> M-
- A- decreased coronary O2 and blood flow
- HYPOXIA- ANEMIA-
- Cor. Artery spasm – cocain - cor. ectasia
- slow coronary flow-micro-vascular disease

B- ANGINA DUE TO INCREAS EDEMAND

- - tachycardia - thyrotoxicosis-
- LVH- HTN- AS- heavy exertion.

Coronary artery disease CAD

the most common cause IHD.

CAD is the largest single cause of death in the UK.

the main pathological lesion in CAD is

(coronary atheroseclerosis)-

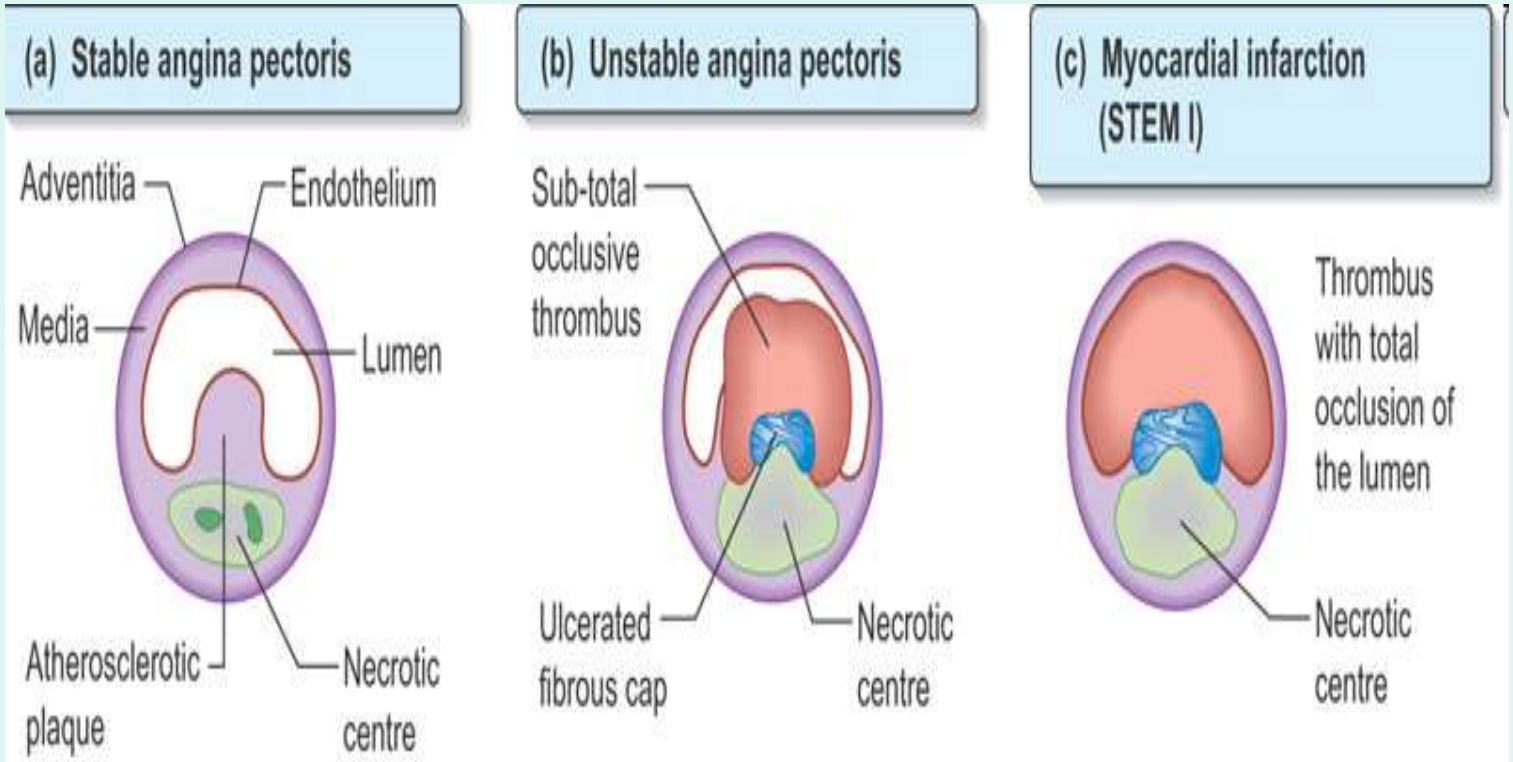
PLAGUE ULCERATION- FISSUREING- RUPTURE-plat. aggregation- occlusion

CAD presents clinically as:-

1-Chronic cor.syn- stable angina pectoris

2- Acute coronary Syndrome-

unstable angina - Myocardial infarction



CAD risk factors

Fixed

Age, gender, family history,

Changeable

Hyperlipidaemia

Homocysteineaemia

Smoking

Hypertension

Diabetes mellitus

Alcohol

microalbumin urea

-HR-CVA- CKD

Personality

lack of exercise-

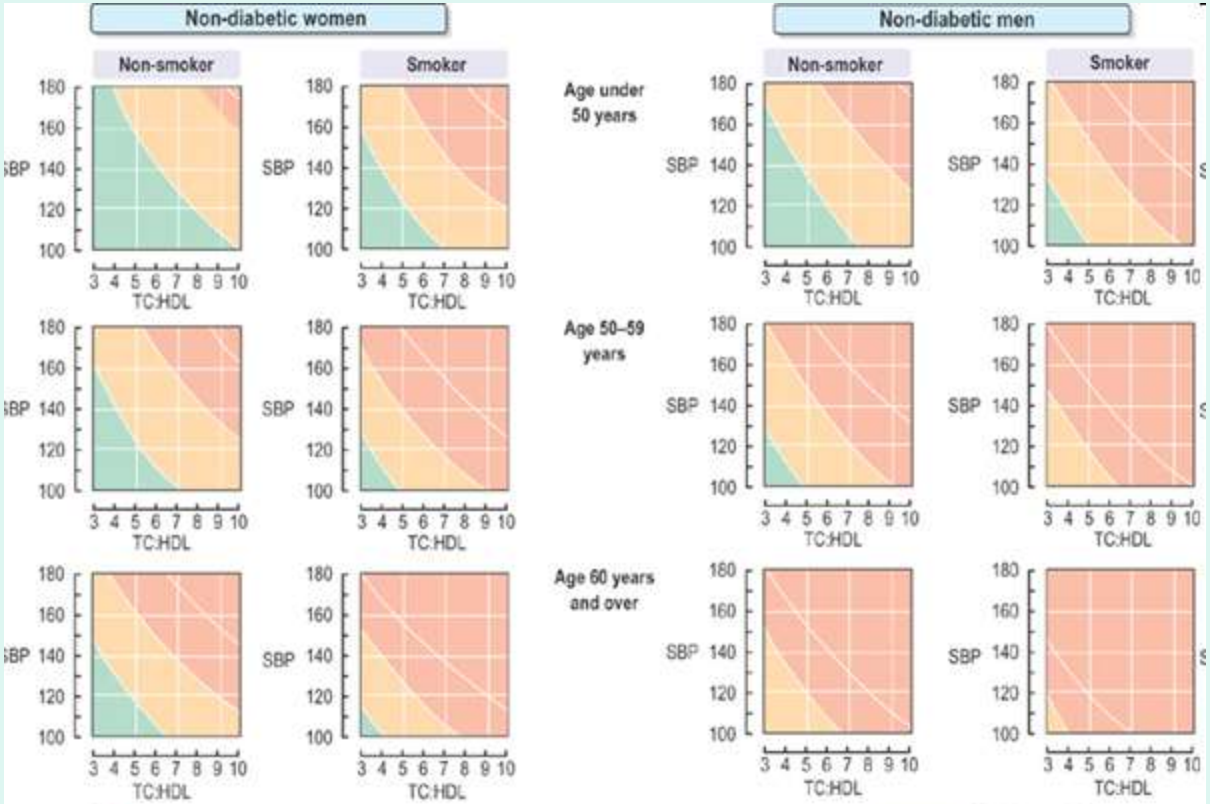
Obesity

Gout

SEXUAL IMPOTANCE

AIR- POLUTION

Drugs -COCAIN



- To estimate an individual's absolute 10-year risk of developing CVD, choose the panel for the gender, smoking status and age. Within this, define the level of risk from the point where the co-ordinates for SBP and ratio of the total to HDL-cholesterol cross. If no HDL cholesterol result is available, assume it is 1.00 mmol/l and use the lipid scale as total serum cholesterol.
- Highest risk individuals (red areas) are those whose 10-year CVD risk exceeds 20%, which is approximately equivalent to a 10-year CHD risk of >15% (indicated by the 1998 charts). As a minimum, those with CVD risk >30% (shown by the line within the red area) should be targeted and treated now. When resources allow, others with a CVD risk >20% should be targeted progressively.
- The chart also assists in identification of individuals with a moderately high 10-year CVD risk — in the range of 10–20% (orange area) and those in whom it is lower than 10% (green area).
- Smoking status should reflect lifetime exposure to tobacco.

