Angina pectoris

- Angina pectoris derived from Greek word; meaning is **strangling feeling in chest**.
- Often known as Angina.
- Clinical Syndrome characterized **by sudden, severe chest pain** that often radiate to left shoulder and arm due to **inadequate blood flow** through coronary arteries to the heart muscle and is consequences of **myocardial oxygen demand exceeding supply.**
- Angina is often brought on by exertion or excitement.
- Last for 15 sec to 15 mins.
- Do not cause cellular death.

Angina pectoris

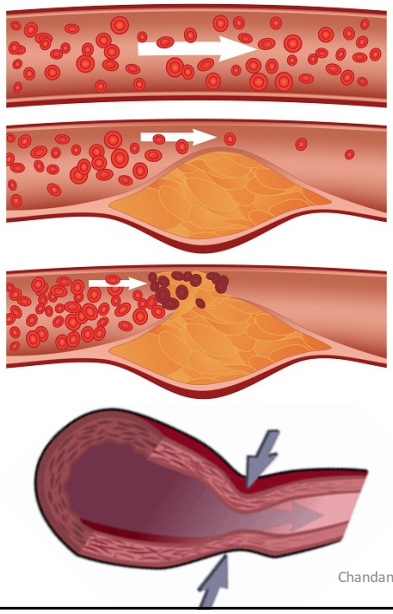
Reduced blood supply

1. Obstruction of coronary artery caused by atherosclerotic lesion
2. Spasm of Vascular smooth muscle

Imbalance between myocardial O2 demand and 02 supply

1. Increased in O2 demand or
2. Decreased in O2 supply or
3. Both

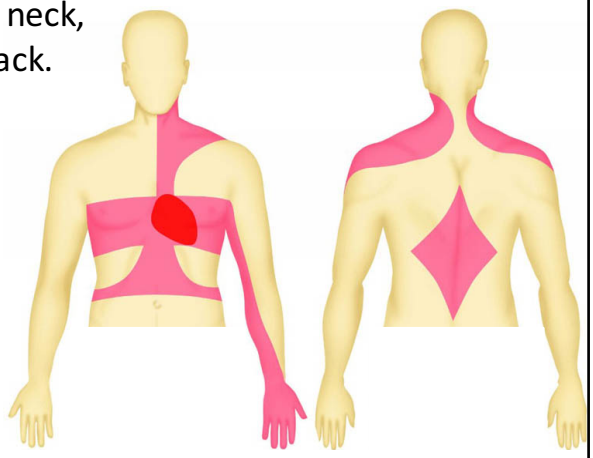
Types of Angina



- Stable angina
- Unstable angina
- Prinzmetal angina
- ***Silent Ischemia***

Sign and Symptoms

Chest pain, radiate to neck, jaw, shoulder, arms, back.



Others

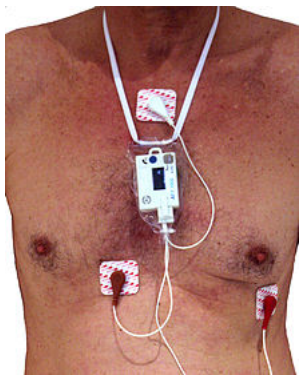
Shortness of breath
Palpitations
A faster heartbeat
Weakness or dizziness
Nausea
Sweating

Risk Factor

- Hypercholesterolemia (↑LDL; ↓ HDL)
- Hypertriglycerides
- HTN
- Smoking
- Diabetes
- Family History
- Age (Male: 45years + / Female:55 years +)
- Sex: Male at higher risk

Diagnosis

- Stress Testing
- ECG
- X-ray
- Echocardiography
- MRI
- Angiography



Holter monitoring

Treatment

➢ **Life Style Modification**

- Physical activity
- Dietary Changes

➢ **Medical treatment**

<u>Goal</u>

- Reduce the heart's workload
- Improve blood flow through the coronary arteries
- Slow down or reverse the buildup of atherosclerosis

Antianginal Agents

1. **Nitrates**

I. Short acting (10 mins): Glyceral trinitrate (GTN; Nitroglycerin)**EMERGENGY**

II. Long acting (1hr): Isosorbide dinitrite, Isosorbide mononitrate

2**. Beta Blockers**: Propanolol, Metoprolol, Atenolol

3. **CCBs**

i. Dihydropyridine: Nifedipine, Amlodipine

ii. Phenyl alkylamine: Verapamil

iii. Benzothiazepine: Diltiazem

4. **Potassium Channel opener**: Nicorandil

5. **Others**: Dipyridamole, Trimetazidine, **Ranolazine**, Oxyphedrine

Nitrates

- Vasodilate coronary arteries (increase blood flow)
- Reduce preload and afterload
- Classification of nitrates

A. Rapidly acting nitrates

* used to terminate acute attack of angina
* e.g. Nitroglycerin (GTN: glyceral trinitrate)
* usually administered sublingually

