

# Management & Nursing Care of Patient with Coronary Artery Diseases

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# Outlines

- Anatomic & physiologic overview of cardiovascular system
- Coronary atherosclerosis
- Angina
- Myocardial infarction
- Congestive heart failure

# Anatomic& physiologic overview of cardiovascular system

- Introduction
- Vascular system( the blood vessels)
- Blood circulation

# Introduction

- The cardiovascular/circulatory system **transports** food, hormones, metabolic wastes, and gases (oxygen, carbon dioxide) to and from cells.

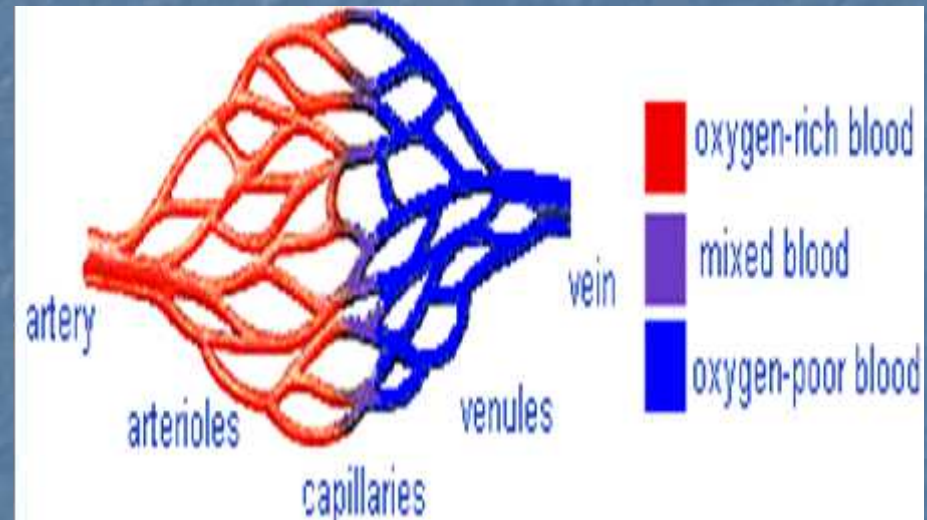
## Components of the circulatory system

- Blood: consisting of liquid plasma and cells
- Blood vessels: (vascular system): the "channels" (arteries, veins, capillaries) which carry blood to/from all tissues. **Arteries** carry blood away from the heart. **Veins** return blood to the heart. **Capillaries** are thin-walled blood vessels in which gas/ nutrient/ waste exchange occurs.
- Heart: a muscular pump to move the blood

