

The background of the slide features a human heart in a reddish-brown color, positioned centrally. A white pulse line, resembling an ECG, runs horizontally across the image, passing behind the heart. In the upper left, a hand is shown with fingers spread, as if feeling a pulse. The entire scene is set against a green grid background. On the far left, there is a decorative teal circular shape.

# **Coronary artery diseases**

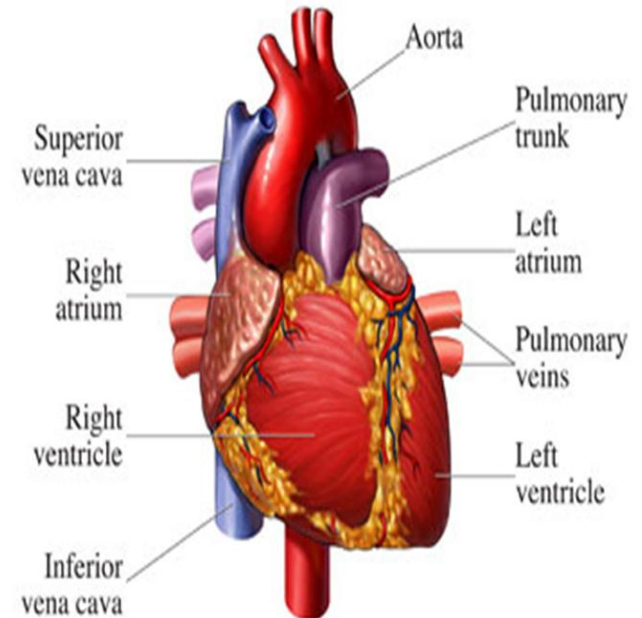
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Hasan**

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# Anatomy of the Heart

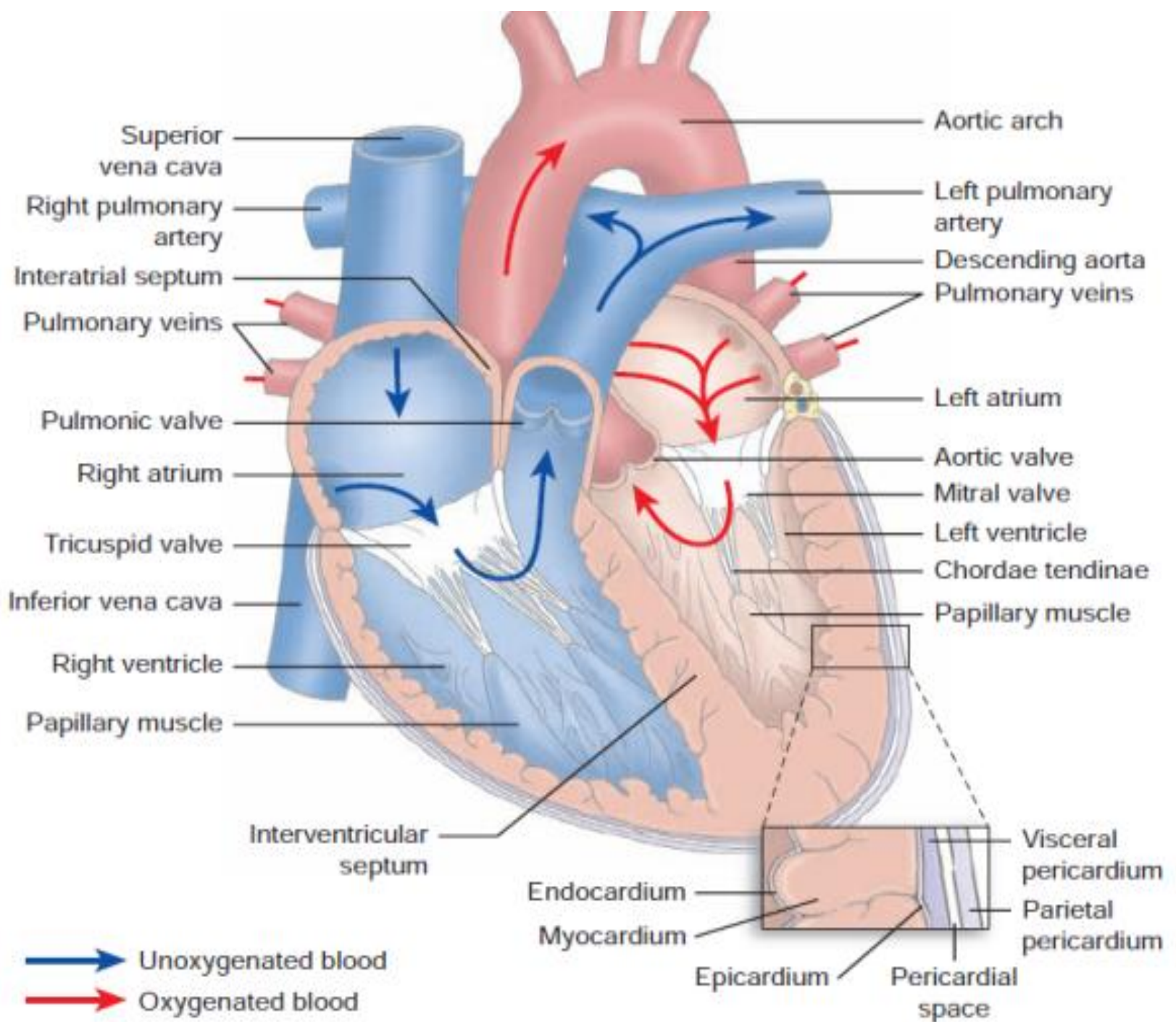
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- Heart is a hollow, muscular organ located in the center of thorax; it occupies the space between lungs (mediastinum) and rests on the diaphragm. It weighs approximately 300 g.