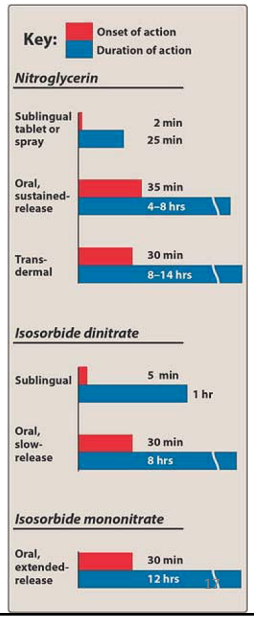
B. Long acting nitrates

* used to prevent an attack of angina
* e.g. Isosorbide dinitrate, Isosorbide mononitrite
* administered orally or topically

Note: Isosorbide dinitrate and isosorbide mononitrate are solids at RT, nitroglycerin is moderately volatile

Routes of Administration

1. Sublingual route – rational and effective for the treatment of acute attacks of angina pectoris.
2. Oral route – to provide convenient and prolonged prophylaxis against attacks of angina
3. Intravenous Route – useful in the treatment of coronary vasospasm and acute ischemic syndrome.
4. Topical route – used to provide gradual absorption of the drug for prolonged prophylactic purpose .



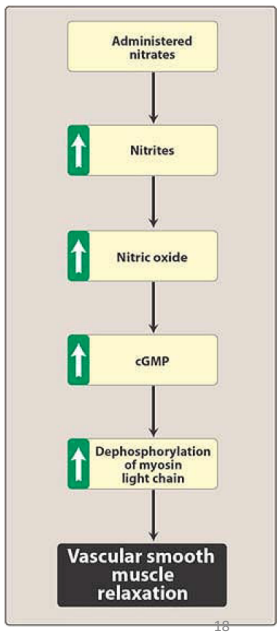
MOA

Nitrates are rapidly denitrated enzymatically in the smooth muscle to release Nitric Oxide (NO) → smooth muscle relaxation

A/E

- Throbbing headache
- Flushing of the face
- Dizziness – especially at the beginning of treatment
- Postural Hypotension – due to pooling of blood in the dependent portion of the body
- Tolerance
- Dependence

Monday Morning Headache??



Nitroglycerin: Nursing Consideration

- Sublingual: not to chew or swallow
- Unstable: original container
- Volatile: heat moisture light
- Best taken before pain develops
- Advise patient to sit down for few mins- to avoid hypotension

Beta Blocker

Atenolol, Metoprolol, Propanolol

- Not the vasodilator, do not cause coronary vasodilatation.
- They are used because of their effect on heart.
- **MOA**
  - ✓ Suppress the activation of the heart by blocking B1 receptors.
  - ✓ Reduces myocardial O2 demand by:
    - I. Decreasing the HR and
    - II. Decreasing myocardial contractility
- Are used only for prophylactic therapy of angina; they are of no value in an acute attack.
- Effective in preventing exercise-induced angina.
- But are ineffective against the vasospastic form.

Benefits

- Decreased frequency and severity of attacks.
- Increased exercise tolerance (classical angina)- cardio selective are preferred.
- Lowers sudden cardiac death.
- Routinely used in UA and with MI.

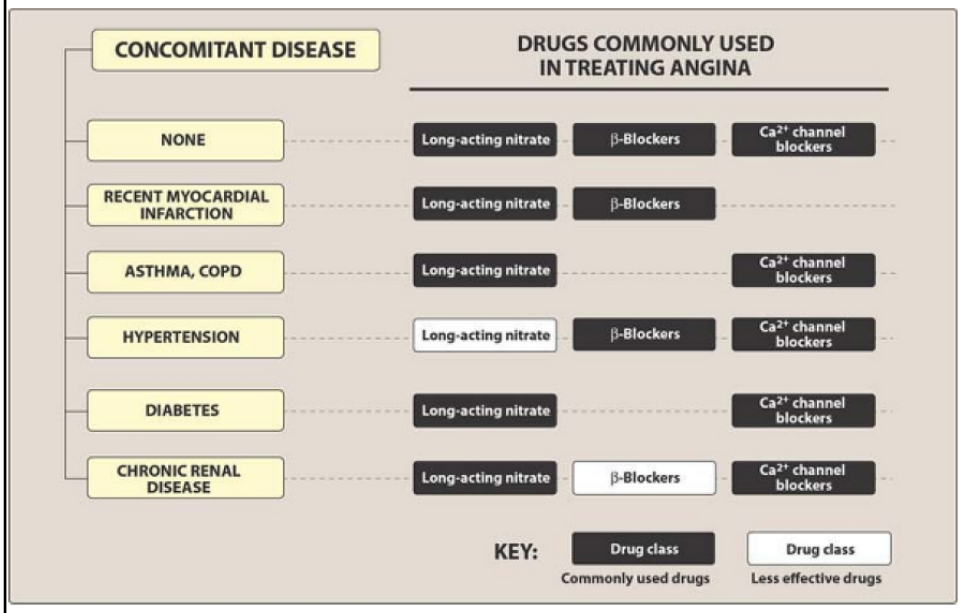
[Note: It is important not to discontinue beta-blocker therapy abruptly. The dose should be gradually tapered off over 5 to 10 days to avoid rebound angina or hypertension.]

