

A 3D rendering of a human heart, primarily yellow and orange, set against a dark blue background. The heart is surrounded by a network of glowing red and orange lines representing blood vessels. The overall effect is a glowing, ethereal representation of the heart.

Coronary Vascular Disorders

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<http://www.youtube.com/AtYourService>

ISCHEMIC HEART DISEASES

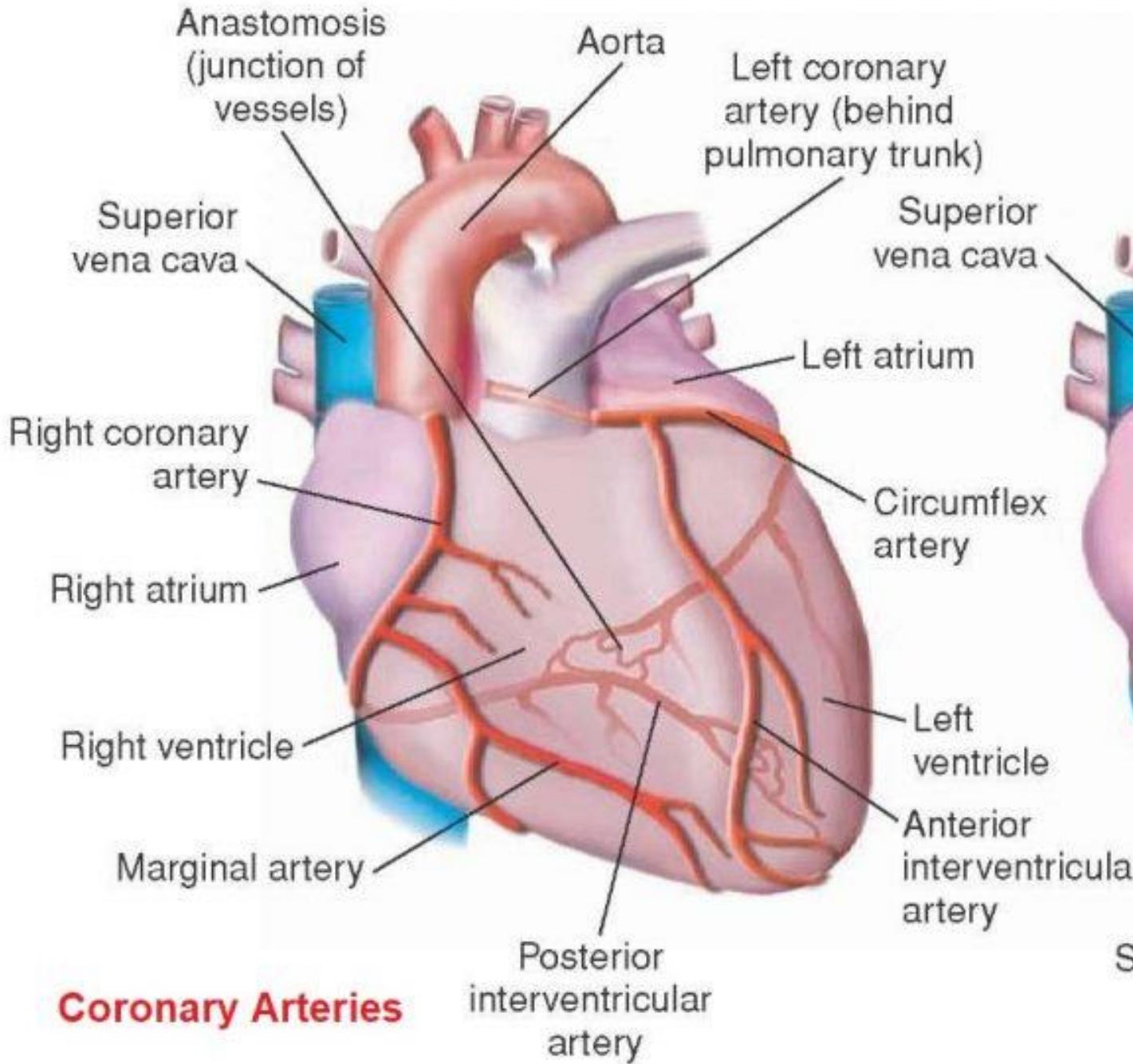
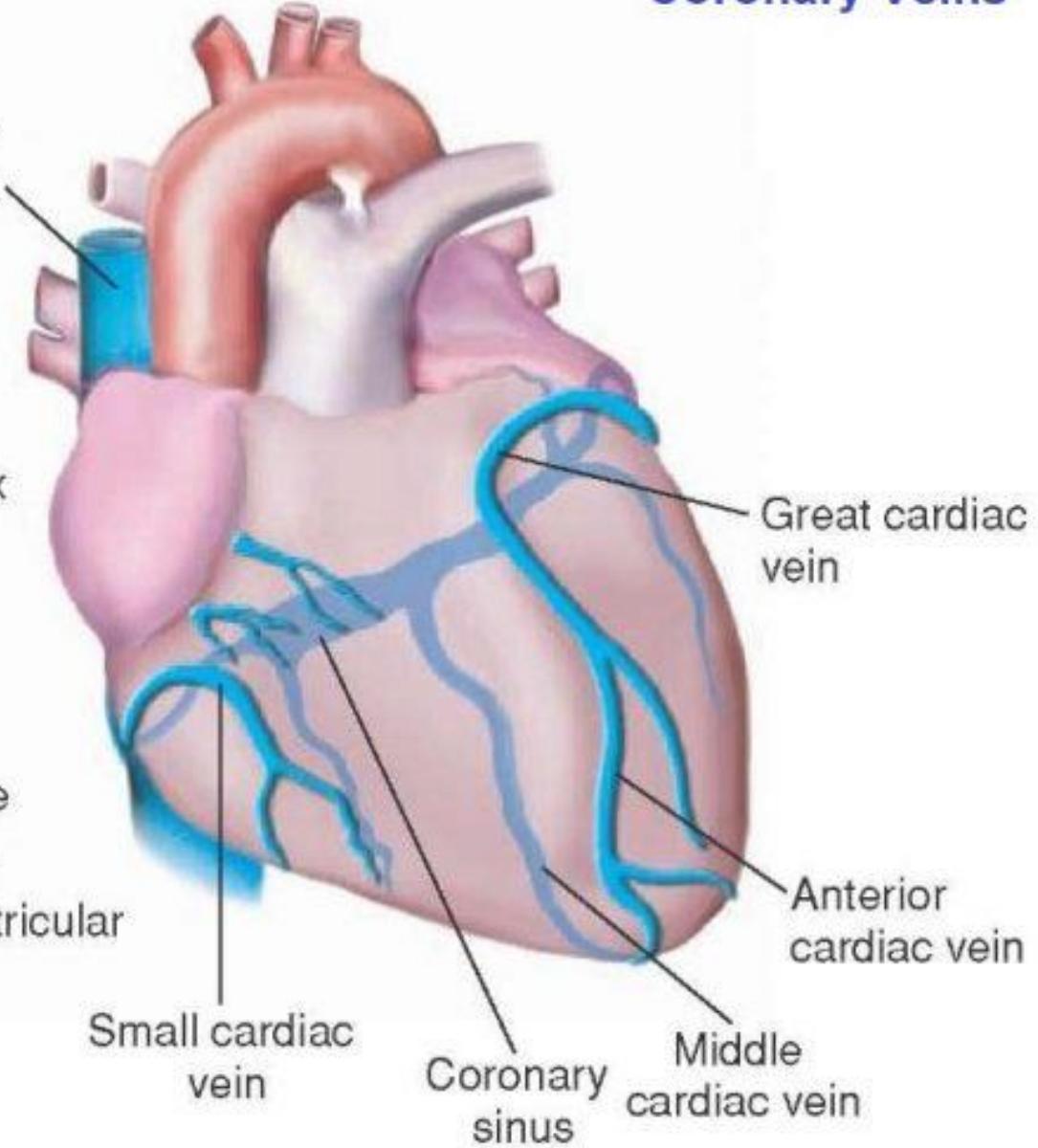
CORONARY ARTERY DISEASE (CAD)