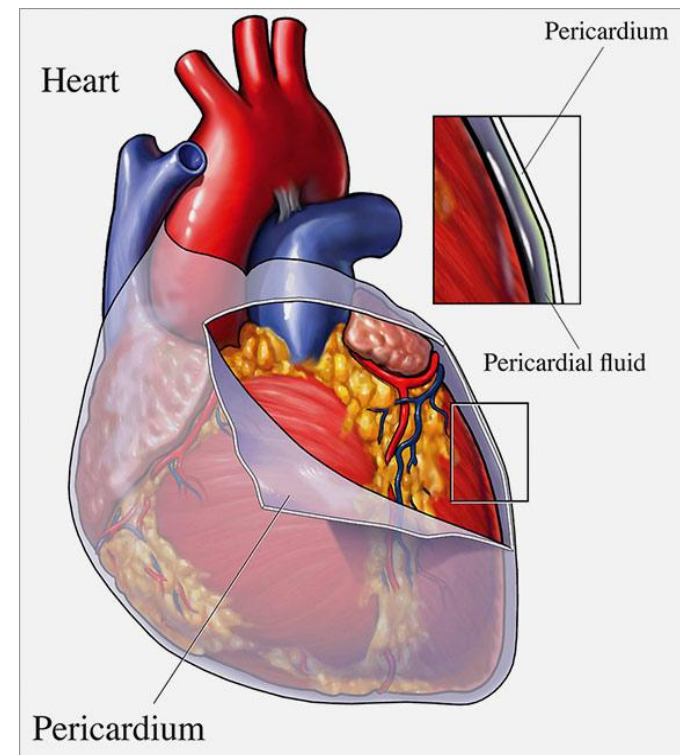
- Heart pumps blood to the tissues, supplying them with oxygen and other nutrients. The heart is composed of three layers. The inner layer (endocardium). The middle layer (myocardium), is made up of muscle fibers and is responsible for the pumping action. The exterior layer is called the (epicardium).



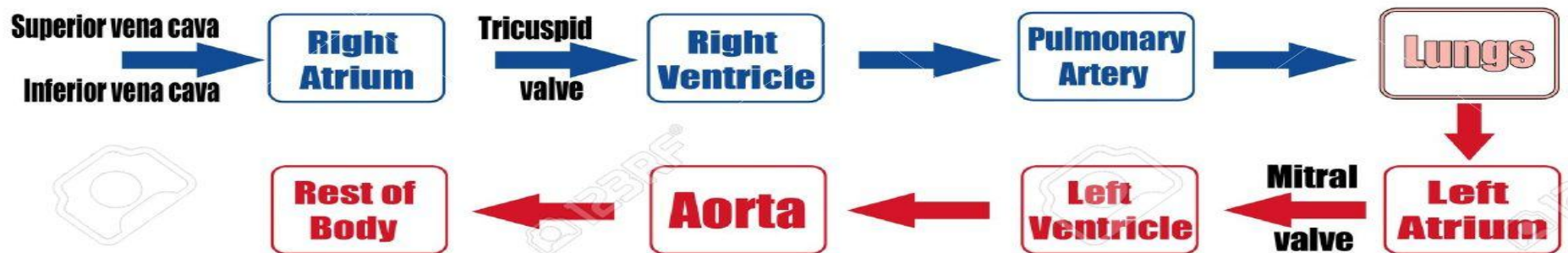
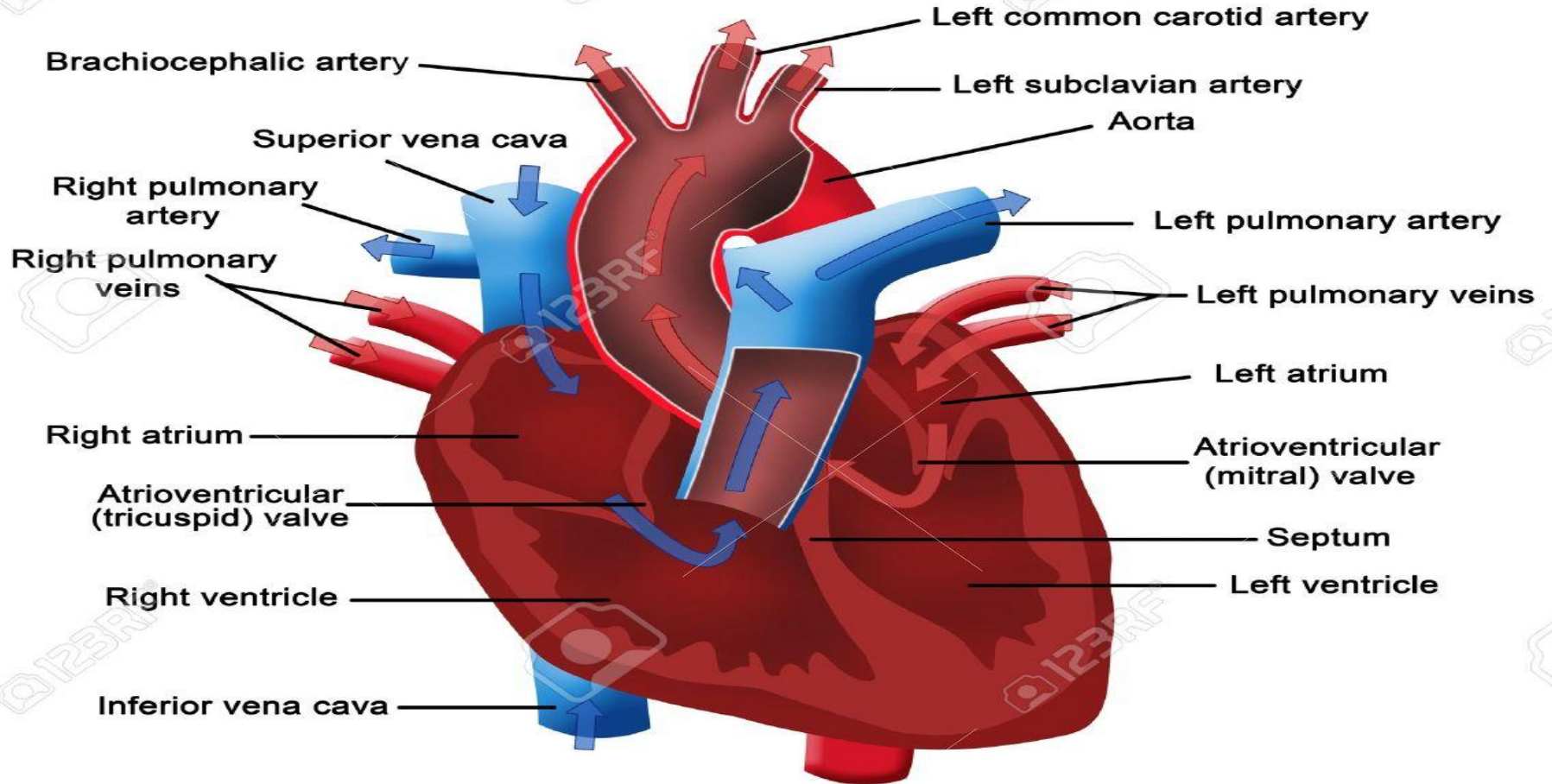