Contraindicated in patients with **ASTHMA**.
Should be taken regularly not sos.

CCBs

Nefidipine, Verapamil, Diltiazem

- the treatment of chronic stable angina, and most effectively in the treatment of variant angina (directly preventing coronary artery vasospasm).
- They are not used in the treatment of unstable angina .
- **MOA**
  - ✓ Vasodilate coronary arteries→ increase O2 supply
  - ✓ Dilatation of aorta → Reduce afterload → decreases workload
  - ✓ The non-dihydropyridines (verapamil and diltiazem) also decrease heart rate and contractility
  - ✓ RESULT: Reduced O2 demand



Others

Antiplatelet

- Aspirin
- Clopidogrel
- Glycoprotein IIb/IIIa Inhibitors

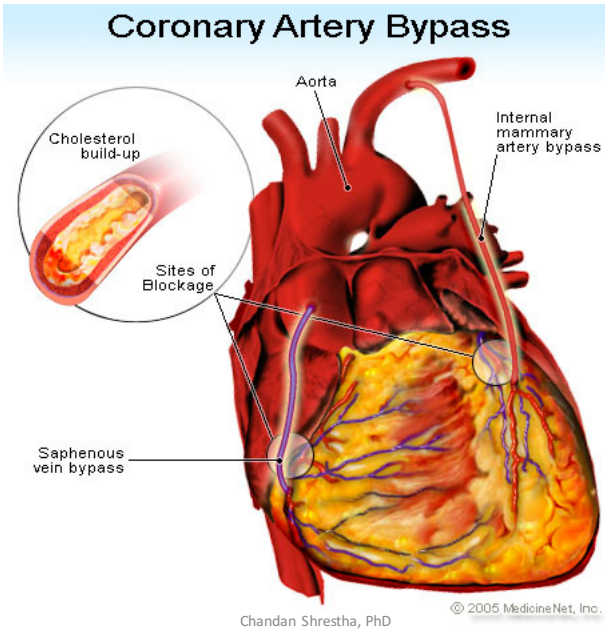
Anticoagulant Medication: Heparin/warfarin

Thrombolytics: Streptokinase

Cholesterol Lowering Drugs

Statin (HMG-CoA reductase inhibitors): Atorvastatin

Opioids analgesic: morphine/ pethidine


Coronary Artery Bypass
Aorta
Internal mammary artery bypass
Cholesterol build-up
Sites of Blockage
Saphenous vein bypass
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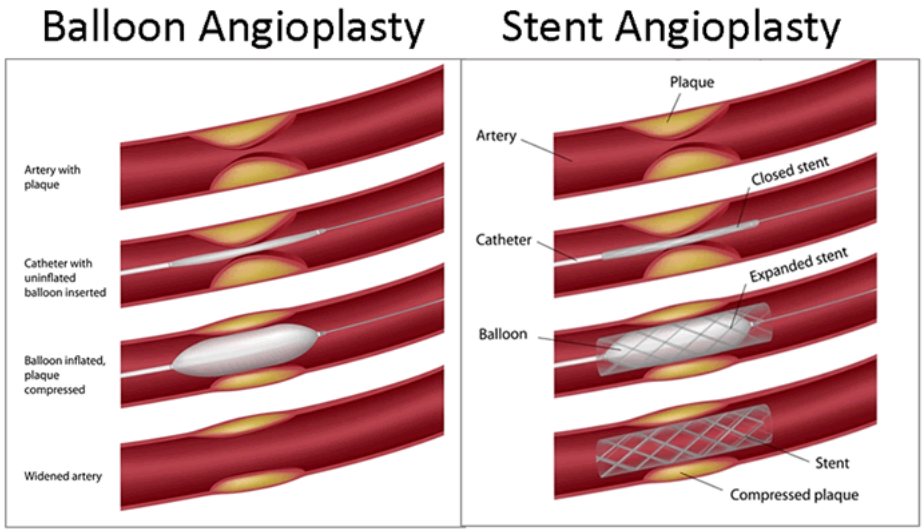
Balloon Angioplasty
Stent Angioplasty
Artery with plaque
Catheter with uninflated balloon inserted
Balloon inflated, plaque compressed
Widened artery
Plaque
Artery
Closed stent
Catheter
Expanded stent
Balloon
Stent
Compressed plaque