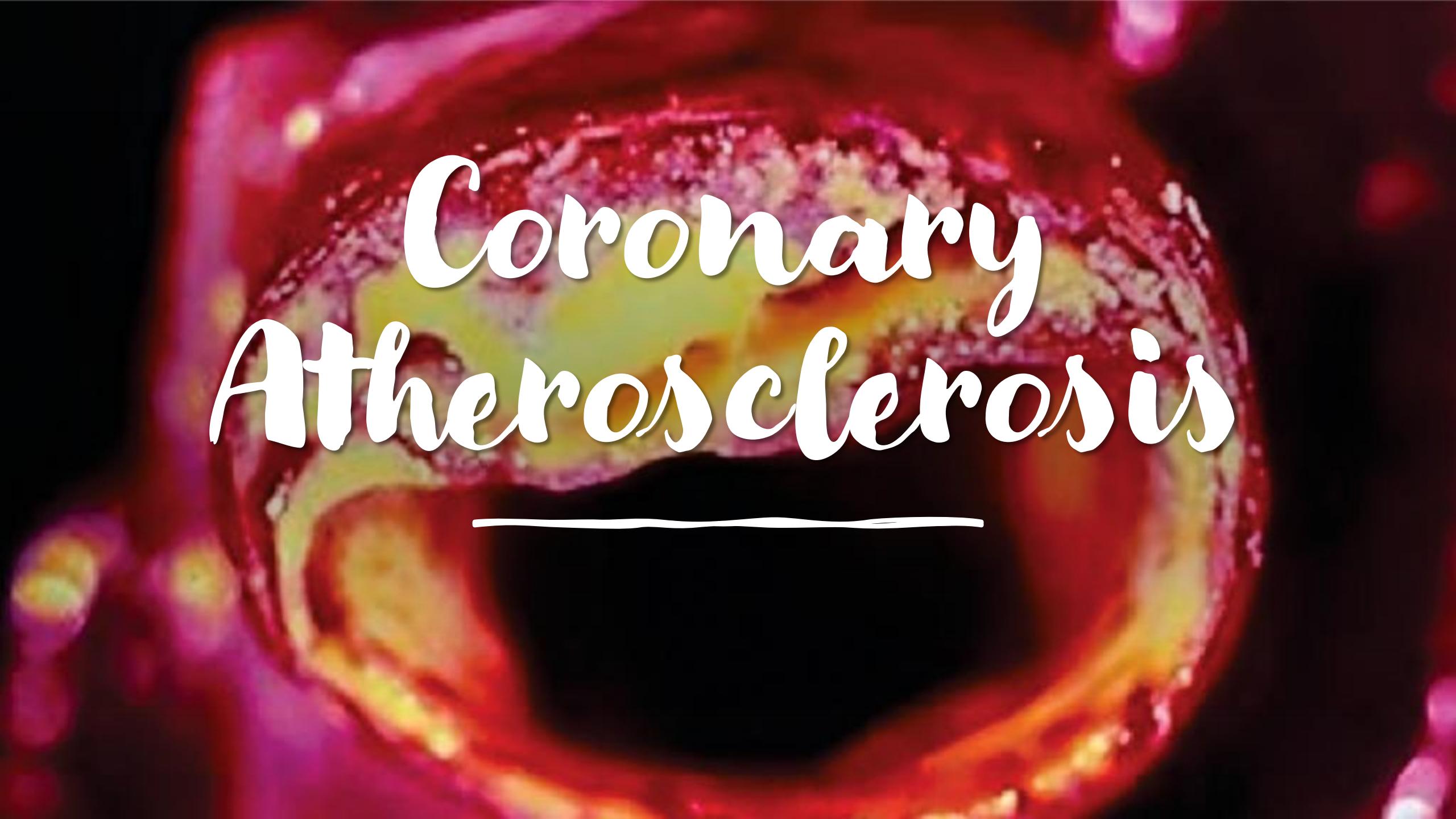
- Coronary Atherosclerosis
- Stable Angina

ACUTE CORONARY SYNDROME (ACS)