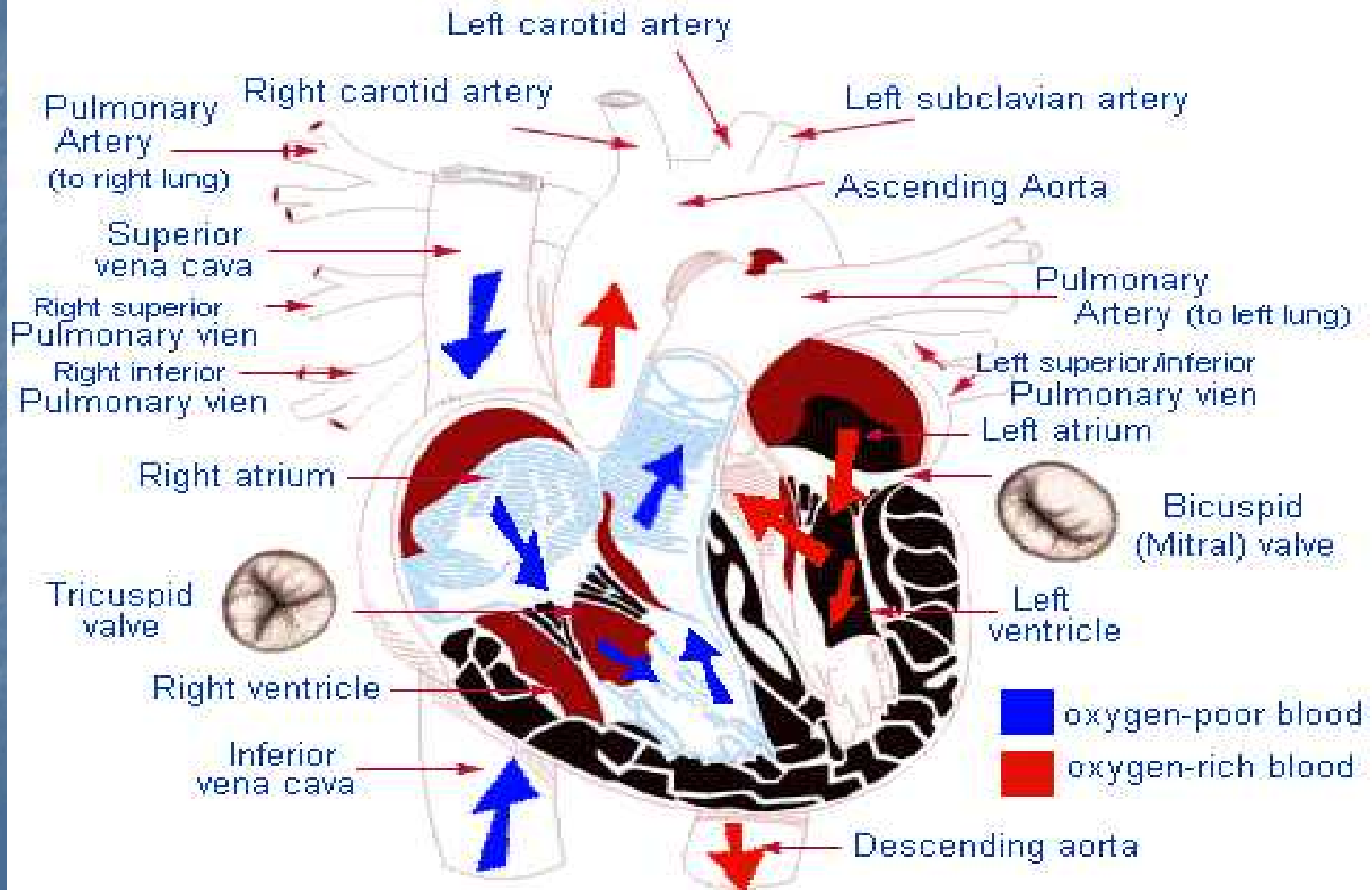


# Vascular System - the Blood Vessels

- Arteries, veins, and capillaries comprise the **vascular system**. Arteries and veins run parallel throughout the body with a web-like network of capillaries **connecting** them.

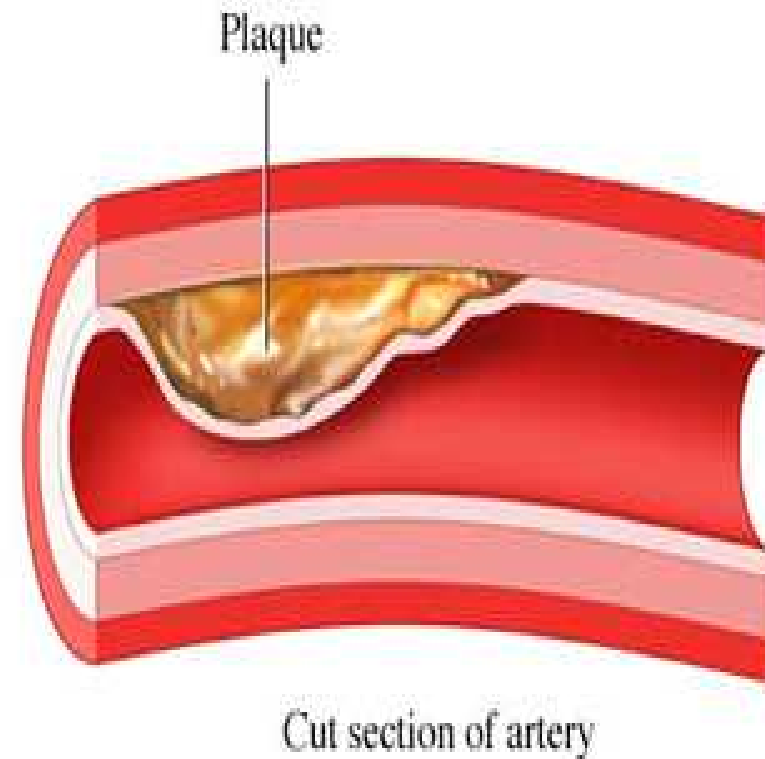


# Blood circulation



# Coronary Atherosclerosis

- Diseases of the coronary arteries is almost always due to **plaque** and its complications, particularly thrombosis.
- **Atherosclerosis** is a progressive inflammatory disorder of arterial wall that is characterized by focal lipid rich deposits of atheroma that remain clinically **silent** until they become large enough to impair tissue perfusion