For further information, see
http://www.bhf.org.uk/professionals/uploaded/aug_2004%20v2.pdf

Angina pectoris

It is the most important cause of recurrent chest discomfort it is syndrome not disease only 15% has typical presentation characterized by:-

- central chest pain, which may radiate to left, right or both arms, throat or jaw and rarely to the back or epigastrium

- short duration usually lasting less than 10 min.

- pain is described as tightness and is usually not sever

-- aggravated by exertion- heavy exercise walking against cold air- heavy meal

- relieved by GTN OR by REST

Types

Decubitus angina :- occurs on lying down

ANGINA EQUIVALENT –SOB after exertion

Nocturnal angina :- occurs at night

Variant (prinzmetal`s) angina :- occurs at rest

Unstable angina :- refer to angina of recent onset, worsening angina or post-infarction angina- or angina at rest

On examination

- usually NO finding

- may have 4th. Heart sound

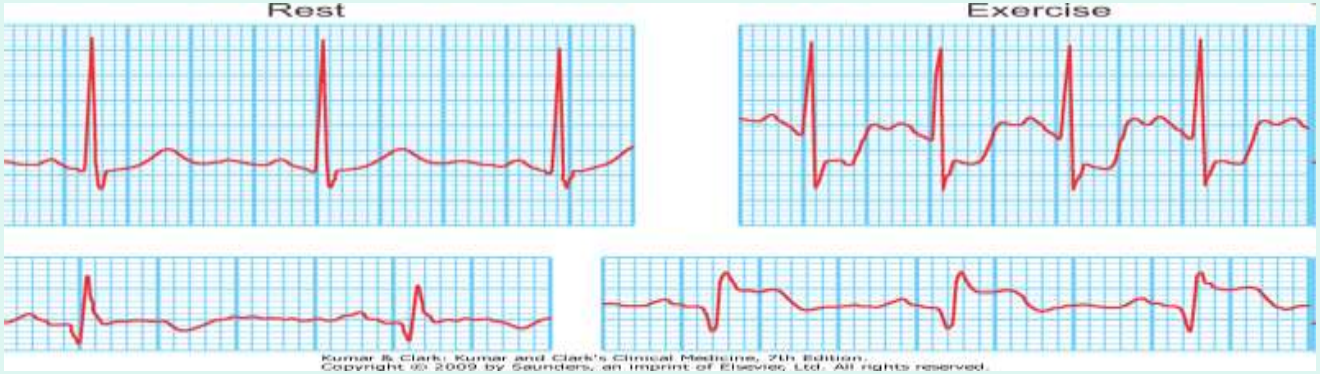
- signs of associated RISK factors

Investigations

- **Resting ECG** is usually normal between attacks may show ST depression or T inversion during attack

-treadmel test - **Exercise ECG**

ST segment depression of > 1 mm. is positive



NON-INVASIVE

Cardiac scintigraphy (myocardial perfusion scan)

EX- ECG- TREADMEL TEST

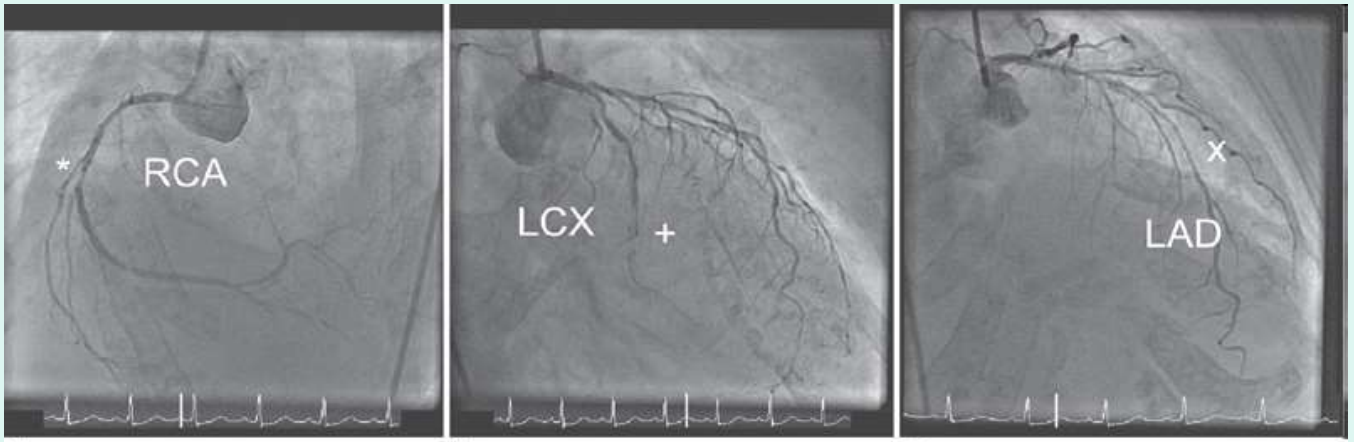
-Echocardiography –

STRESS-ECHO

Cardiovascular magnetic resonance (C-MRA)

-INVASIVE

Coronary angiography



Treatment of angina

General management

-- Assurance and education –life style

-- Treat underlying problems such as anaemia, hypertension, DM-AS hyper –and hypo-thyroidism and stop alcohol and smoking

-- Treat hypercholesterolaemia

-- Weight reduction

-- Regular exercise

Medical treatment

Symptomatic treatment

Glyceryl trinitrate (GTN)

used sublingual tablet or spray, action peaks 4-8 minutes and last 20-30 minutes, transdermal GTN last up to 24 hours

-Beta- blockers

negative inotropic and chronotropic

Atenolol, 50 -100 mg. daily Metoprolol 25-50 mg twice daily-Bisoprolol- Nibevolol

IVABRADINE- SA- NODE –WITH beta blocker-both are very useful in reducing HR –to <70 –

first reduce metabolic O2 requirement and demand of myocytes and myocardium

and at same time increase diastolic time for more coronary blood flow and increase O2 supply to myocytes so will reduce angina symptoms.