- Heart is encased in a thin, fibrous sac called pericardium, composed of two layers (visceral and parietal pericardium). The space between them (pericardial space) is normally filled with about 20 mL of fluid, which lubricates surface of heart and reduces friction during systole.



# CIRCULATION OF BLOOD THROUGH THE HEART



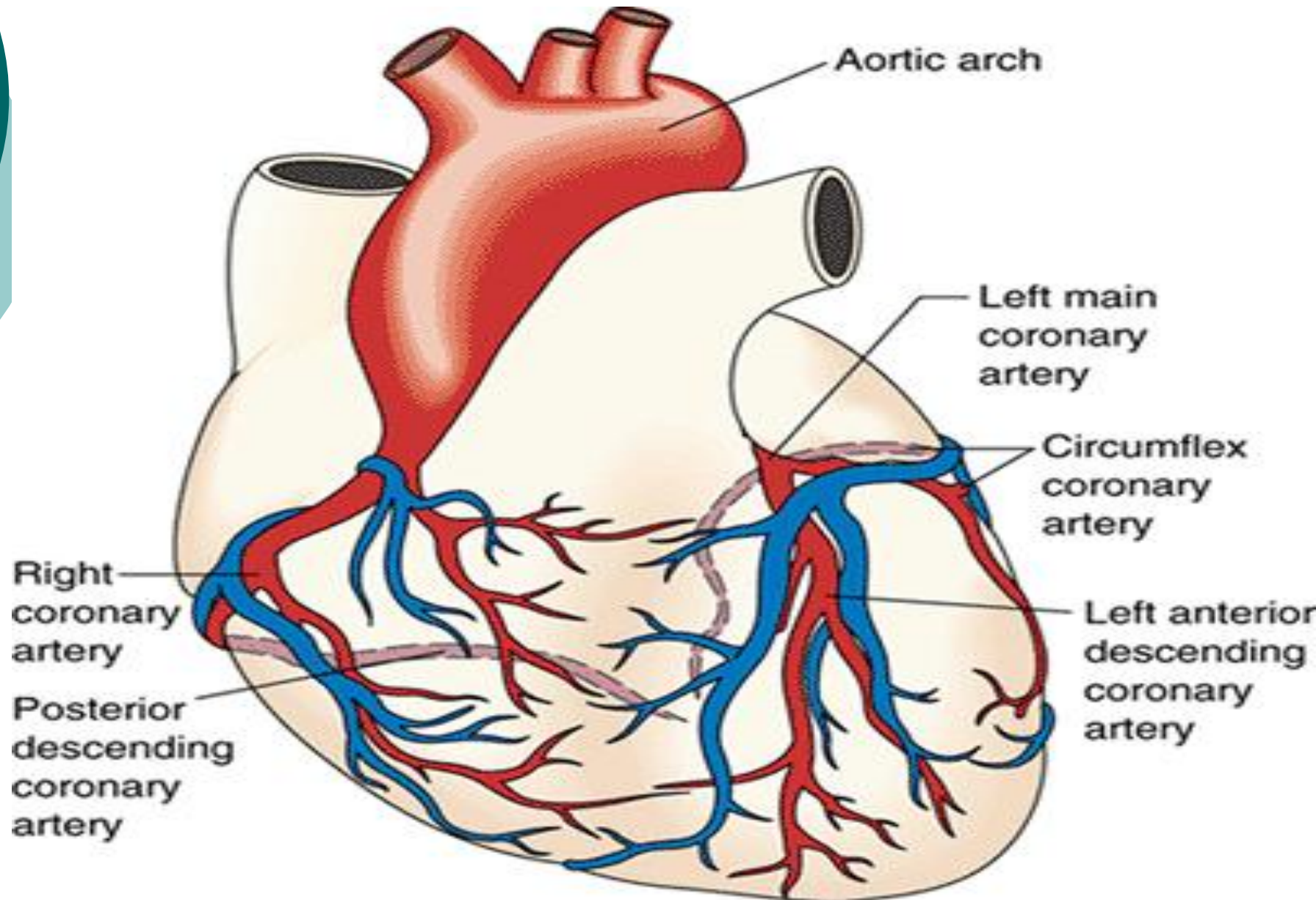


# Coronary Arteries

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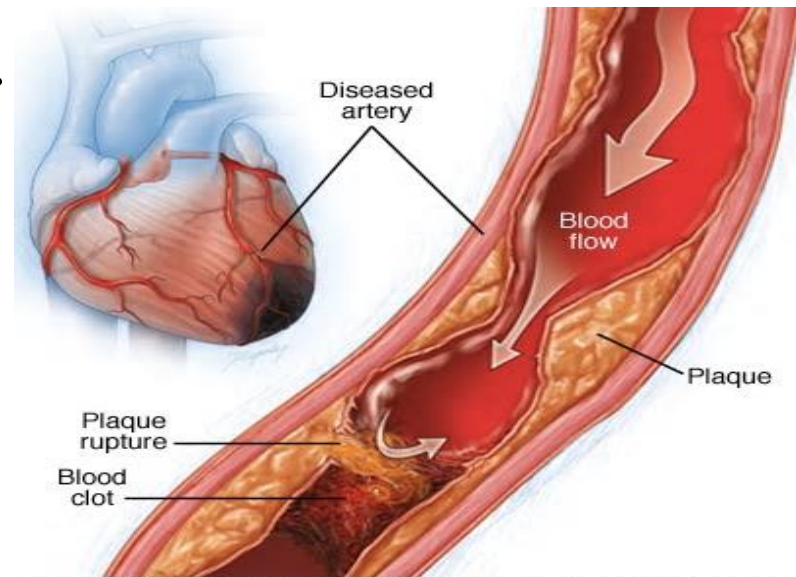
- The left and right coronary arteries and their branches supply arterial blood to the heart. They originate from the aorta just above the aortic valve. Heart has high metabolic requirements.
- Unlike other arteries, coronary arteries are perfused during diastole. With a normal heart rate of 60 to 80 b/m there is ample time during diastole for myocardial perfusion.

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





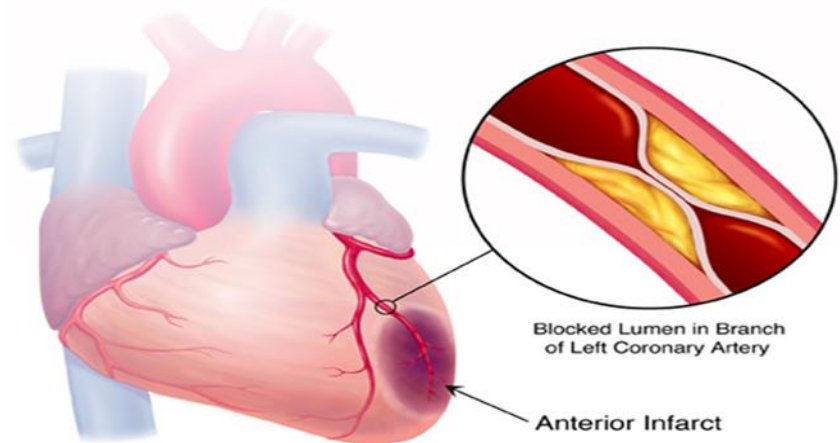