## Risk factors for developing atherosclerosis

- Age and sex
- Family history for (hypertension, hyperlipidemia, diabetes mellitus)
- Smoking
- Hypertension
- Hypercholesterolemia
- DM
- Haemostatic factors, platelets activation and high levels of fibrinogen are associated with an increased risk of coronary thrombosis
- Physical activity
- Obesity
- Alcohol
- Personality type

# Coronary heart disease: clinical manifestations and pathology

## ■ Clinical problem

- Stable angina

- Unstable angina

- Myocardial infarction

- Heart failure

- Arrhythmia

- Sudden death

## ■ Pathology

- Ischemia due to **fixed** atheromatous stenosis of one or more coronary arteries

- Ischemia caused by **dynamic** obstruction of a coronary artery due to plaque rupture or erosion with imposed thrombosis

- Myocardial necrosis caused by acute **occlusion** of a coronary artery due to plaque rupture or erosion with imposed thrombosis

- Myocardial dysfunction due to **ischemia** or infarction

- Altered **conduction** due to ischemia or infarction

# Prevention of atherosclerosis

- primary prevention (control of risk factors)
- Do not smoke
- Take regular exercise ( minimum of 20 min 3 times a week)
- Maintain ideal body weight
- Eat a mixed diet rich in fresh fruit and vegetables

- Aim to get no more than 10% of energy intake from saturated fat
- **Primary prevention** in patients without evidence of coronary disease but with high serum cholesterol concentration, cholesterol-lowering with statin prevent coronary events e.g. (angina, MI)



- Secondary prevention in patients with established coronary disease (MI or angina), statin therapy is safely.



# Angina

- Out lines
- Definition
- Causes and pathophysiology
- Precipitating factors
- Clinical manifestation
- Types
- Diagnostic evaluation
- Management
- Nursing process

## Definition

- It is a clinical syndrome, characterized by **paroxysm** of chest pain, or a feeling of pressure in the **anterior chest**. It may occur whenever there is an imbalance between myocardial oxygen supply and demand.

## Causes and Pathophysiology

- The cause is considered to be **insufficient** coronary blood flow, resulting in **inadequate** O<sub>2</sub> supply of the myocardium. Angina is usually **caused** by atherosclerotic plaque.

# Precipitating factors

- Common factor
- Physical exertion can precipitate an attack by increase myocardial O<sub>2</sub> demands.
- Exposure to cold can cause vasoconstriction and increased B.P with increased demands.
- Eating heavy meal which the blood flow to the mesenteric area places a heavier demands on the heart.

- Stress and emotional provoking situation cause the release of adrenaline and B.P may accelerate the heart rate



## Precipitating factors (cont...)

- Uncommon factor
- Lying flat (angina decubitus)
- Vivid dreams (nocturnal angina)

# Clinical manifestations

- The pain is usually felt **deep** in the chest behind the sternum. Although the pain frequently is localized, it may **radiate** to the neck, jaw, shoulders, and inner aspects of the upper extremities
- Patient often experience a **tightness** or strangling sensation

## Clinical manifestations (cont...)

- Feeling of **weakness or numbness** in the arms, wrists, and hands may be accompanied by pain
- Patient also has a sense of **impending death** and an apprehension

# Types of angina

- Stable angina (classic angina)
- It may occur whenever there is an **imbalance** between myocardial oxygen supply and demand. Stable angina is **characterized** by central chest pain, discomfort or breathlessness that is **precipitated** by exertion or other forms of stress, and is promptly **relieved** by rest.



## Types of angina (Cont...)

- Unstable angina (Acute coronary syndrome)
- Unstable angina is characterized by new-onset or rapidly worsening angina, angina on minimal exertion or angina at rest. It is most dangerous and does not follow a pattern, do not go away with rest or medicine. the common features of unstable angina are breathlessness, nausea&vomiting



## Types of angina (Cont...)

- The pain occurs in the same sites as angina but is usually more **severe** and lasts **longer**; it is often described as a **tightness, heaviness** or constriction in the chest.