Long acting nitrates (e.g. isosorbide mononitrate)

Calcium channel blockers

DIHYDROPYRIDINE

Nifedipine - amlodipine

Lercanidpine 3rd generation

NONDIHYDROPYRINE

VERAPAMINE-DELTIAZEM

Trimetazidine – metabolic treatment inh.FFA oxidation decrease myocardium-O2-requirement has no haemodynamic effect no hypotension

Prophylactic medication

Aspirin **is used in all patients with angina75 mg.daily**

Lipid lowering therapy-

1mmol cholesterol = 39mg-

6 H 6m-co-enzyme-A- reductase inh.

--statin-atorvstatine-simvestatine-INCLISIRAN- PCSK9- inhibitor

HIGH risk pt.- LDL- level <70mg/dl

VERY high risk- LDL-LEVEL-<55mg/dl

extremely high risk recurrent CVA-LDL-< 39mg/dl-

HDL >40mg/dl. TGs level < 150mg/dl a

Percutaneous coronary intervention (PCI)

Percutaneous transluminal coronary angioplasty PTCA :-

the process of dilating a coronary artery stenosis with stent implantation using an inflatable balloon introduced into the artery via the femoral , radial or brachial artery

PTCA criteria

- It can reduce angina symptoms

It reduces the requirement for -

anti-anginal drug therapy -

- It increases exercise capacity

the best outcome is with adiscrete, - short-soft lesion in a straight vessel without involving a bifurcation

Risks include

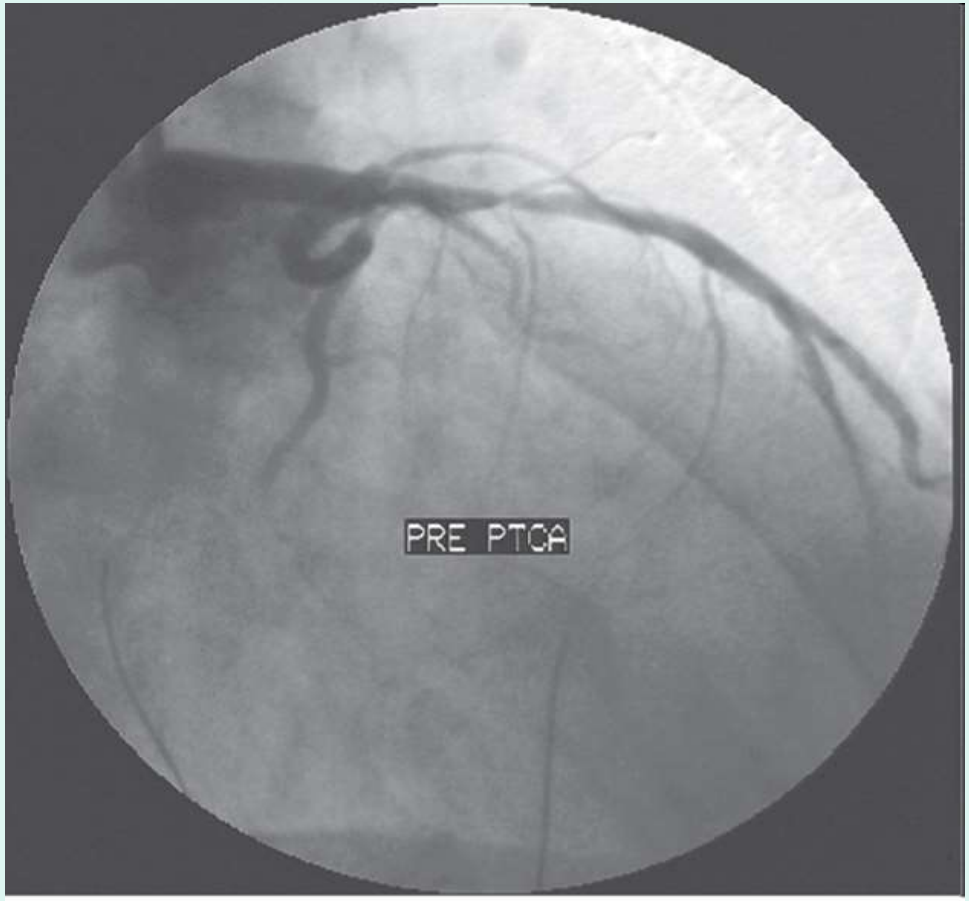
acute MI (2%)

Restenosis and stent thrombosis

blood vessel dissection

are the main complications, these has been reduced with the introduction of

drug eluted stent



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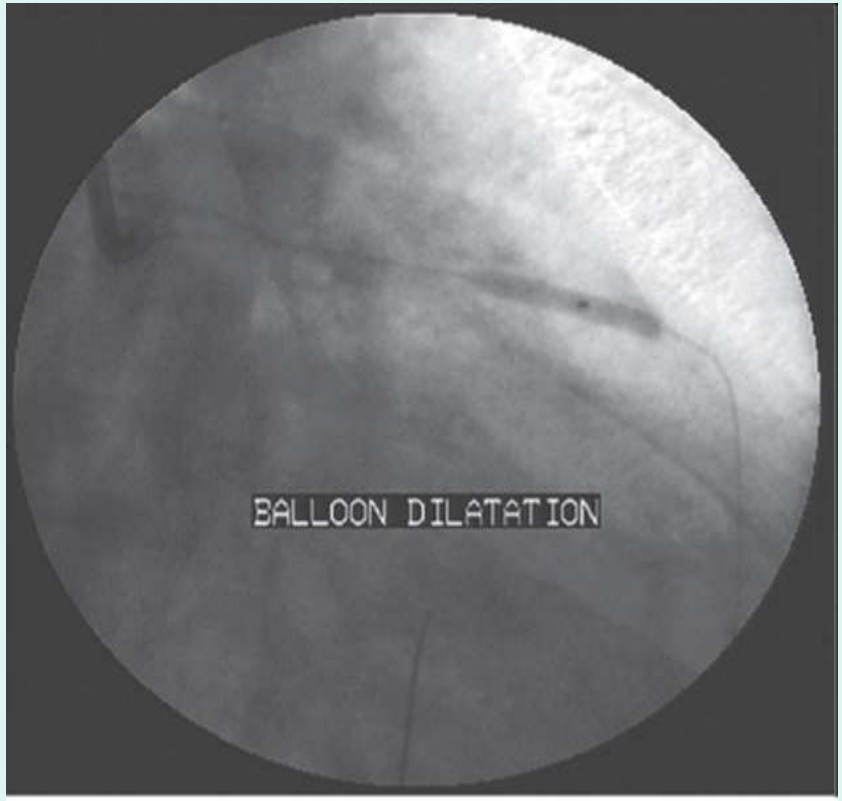

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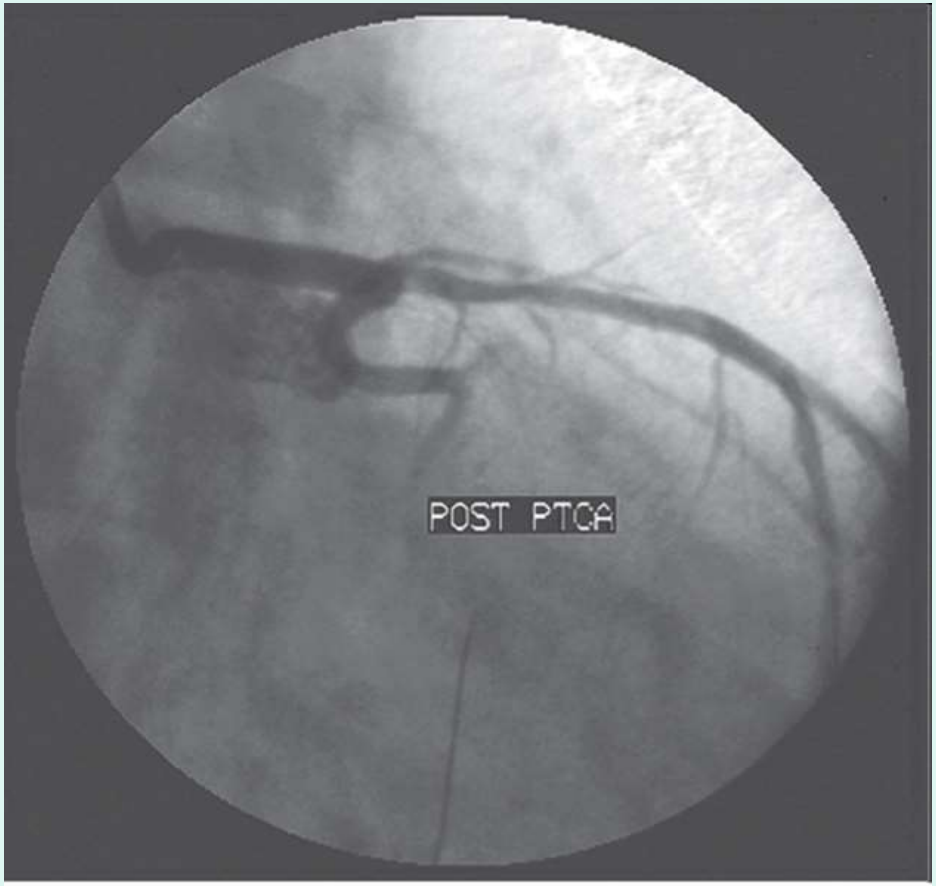