- As heart rate increases, diastolic time is shortened, which may not allow adequate time for myocardial perfusion. As a result, patients are at risk for myocardial ischemia (inadequate oxygen supply) during tachycardia (heart rate greater than 100), especially patients with CAD.



# Coronary artery diseases

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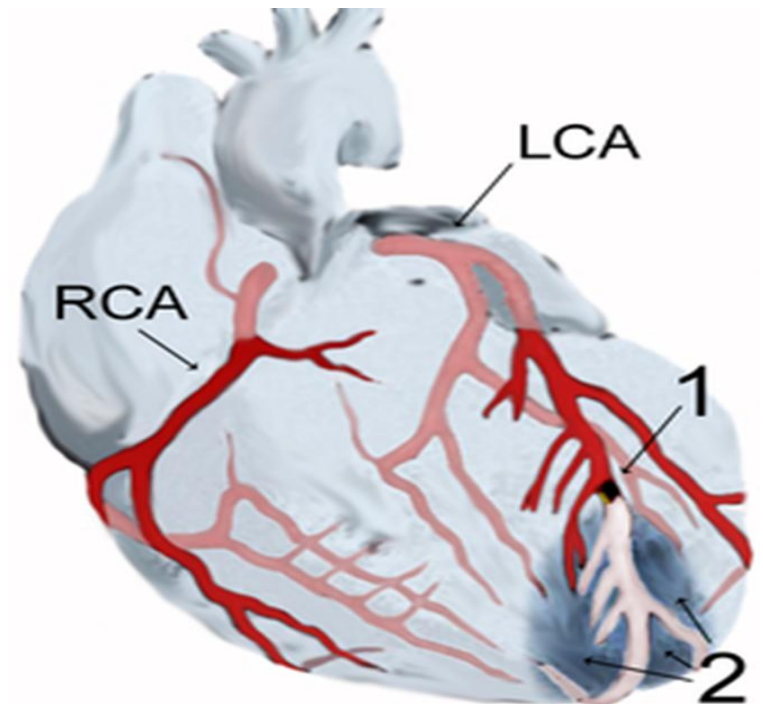
CAD is the most prevalent type of cardiovascular disease in adults. For this reason, it is important for nurses to become familiar with various manifestations of coronary artery conditions and methods for assessing, preventing, and treating these disorders.



# Coronary Atherosclerosis

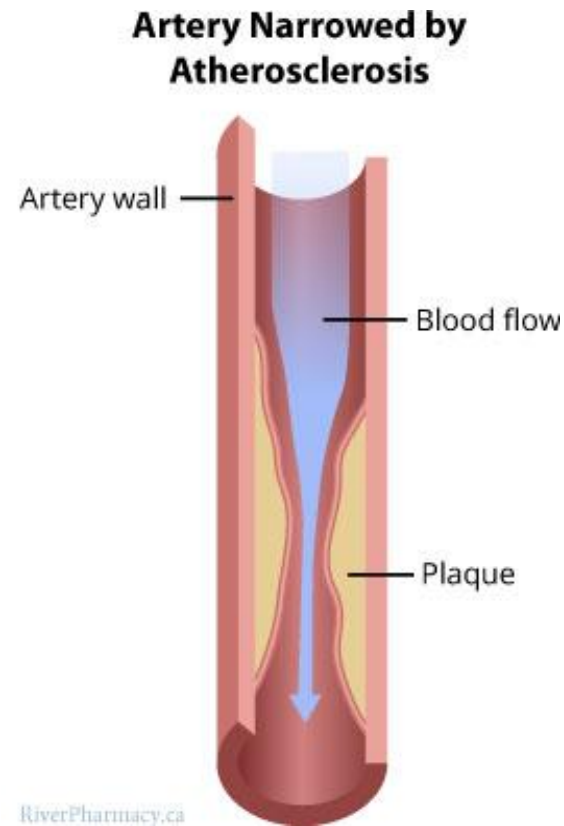
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- The most common cause of cardiovascular disease is atherosclerosis (abnormal accumulation of lipid, or fatty substances, and fibrous tissue in the lining of arterial blood vessel walls).