# Diagnostic evaluation

- Patient's history
  - Cigarette smoking
  - Hypertension
  - Hyperlipidemia
  - Family history of coronary artery disease
  - Male gender
  - Obesity
  - Diabetes mellitus
  - Lack of regular exercise
  - Type A personality

## Diagnostic evaluation (Cont...)

- The clinical manifestations of pain
- Chest discomfort which may be described as : heavy pressure, burning sensation, or squeezing or tightness.
- This discomfort radiates to the shoulders, arms, neck or jaw.
- May be sudden in onset and relieved in minutes by rest and /or vasodilators.
- May be precipitated by exercise or possibly associated with nausea and / or belching.

## Diagnostic evaluation (Cont...)

- Objective indicators of angina
- Mental status: fearful and apprehension during acute attack
- Vital signs: normal between anginal episodes, hypertension and tachycardia during an acute attack
- Lungs: clear to percussion and auscultation, possibility of lung crackles during an acute attack.
- Heart: irregular rhythm during an acute attack



# Diagnostic evaluation (Cont...)

- Diagnostic tests
- Resting ECG, is often normal, even in patients with severe coronary artery disease.
- Exercise ECG, is usually performed using a standard treadmill while monitoring the patient's ECG, BP and general condition.



- **Coronary arteriography**, this provides detailed anatomical information about the extent and nature of coronary artery disease, and is usually performed with a view to coronary artery bypass graft (CABG) surgery or percutaneous coronary intervention(PCI).

# Management of angina pectoris

- General measures
- A careful assessment of the likely extent and severity of arterial disease
- The identification and control of risk factors such as smoking, hypertension and hyperlipidemia
- The use of measures to control symptoms
- The identification of high-risk patients for treatment to improve life expectancy

## Management of angina pectoris (Cont...)

- Advice to patients with stable angina
- Do not smoke
- Aim for ideal body weight
- Take regular exercise
- Avoid vigorous exercise after a heavy meal or in very cold weather
- Take sublingual nitrate before undertaking exertion that may induce angina

## Management of angina pectoris (Cont...)

- Antiplatelet therapy
- Low-dose (75mg) aspirin **reduces** the risk of adverse events such as MI and should be prescribed for all patients with coronary artery disease indefinitely.



## Management of angina pectoris (Cont...)

- Anti-anginal drug treatment
- Five groups of drug are used to help relieve or prevent the symptoms of angina: nitrates,  $\beta$ -blockers, calcium antagonists and potassium channel activators.

### Nitrate

- These drugs act directly on vascular smooth muscle to produce venous and arteriolar dilatation.

## Management of angina pectoris (Cont...)

### Beta - blockers

- These lower myocardial oxygen demand by reducing heart rate, BP and myocardial contractility.

### Calcium channel antagonist

- These drugs lower myocardial oxygen demand by reducing heart rate, BP and myocardial contractility.

### Potassium channel activator

- These have arterial and venous dilating properties but do not exhibit the tolerance seen with nitrates.