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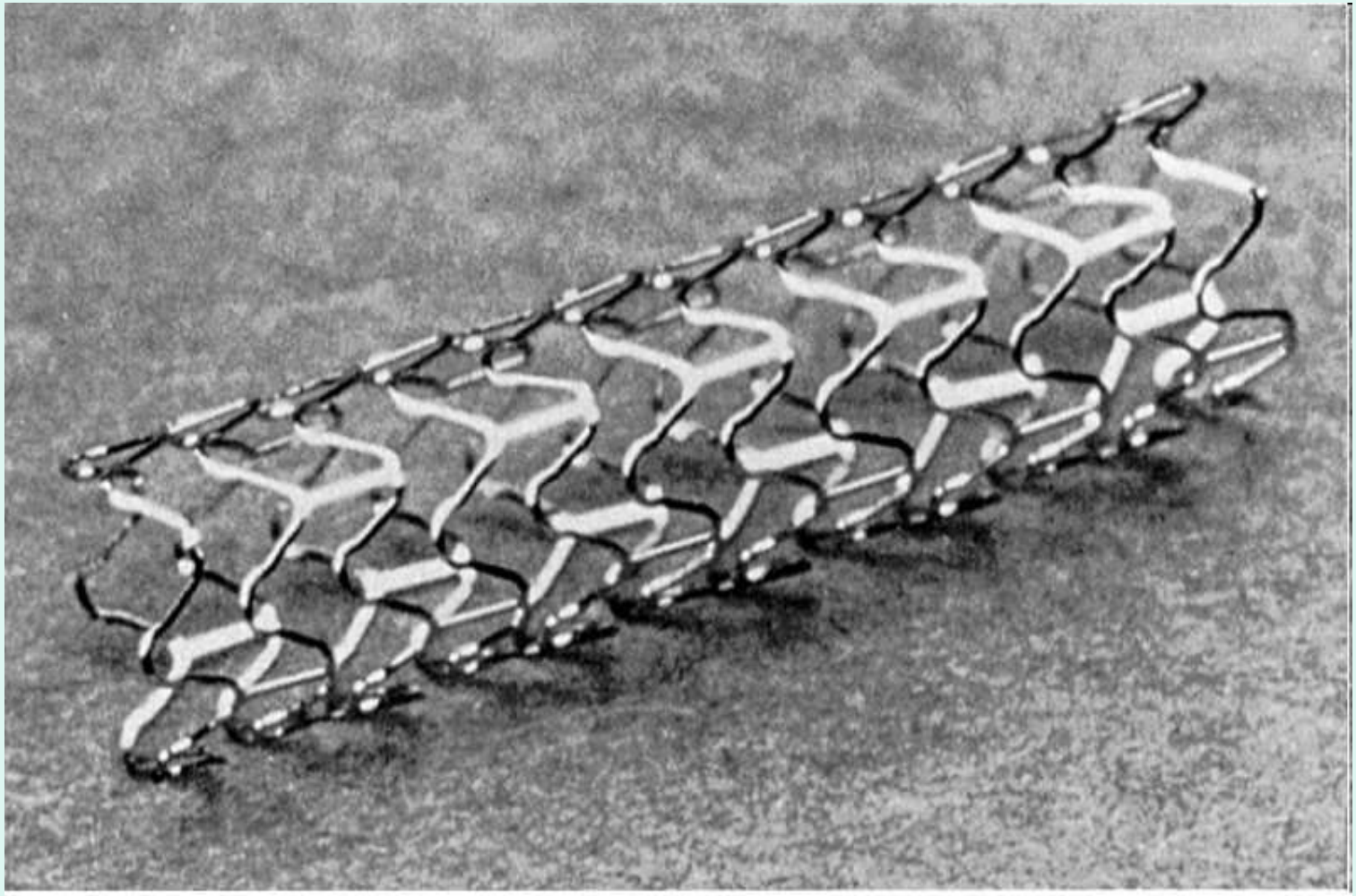
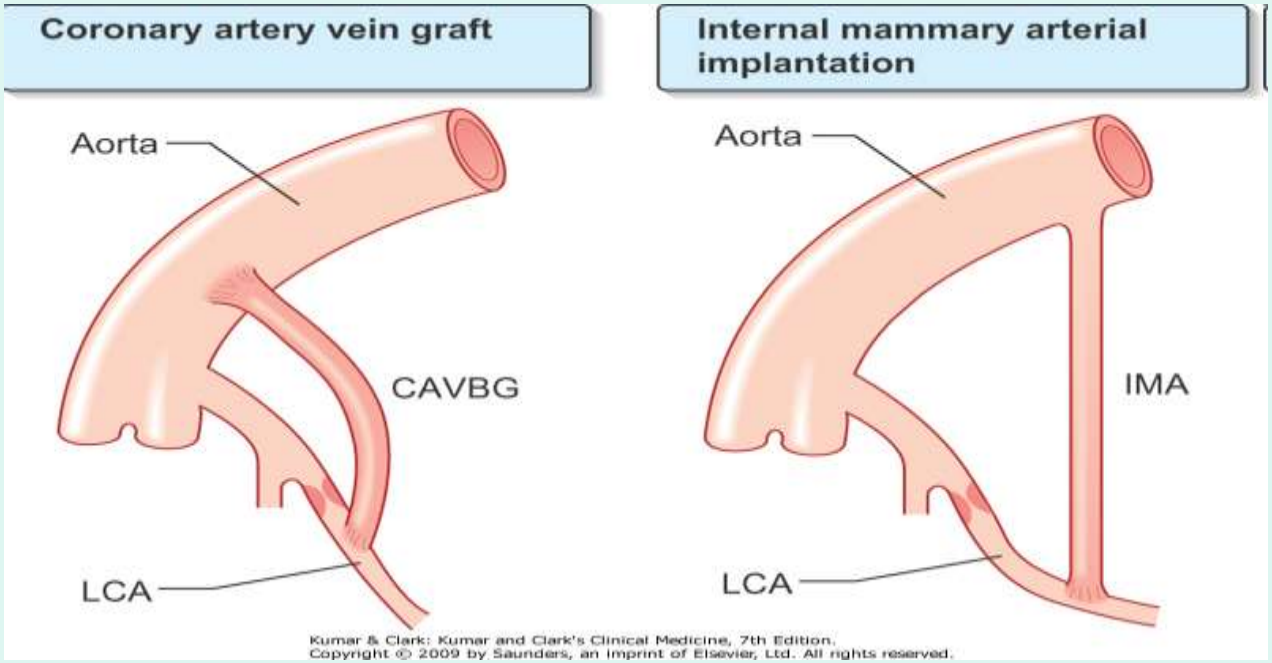


Coronary artery bypass grafting (CABG)