- These substances block and narrow the coronary vessels in a way that reduces blood flow to the myocardium.

- Atherosclerosis involves repetitious inflammatory response to injury of artery wall and subsequent alteration in the structural and biochemical properties of the arterial walls.







# Risk Factors for Coronary Artery Disease

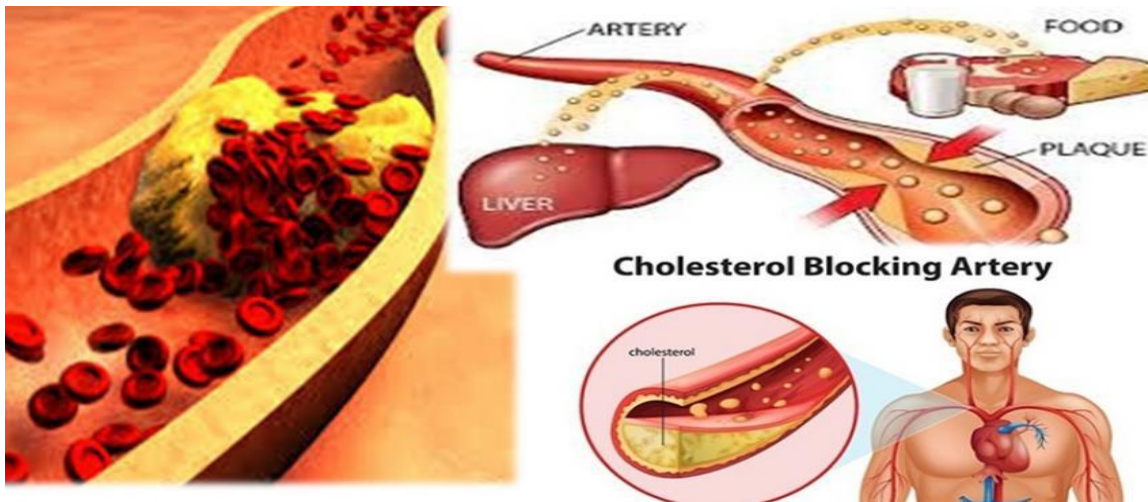
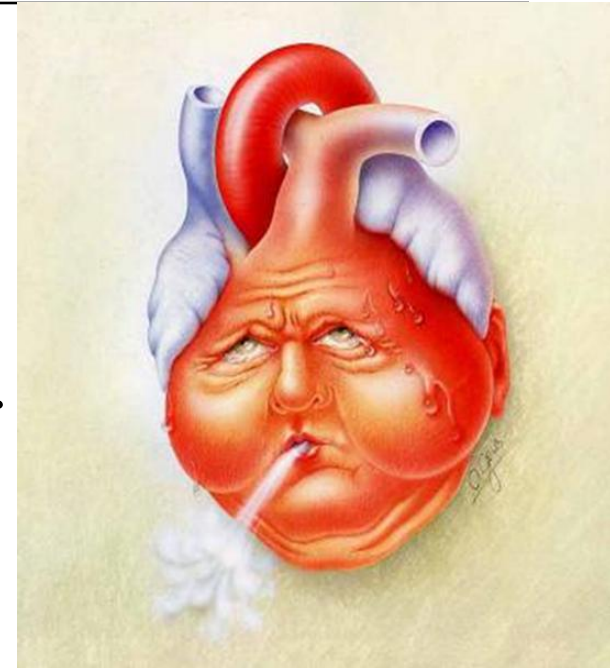
## Nonmodifiable Risk Factors

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- Family history of CAD
- Increasing age (more than 45 for men; more than 55 years for women)
- Gender (men develop CAD at earlier age than women)
- Race (higher incidence in African Americans)

# Modifiable Risk Factors

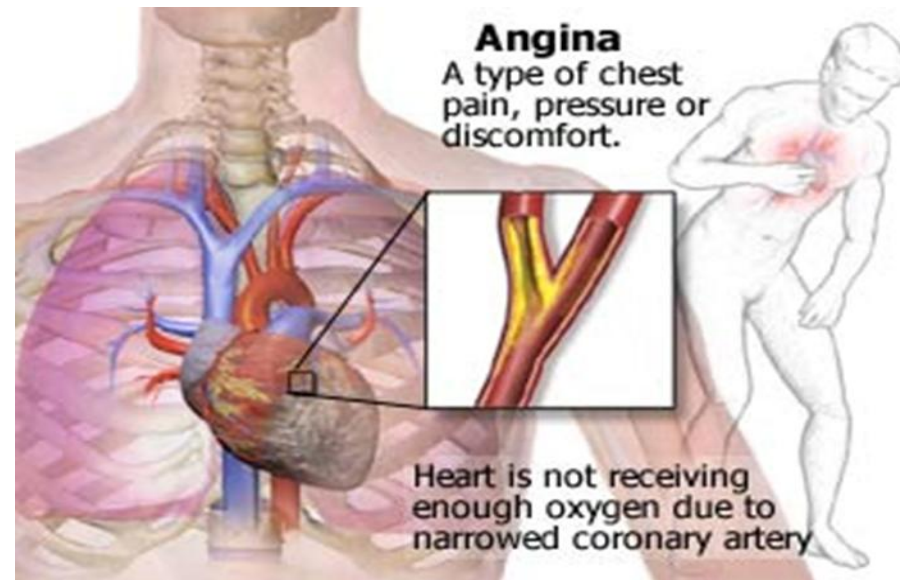
- Hyperlipidemia.
- Cigarette smoking & tobacco use.
- Hypertension & Diabetes mellitus.
- Obesity and physical inactivity



# *Angina Pectoris*

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Angina pectoris is a clinical syndrome usually characterized by episodes of pain or pressure in the anterior chest caused by insufficient coronary blood flow resulting in the need for oxygen exceeds the supply.