## Management of angina pectoris (Cont...)

- Invasive treatment

1. Percutaneous coronary intervention (PCI)  
(angioplasty with stent)

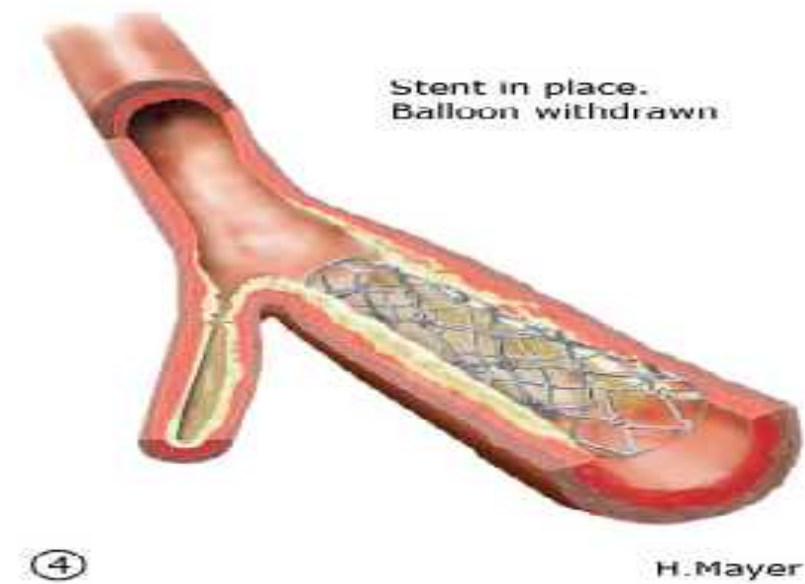
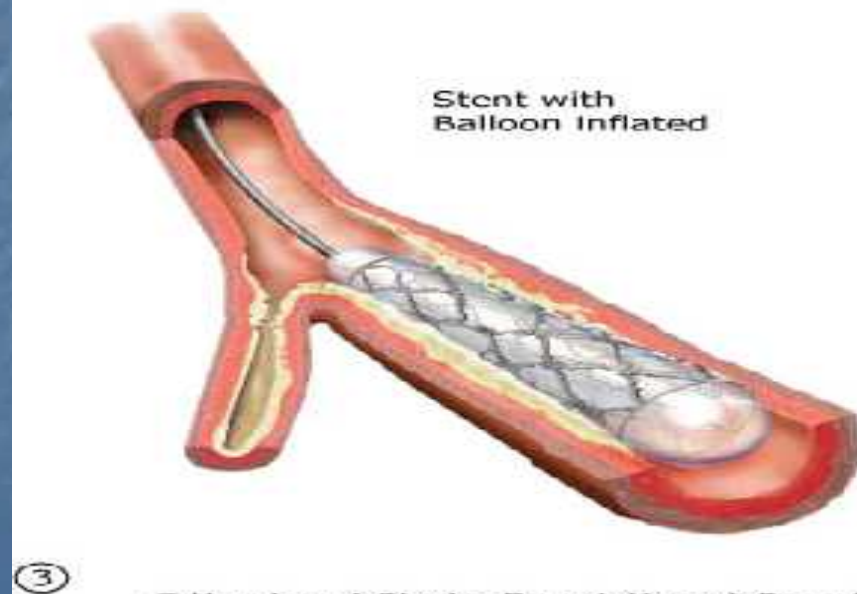
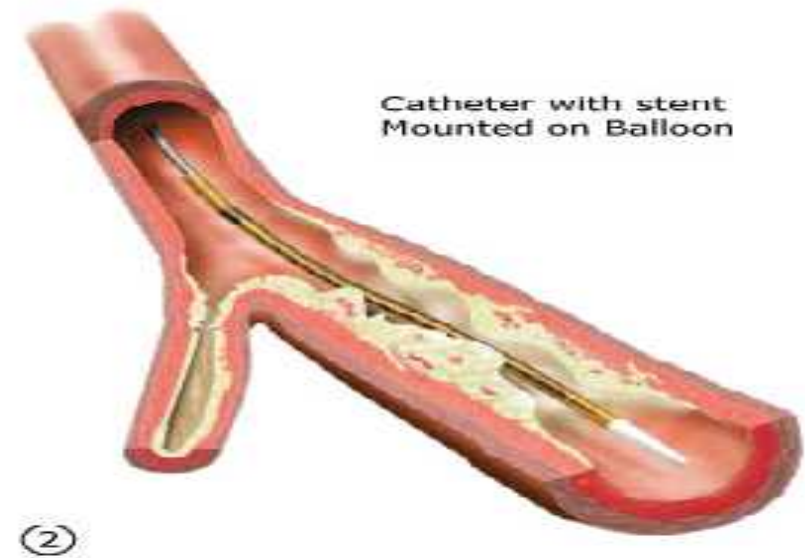
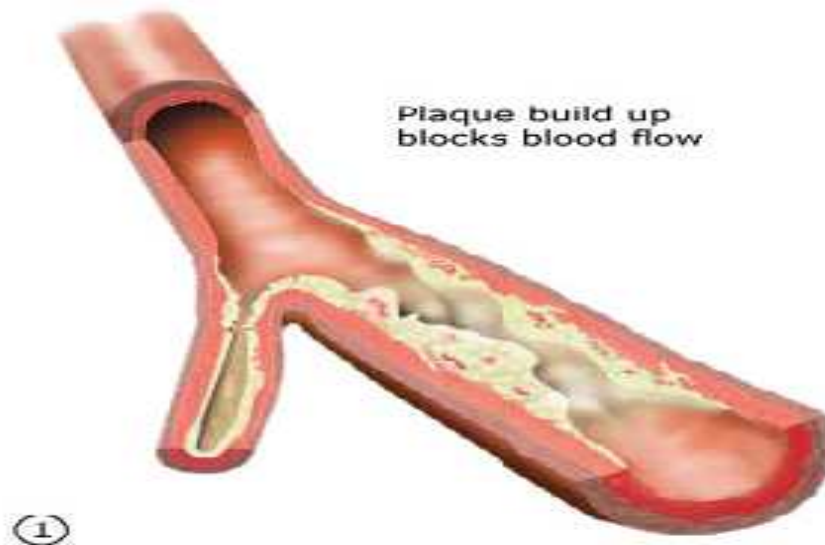
- **I**s a non-surgical procedure that uses a catheter (a thin flexible tube) to place a small structure called a stent to open up blood vessels in the heart that have been narrowed by plaque buildup.
- **A** catheter is inserted into the blood vessels either in the groin or in the arm. Using a special type of X-ray called fluoroscopy, the catheter is threaded through the blood vessels into the heart where the coronary artery is narrowed.