ISCHAEMIC HEART DISEASE II

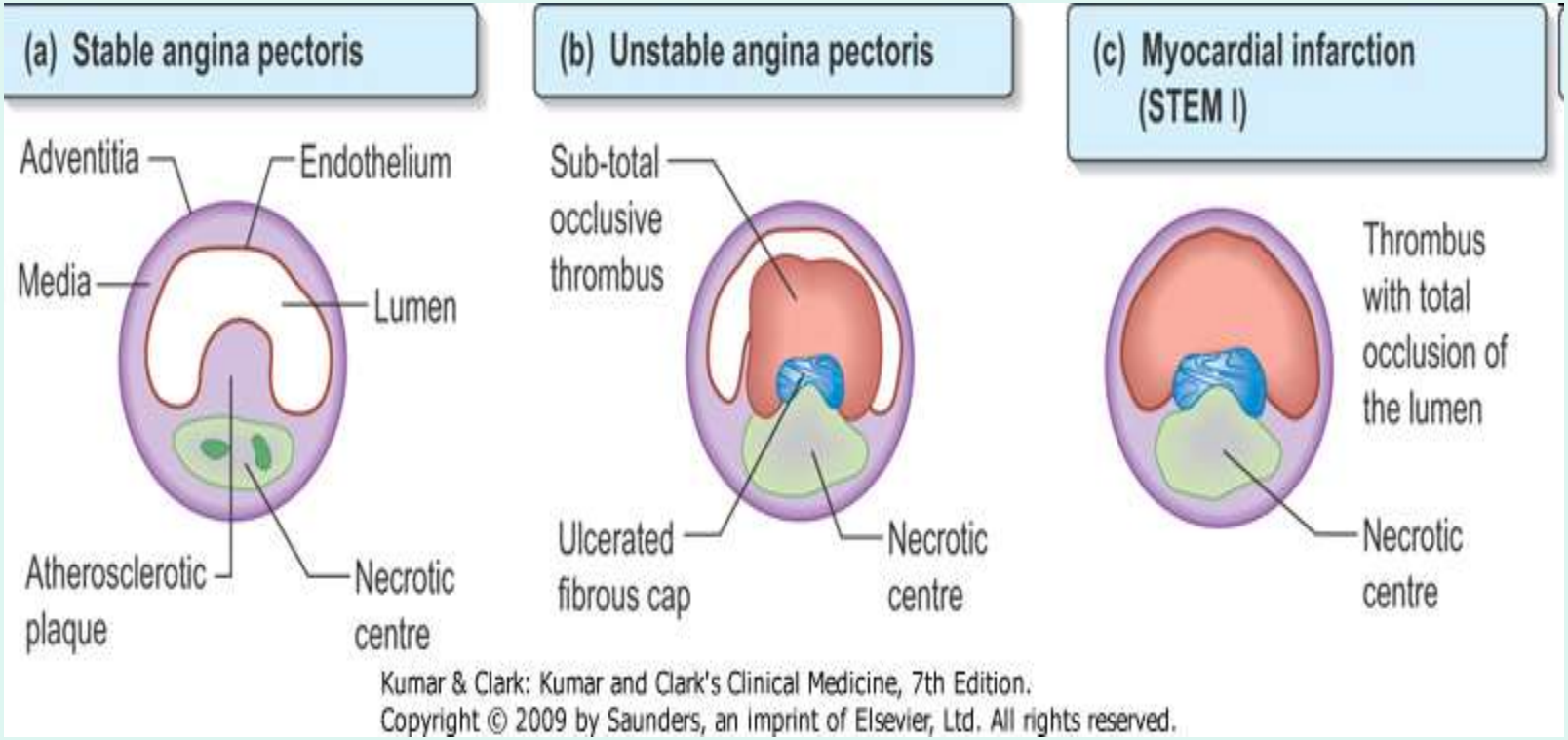
-ACS- ACUTE coronary syndromes

Unstable angina

Non-ST-elevation myocardial infarction (NSTEMI)

ST-elevation myocardial infarction (STEMI)

Pathophysiology



Clinical presentation

new onset chest pain, -

SEVER chest pain at rest or -
deterioration of pre- existing angina –
may be presentwd with

indigestion-EPIGASTRIC PAIN , or -
dyspnea—SOB- PUL.EDEMA

pre-syncopy—syncopy- SHOCK. -

on examination there may be -

low BP, tachycardia- basal crackles, -
S4 ,and cardiac systolic murmurs-MR

Electrocardiogram

- it may be normal

- presence of ST depression and T inversion are highly suggestive

- repeat ECG when patient is in pain

persistent ST elevation-or -

new bundle branch block-

it indicates complete coronary - artery occlusion –

STEMI- TRANSMURAL –MI- -

- transient ST elevation is seen with coronary vasospasm or Prinzmetal`s angina

Biochemical markers

- Cardiac troponin (I ,T and C) -
- AST and ALT
- LDH
- Creatinine - kinase—CPK-MB
- Myoglobin
- OTHER- CRP- ESR- WBC

Management

All patients need chest pain treatment

Rest in bed

Oxygen

Antiplatelet

Aspirin 150 -300 mg. ,

then 75-100 mg. daily

Clopidogrel 300mg. Then 75 mg.

P2Y12- inhibiter

PRASUGREL - TICAGRELOR

Antithrombin

Heparin 5000 units i.v. then 0.25 units kg/ hour

LMWH (Enoxaparin)1mg./kg s.c. twice daily

-PCI-Glycoprotein IIB/IIIA inhibitors

Abciximab 0.25mg/kg i.v. then 0.125mcg/kg/min.

Eptifibatide 180mcg/kg then 2 mcg/kg/min.

Tirofiban 0.4 mcg/kg/min. then 0.1mcg/kg/min.

Analgesia

Morphine or dimorphine 2.5-5 mg i.v.

Beta- blockers

Atenolol 5 mg i.v.then25-50 mg orally daily

-Metoprolol- BISOPROLOL-NIBLET- IVABRADIN

Coronary vasodilators

Glyceryl trinitrate 2-10 mg /hour i.v./ buccal /or sub lingual

Plague stabilization/ ventricular remodelling

-Statins

- **Simvastatin 20-40 mg daily**
- **Pravastatin 20 -40 mg daily**
- **Atorvastatin 80 mg daily -**

PCSK9- INHIBITORS-INCLISIRAN-

ACE inhibitors

- **Ramipril 2.5 -10 mg daily**
- **Lisinopril 5 – 10 mg daily**

-

ARABS-

VALSARTAN- CANDESARTAN - TELMISARTAN-

Coronary intervention

PCI and CABG

- they are recommended in high–risk patients with ACS

Post ACS :- Risk factor modification

- stop cigarette smoking

- Treat hypertension to a level < 130/85

- Tight diabetic control

- Low fat diet ,with statins and EZETIMIBE- to reduce LDL cholesterol TO less than 70mg in high risk patients- OR- >55mg/dl- EXYREMILY high risk pt. > 39mg/dl.

- On discharge medication should include aspirin, clopidogrel, beta- blocker ,ACEi- and GTN spray on need

ST- elevation myocardial infarction

(STEMI)

There is cardiac myocytes death duo to prolonged ischaemia.

Diagnosis

is made on clinical history

prolonged classical chest pain with

ECG findings of MI and

elevated biochemical markers-

troponin I and T,CK- MB.

1- month mortality of MI

may be as high as 50%,

50% of deaths occur in first 2 hours

because of arrhythmia-VT-VF-CARDIAC ARREST

Diagnosis

Clinical :-

Sever PROLONGED chest pain, lasting 20 minutes , not responding to sublingual GTN, may radiate to the left arm , neck or jaw.