## *Factors associated with anginal pain:*

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- 1) Physical exertion, precipitate attack by increasing myocardial oxygen demand.
- 2) Exposure to cold, cause vasoconstriction and elevated blood pressure, with increased oxygen demand.




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- 3) Eating a heavy meal, increases blood flow to the mesenteric area for digestion, so reducing blood supply available to the heart muscle.
  - 4) Stress or any emotional situation, causing the release of catecholamines, which increases blood pressure, heart rate, and myocardial workload



## *Types of Angina*

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- **Silent ischemia:** objective evidence of ischemia (such as ECG changes) but patient reports no pain.
- **Stable angina:** predictable and consistent pain that occurs on exertion and is relieved by rest and/or nitroglycerin

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- . **Intractable or refractory angina:** severe incapacitating chest pain
  - . **Variant angina:** pain at rest caused by coronary artery vasospasm.
  - . **Unstable angina** (preinfarction angina): symptoms increase in frequency and severity; may not be relieved with rest or nitroglycerin.



## *Clinical Manifestations*

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- . Chest pain, vary from mild indigestion to choking or heavy sensation in upper chest.
- . Pain is poorly localized and may radiate to neck, jaw, shoulders, and inner aspects of upper arms (left arm).
- . A feeling of weakness or numbness in the arms, wrists, and hands, as well as shortness of breath, pallor, diaphoresis, dizziness, and nausea and vomiting.



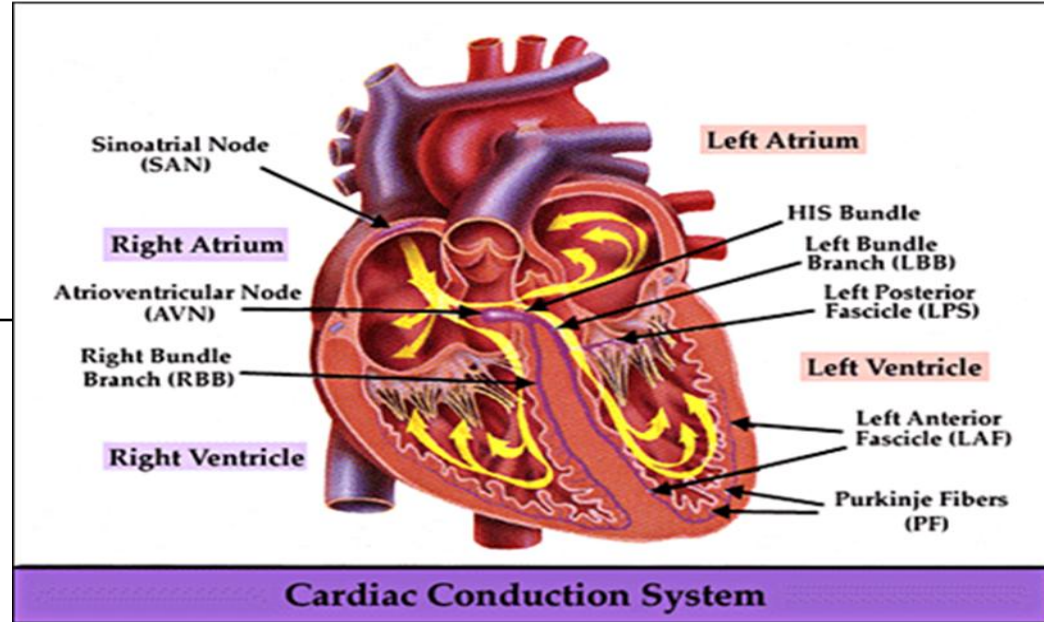


# *Medical Management*

## *Pharmacologic Therapy*

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- . **Nitroglycerin:** A vasoactive agent (reduce myocardial oxygen consumption, which decreases ischemia and relieves pain).
- . **Beta-Adrenergic Blocking Agents:** as metoprolol and atenolol reduce myocardial oxygen consumption by blocking beta-adrenergic sympathetic stimulation to the heart.



- **Calcium Channel Blocking Agents** decrease sinoatrial node automaticity and atrioventricular node conduction, resulting in a slower heart rate.
- **Antiplatelet and Anticoagulant Medications** prevent platelet aggregation and subsequent thrombosis, which impedes blood flow.

## *Oxygen Administration*

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is usually initiated at the onset of chest pain to increase amount of oxygen delivered to the myocardium and to decrease pain.

Nurse observes the rate and rhythm of respirations, blood oxygen saturation.