## Management of angina pectoris (Cont...)

- When the tip is in place, a balloon tip covered with a stent is **inflated**. The balloon tip **compresses** the plaque and **expands** the stent. Once the plaque is compressed and the stent is in place, the balloon is **deflated** and withdrawn



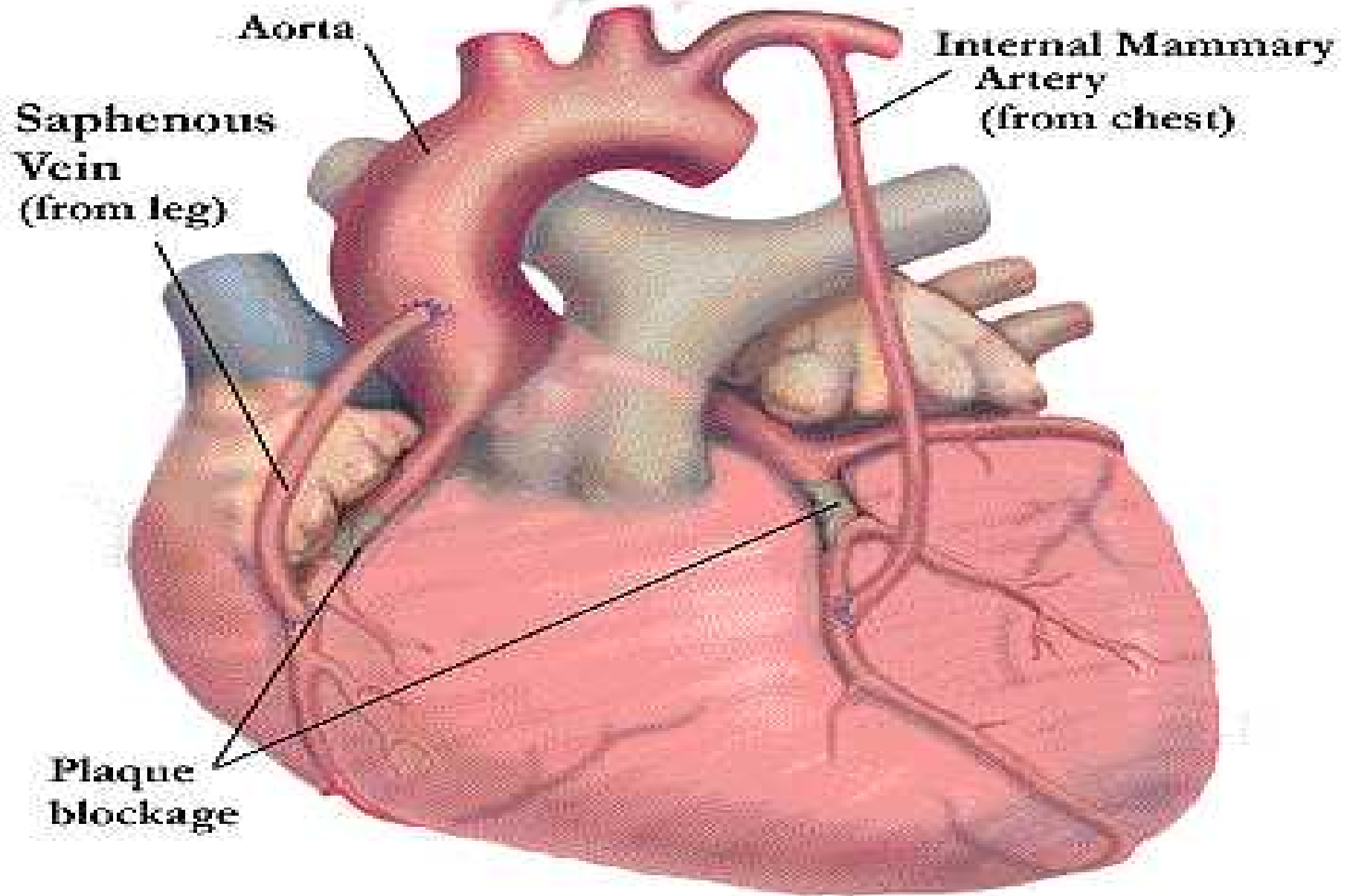
## Carotid Artery Stent Insertion



## Management of angina pectoris (Cont...)

### 2. Coronary artery bypass grafting (CABG) (Revascularization)

- Coronary artery bypass grafts (CABG) deliver a new source of blood to regions of the heart served by blocked arteries. Surgeons use segments of the patient's own veins and arteries to go around, or bypass these blockages. If left untreated, severely blocked arteries may lead to heart attack or death. Coronary bypass operations are performed half a million times a year with an overall success rate of almost 98 percent.



# Nursing process

- Assessment
- The nurse should observe & ask the patient about:
  - When do attack tend to occur?
  - How does the patient describe the pain?
  - Is the onset of pain gradual or sudden
  - How long does it last?
  - Is the pain is steady?
  - Is the discomfort accompanied by other symptoms?
  - How many minutes after taking the nitroglycerin does the pain last?
- Full history
- Physical examination & clinical manifestation
- Interpretation of the finding of the diagnostic tests



# Nursing process (cont...)

## ■ Nursing diagnosis

Nursing diagnosis may include the following:

- **Chest** pain related to decreased O<sub>2</sub> supply to the heart muscle secondary to arterial stenosis
- **Anxiety** related to fear of death
- **Health** maintenance altered related to knowledge deficit about nature of the diseases and ways to avoid
- **High** risk for complications ( myocardial infarction) related to non adherence to the therapeutic regimen & non acceptance of necessary life- style changes

# Nursing process (cont...)

- Patient's goals: ( patient will)
  - Report pain free or pain is decreased
  - Report anxiety level is decreased
  - Understand nature of the disease & capable to avoid complications
  - Adhere to the therapeutic regimen
  - Accept the necessary of life-style changes

# Nursing process (cont...)

- Nursing intervention