Atypical symptoms include

ACUTE PULMOARY EDEMA-fatigue,

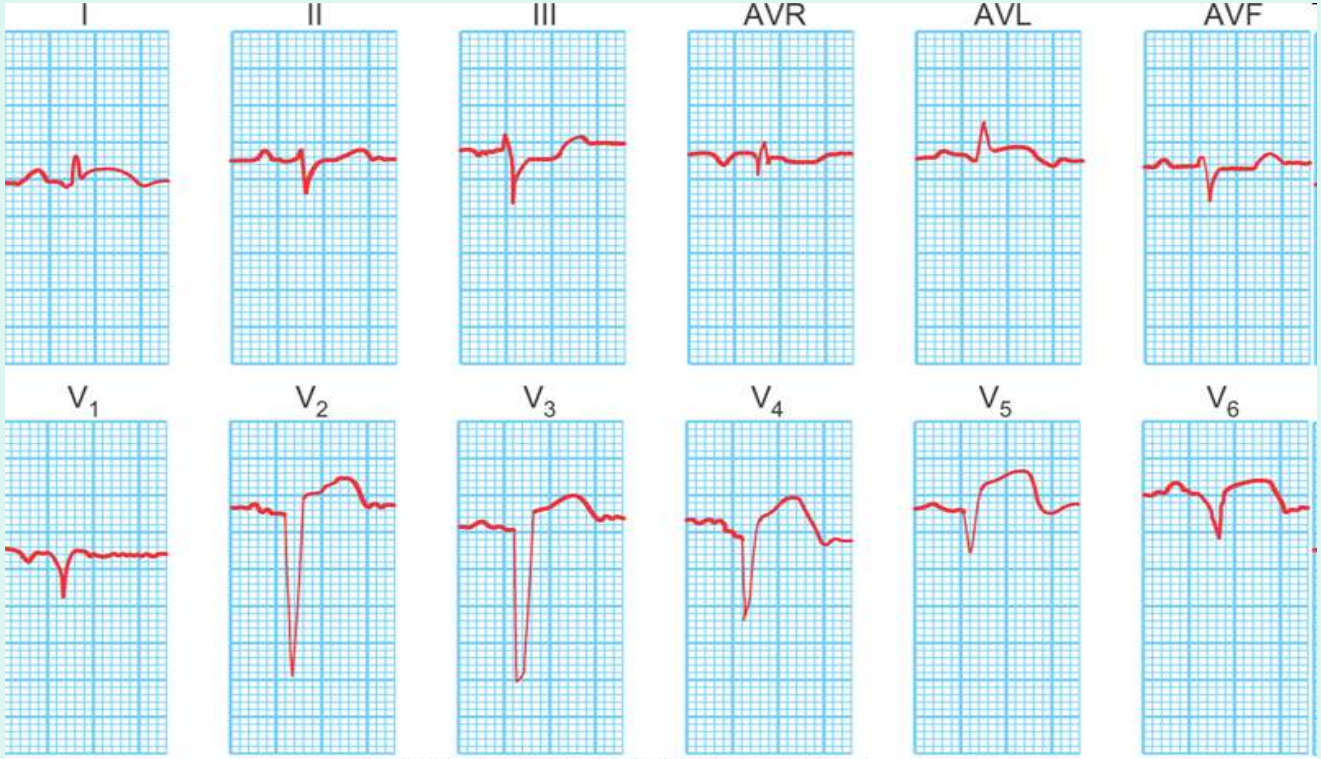
pre-syncopy -syncope- shock- SUDDEN DEATH - cardiac arrest-vertigo-CVA

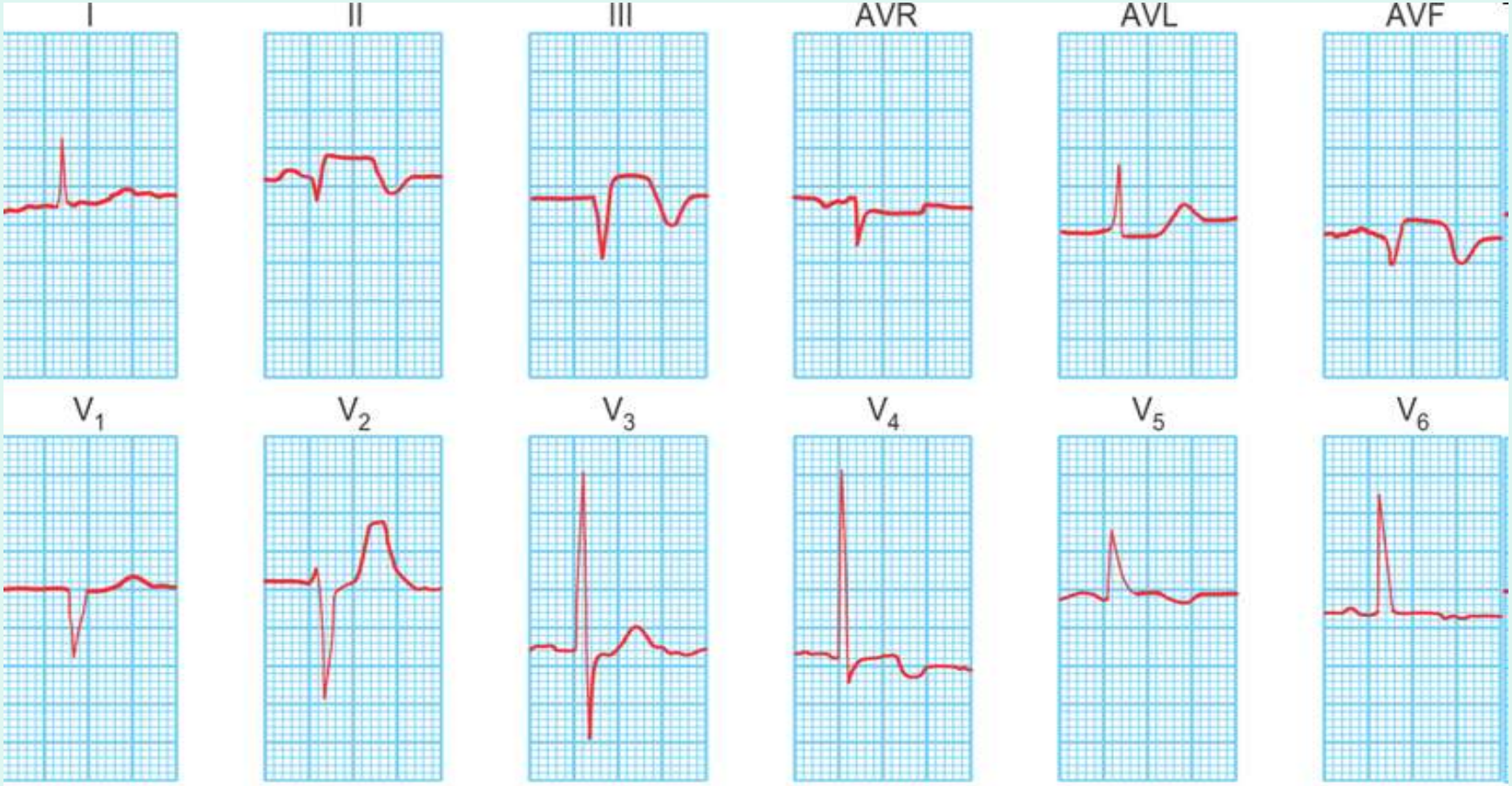
vomiting- epigastric pain.