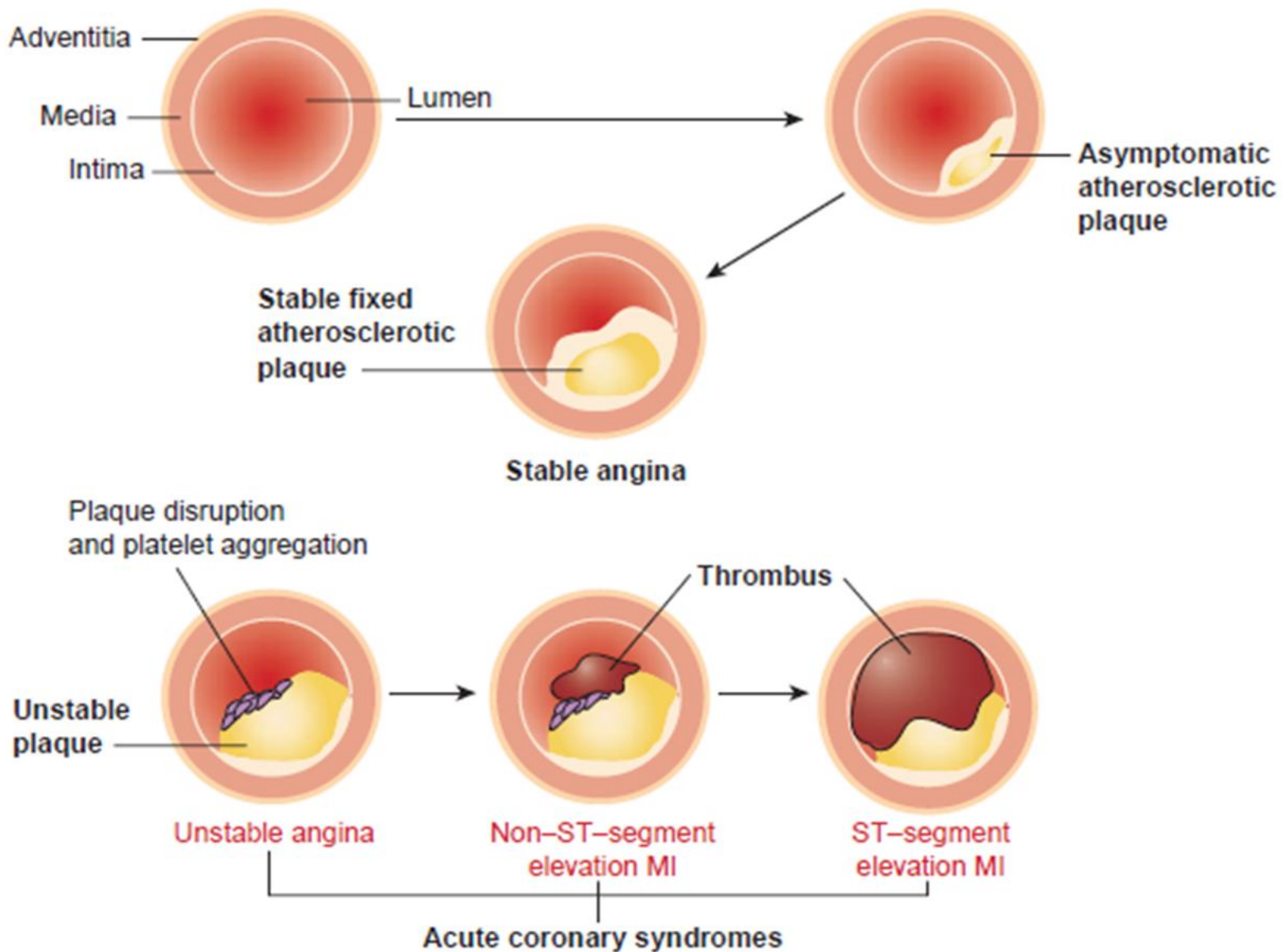




## *Acute Coronary Syndrome and Myocardial Infarction*

ACS is an emergent situation characterized by an acute onset of myocardial ischemia that results in myocardial death, if definitive interventions do not occur promptly. (It's termed coronary occlusion, heart attack, and MI)





## *Clinical Manifestations*

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- Chest pain ( occurs suddenly & continues despite rest)
- Shortness of breath, indigestion, nausea, and anxiety.
- Cool, pale, and moist skin.
- HR & RR may be faster (caused by stimulation of sympathetic nervous system).



## *Early management:*

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- ✚ Patient's history and 12-lead ECG are the primary methods used to determine the diagnosis of MI.
- ✚ Administer aspirin, 160 to 325 mg chewed.
- ✚ After recording initial 12-lead ECG, place the patient on a cardiac monitor and obtain serial ECGs.

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- ✚ Administer sublingual nitroglycerin.
  - ✚ Provide adequate analgesia with morphine sulfate.
  - ✚ Give oxygen by nasal cannula.
  - ✚ Intravenous heparin or low-molecular-weight heparin.
  - ✚ Bed rest for a minimum of 12 to 24 hours



## *Intensive and intermediate care management*

- ✚ IV nitroglycerin is continued for 24 to 48 hours.
- ✚ Daily aspirin is continued.
- ✚ IV beta blocker therapy should be administered within the initial hours of the evolving infarction, followed by oral therapy.

# *Nursing care plan for patient with acute coronary syndrome*

## **Assessment**

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Systematic assessment includes careful history, particularly as it relates to symptoms: chest pain or discomfort, dyspnea, palpitations, unusual fatigue, faintness, or sweating.

**HEART PALPITATIONS**







## *Nursing Diagnoses*

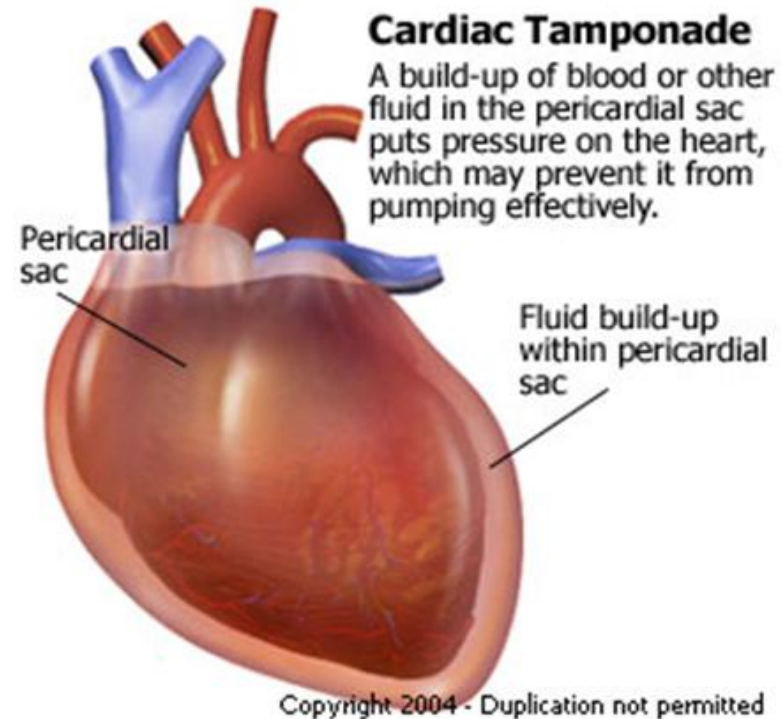
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- Ineffective cardiac tissue perfusion related to reduced coronary blood flow
- Risk for imbalanced fluid volume related to inadequate intake.
- Risk for ineffective peripheral tissue perfusion related to decreased cardiac output from left ventricular dysfunction
- Anxiety related to cardiac event
- Deficient knowledge about post-ACS self-care