  - Prevention of pain
  - Control of pain
  - Reduction of anxiety
  - Understanding of illness & ways to avoid complications
  - Adherence to the self care program

## health teaching of patient with angina

**Goal :** to improve the quality of life and promotion of health

- **Expected outcomes:**
- Patient prevents an episode of anginal pain
- Patient cope with an attack of anginal pain



# health teaching of patient with angina ( Cont...)

- patient prevents an episode of anginal pain
  - Uses moderation in all activities of life
  - Participates in normal daily program of activities that don't produce chest discomfort, shortness of breath& fatigue
  - Avoid exercises requiring sudden bursts of activity
  - Refrains from engaging in physical exercise for 2 hours after meals
  - Avoid activities that require heavy effort
  - Alternates activities with periods of rest

# health teaching of patient with angina ( Cont...)

- **Avoid** situations that are emotionally stressful
- **Maintain** proper weight
- **Avoid** excessive caffeine intake which can increase the heart rate& produce angina
- **Stop** smoking, since smoking increase the heart rate, blood pressure&blood carbon monoxide levels
- **Avoid** cold weather if possible
- **Walk** more slowly in cold weather
- **Avoid** walking against the wind

## health teaching of patient with angina ( Cont...)

- patient cope with an attack of anginal pain
- **Carries** nitroglycerin at all times
- **Places** nitroglycerin under the tongue (sublingually) at first sign chest discomfort. It relieves pain within 3 minutes.
- **Doesn't** swallow saliva until the tablet has dissolved
- **Stops** activities and be in rest until all pain subsides

## health teaching of patient with angina ( Cont...)

- **Keep** the upright position to potential the effect of nitroglycerin
- **Usually** another nitroglycerin tablet may be taken in 3-5 minutes if pain persist
- **If** the anginal discomfort is un relived or if it reoccurs after short interval, the patient must go to the nearest emergency facility
- **Takes** nitroglycerin prophylactically to avoid pain known to occur with certain activities (stair- climbing- sexual intercourse)
- **Be** alert for the side effects of nitroglycerin, headache, flushing& dizziness.





*Merci*