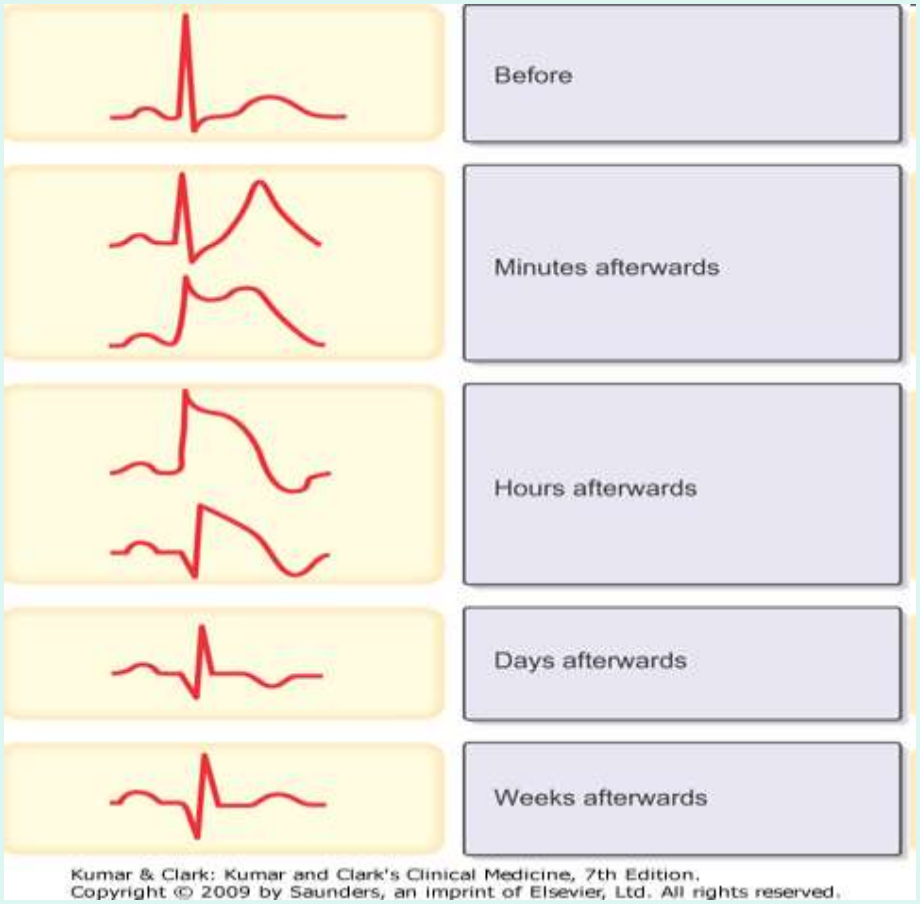
On examination: patient is pale, clammy, sweaty, thread small volume pulse, tachycardia-hypotensive

Electrocardiography

- ECG on admission is usually abnormal, if not it should be repeated every 15 minute while the patient remains in pain
- ECG changes (new ST elevation) are usually confined to the leads that face the infarction
- New LBBB is compatible with diagnosis of MI
- Continuous cardiac monitoring is required because of the likelihood of significant arrhythmia







Investigation

- Blood sample should be taken for cardiac enzymes troponin I or T level or CK-MB level

- Full blood count, serum electrolytes, glucose and lipid profile should be obtained.

- ECHO-

LV- DYSFUNTION- HK-AK-

dyskinatic segment-

may be helpful to confirm

a diagnosis of myocardial infarction and any abnormal LV-WALL motion

Early medical management

Accident& emergency

- Bed rest
- Oxygen therapy
- Intravenous access + blood for markers
- I.v. opiates e.g. diamorphine or morphine 2.5–5mg + antiemetic, e.g. metcloprimide 10mg

Aspirin 150-300mg and -

clopidogrel 300mg— -

new anti-plat.p2y12 -TICAGRELOR -

- Sublingual GTN 0.3-1mg ,repeated

- Beta-blockers

- Refer for PCI if available, preceeded by -

giving (GP IIb/IIIa) inhibitors. -

- Alternatively give thrombolysis - for -

ST-ELEVATION-MI –NEW LBBB -

Fibrinolysis

- Fibrinolytic agents enhance the breakdown of occlusive thromboses by the activation of plasminogen to form plasmin.
- Streptokinase is initially used , it causes allergy
- Tissue plasminogen activator(t-PA), r-PA(reteplase),TNK –t-PA (tenecteplase)
- Aspirin should be used with fibrinolysis,
- Heparin is recommended with t-PA or tenecteplase but not with streptokinase.

Percutaneous coronary intervention (PCI)

- It needs specialized expert cardiology center- D0OR-TO NEEDLE
- Earlier referral gives the better result

The use of abciximab (GP IIb/IIIa inhibitor) prior to PCI reduce immediate outcome (death, myocardial infarction, urgent -Revascularization –

RESCUE- PCI after FAILED fibrinolysis

Coronary artery bypass surgery

This is usually reserved for the complication of myocardial infarction- FAILURE--PCI

ComplicationS of myocardial infarction

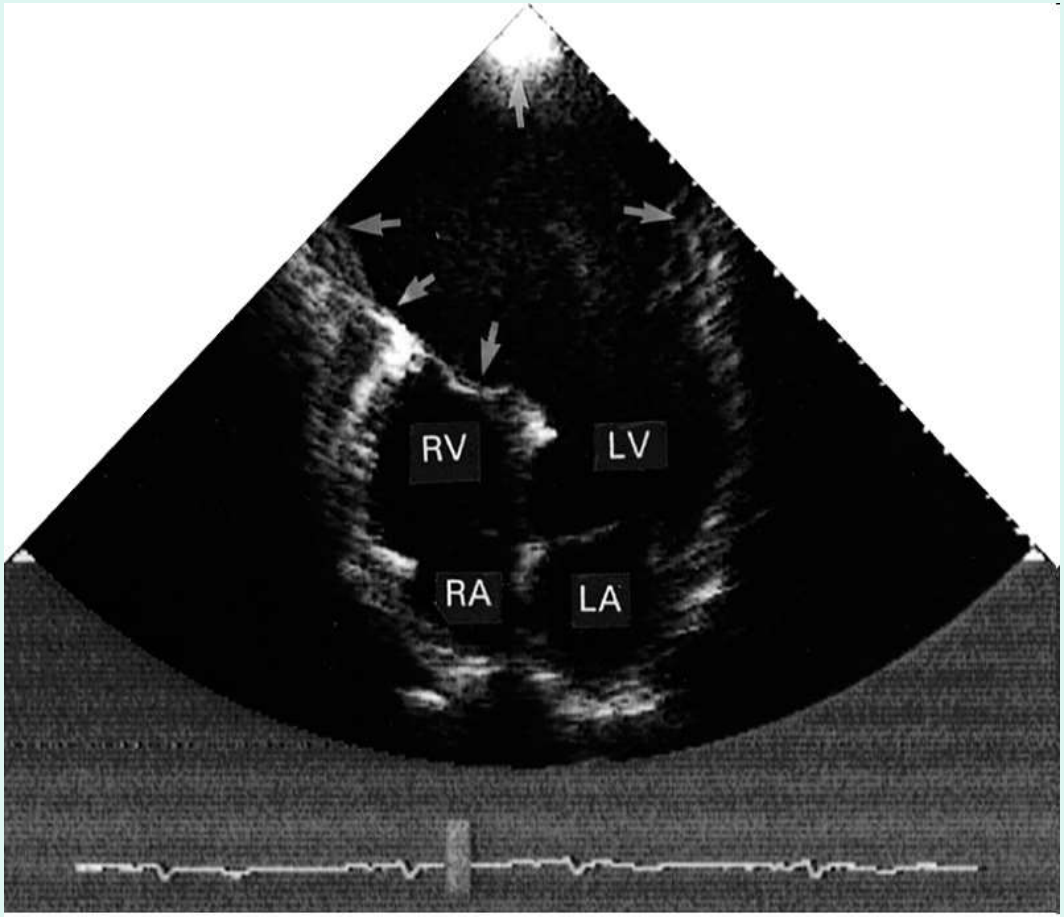
1- Heart failure treated with furosemide i.v., ACE inhibitors, i.v. inotropes such as dopamine, if there is cardiogenic shock then intra-aortic balloon pump may be required.

2- Myocardial rupture and aneurysmal dilatation treatment is surgical

3- Ventricular septal defect: treated by intra- aortic balloon pump and coronary angiography then surgery

4- Mitral regurgitation: treated surgically

5-RV- INFARCTION- complication of INF.MI-SHOCK-high-JVP.