## *Collaborative Problems/Potential Complications*

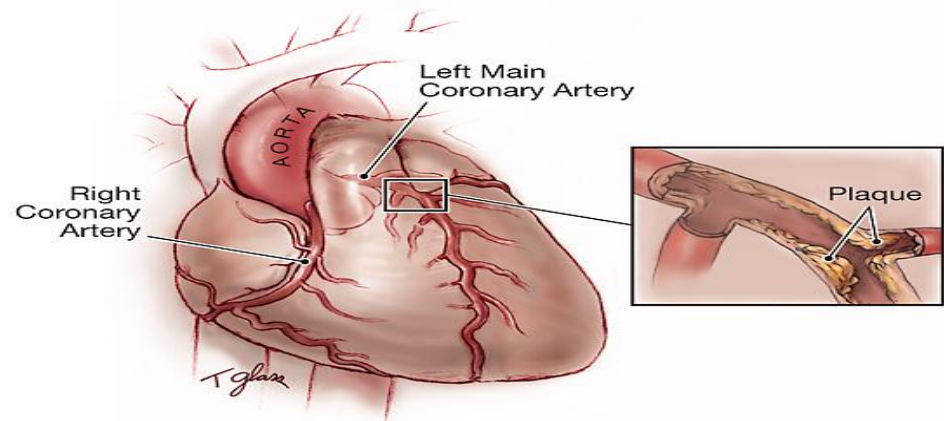
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- Acute pulmonary edema
- Heart failure
- Cardiogenic shock
- Dysrhythmias
- Cardiac arrest
- Pericardial effusion and cardiac tamponade



# Prevention of CAD

Four modifiable risk factors—cholesterol abnormalities, tobacco use, hypertension, and diabetes mellitus—have been cited as major risk factors for CAD and its complications. As a result, they receive much attention in health promotion programs.





## ➤ *Controlling Cholesterol Abnormalities*

The metabolism of fats is an important contributor to the development of heart disease. Elevated triglyceride level (more than 200 mg/dL) may be genetic in origin; it also can be caused by obesity, high-carbohydrate diets, physical inactivity, and certain medications, such as oral contraceptives and corticosteroids.



## *1. Dietary Measures*

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- Therapeutic Lifestyle Changes (TLC) diet is a diet low in saturated fat and high in soluble fiber (fresh fruit, cereal grains, vegetables, and legumes).
- Other TLC recommendations include weight loss, cessation of tobacco use, and increased physical activity.
- People who adopt strict vegetarian diets can significantly reduce blood lipids, blood glucose, body mass index, and blood pressure.

## 2. *Physical Activity*

- Regular, moderate physical activity reduces triglyceride levels, incidence of coronary events and reducing overall mortality risk.
- Nurse helps patients set realistic goals for physical activity. For example, inactive patients can start with activity that lasts 3 minutes.





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- Patients should stop any activity if chest pain, unusual shortness of breath, dizziness, lightheadedness, or nausea occurs.
  - Monitor pulse rate during physical activity.
  - Avoid physical exercise immediately after a meal.
  - Alternate activity with rest periods.

### 3. *Medications*

- If diet alone cannot normalize serum cholesterol levels, Lipid-lowering medications can reduce CAD mortality.



## ➤ *Promoting Cessation of Tobacco Use*

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- . A person at increased risk for heart disease is encouraged to stop tobacco use through any means possible: educational programs, counseling, consistent motivation, support groups, and medications.



## ➤ *Managing Hypertension*

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- . Long-standing elevated blood pressure may result in increased stiffness of the vessel walls, leading to vessel injury and a resulting inflammatory response.
- . Early detection of high blood pressure and adherence to a therapeutic regimen can prevent the serious consequences associated with untreated elevated blood pressure.

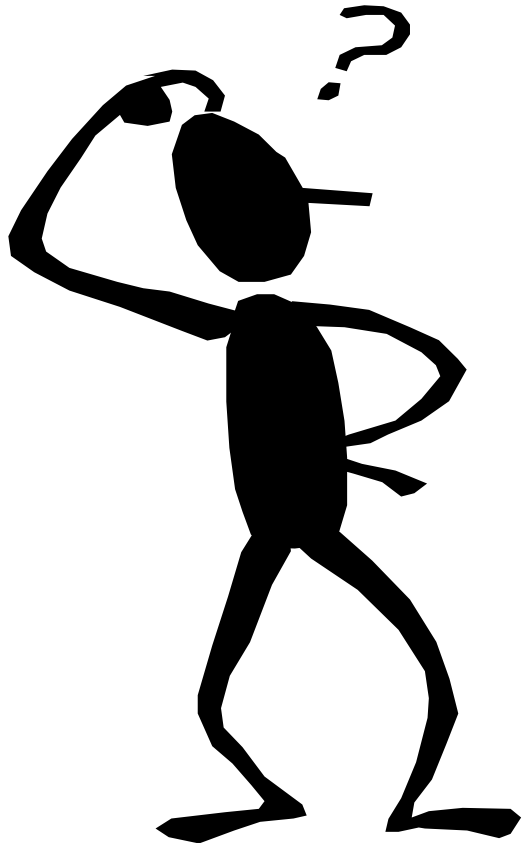


## ➤ *Controlling Diabetes Mellitus*

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- Diabetes mellitus is known to accelerate development of heart disease, and for 65% to 75% of patients with diabetes, cardiovascular disease is identified as the cause of death.
- Hyperglycemia fosters increased platelet aggregation, and altered red blood cell function, which can lead to thrombus formation.

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- . Treatment with insulin (eg, Humulin, Novolin) and metformin (Glucophage) and other therapeutic interventions that lower plasma glucose levels can lead to improved endothelial function and patient outcomes.



**Any question**