5- Cardiac arrhyhmia :-

a-ventricular tachycardia is treated with i.v. beta- blockers (metoprolol 5 mg.)

b- ventricular fibrillation require defibrillation- DC

c- AF- is treated with beta-blockers and digoxin,amoidarone-flecanide-propafenon-DC- may be needed

6- Conduction disturbances : most commonly heart block , treated by atropine or temporary pacemaker

7- Post-MI- pericarditis –

pericardial tamponade

Dressler`s syndrome

Post – MI lifestyle modification

- Low fat diet
- Stop smoking
- Active exercise for 20-30 minutes /day
- Weight reduction
- Treat hypertension to less 130/85
- Treat diabetes to maintain HbA1c < 7%

Post-MI drug therapy

- Aspirin 75-100mg/day

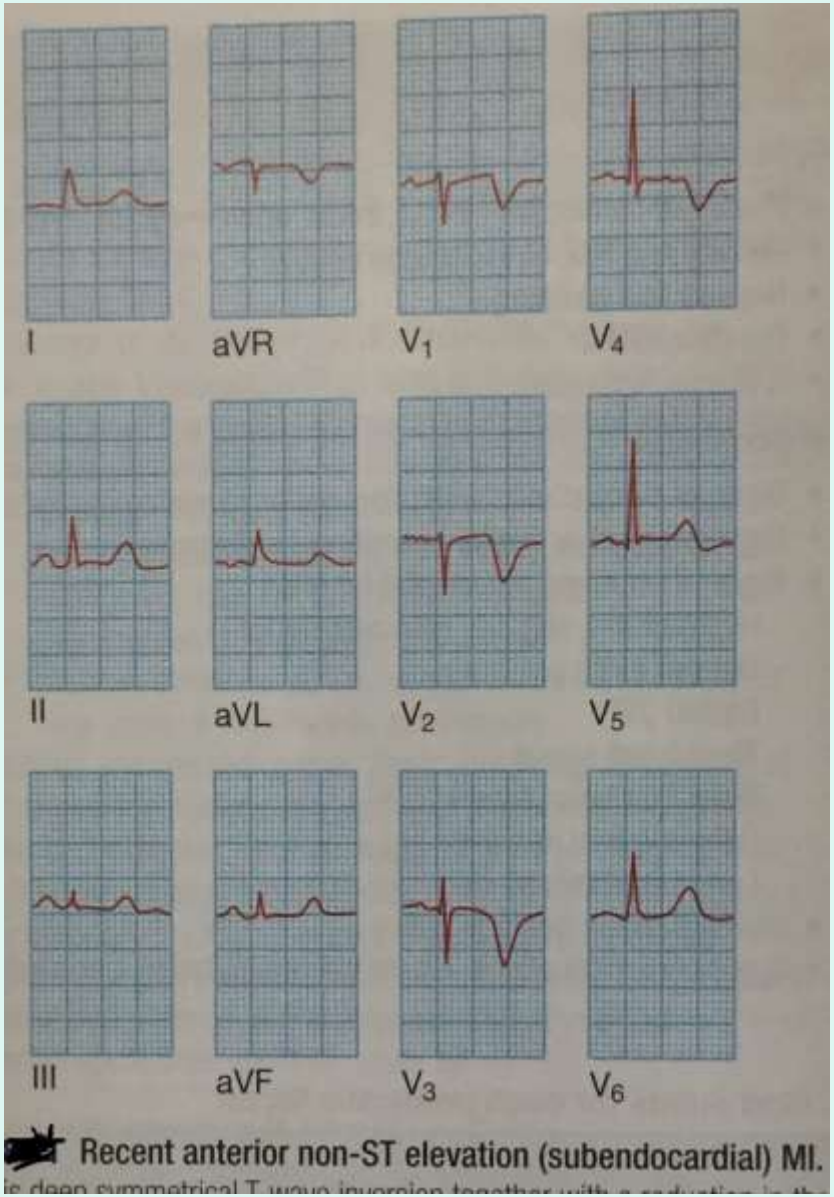
Beta-blocker -

e.g. metoprolol 50 mg twice daily -

ACE inhibitors -

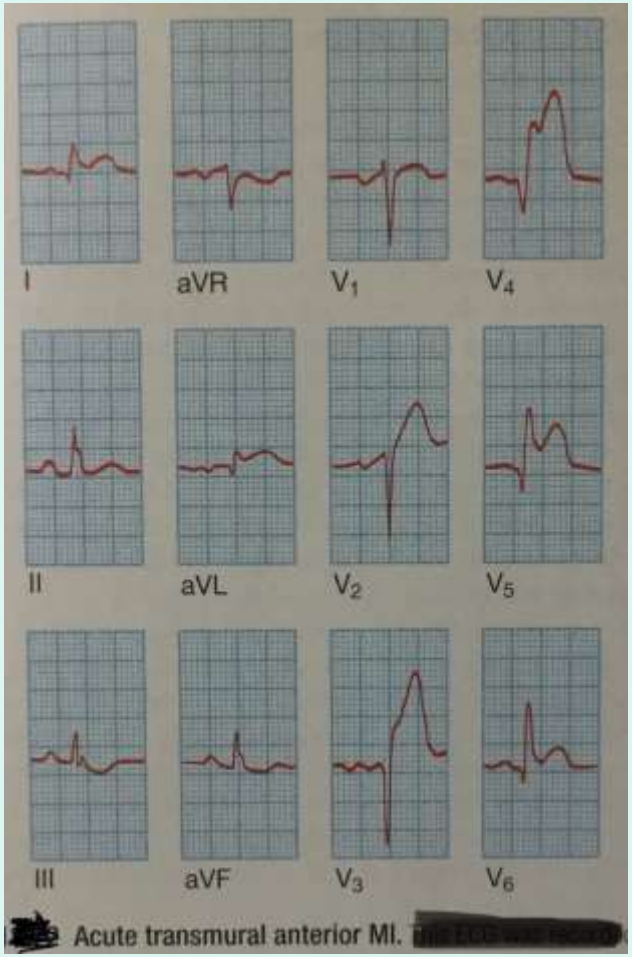
e.g. ramipril 2.5 mg twice daily, if intolerant - use ARB, e.g. valsartan 20 mg twice daily

- Statins e.g. simvastatin 20-80 mg/day

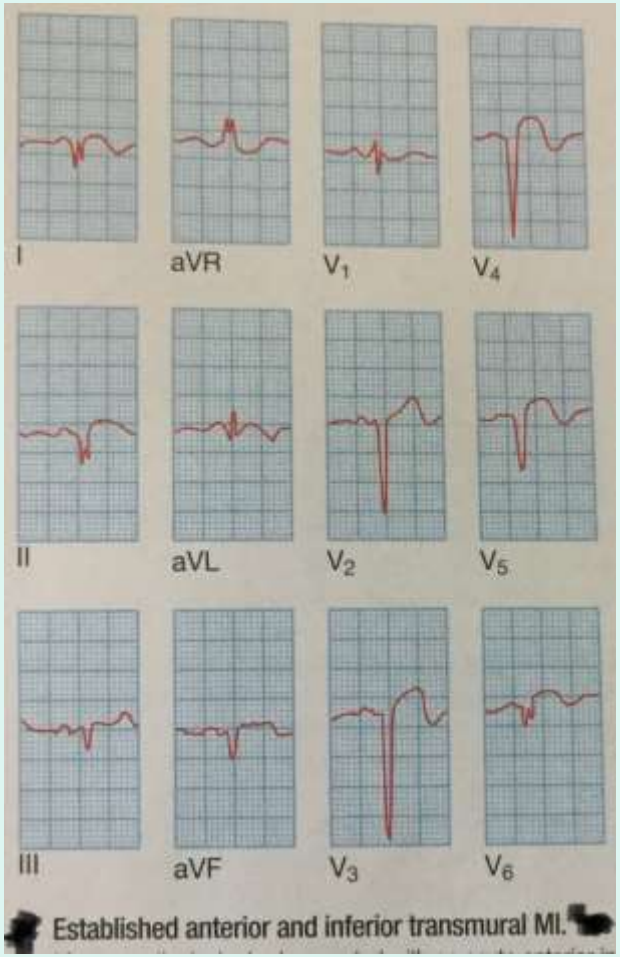


Recent anterior non-ST elevation (subendocardial) MI.

is deep symmetrical T wave inversion together with a reduction in the



[redacted] Acute transmural anterior MI. [redacted]



Established anterior and inferior transmural MI.