- Unstable Angina
- Non ST segment Elevation Myocardial Infarction (NSTEMI)
- STEMI

Coronary Veins

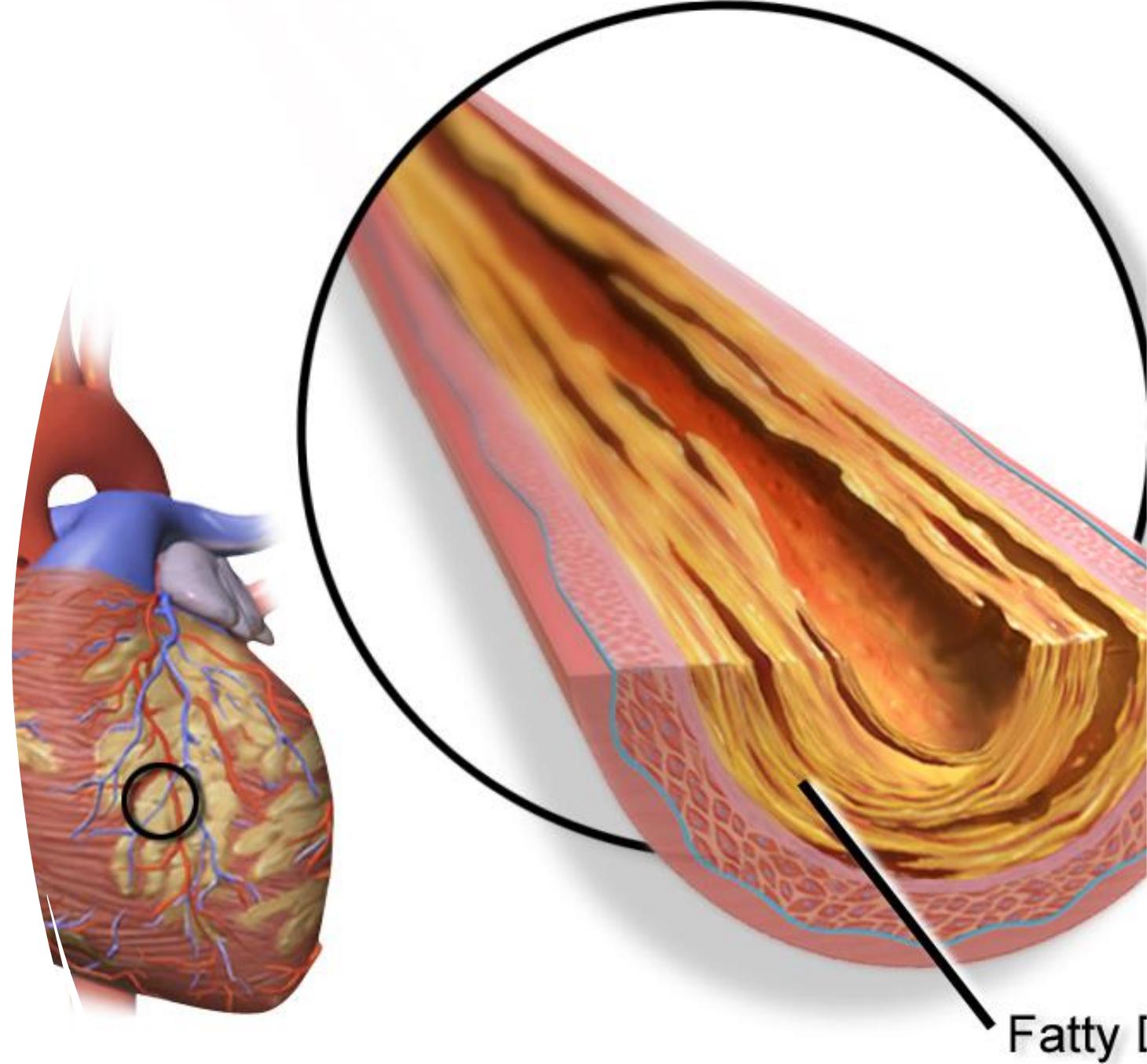




Coronary Atherosclerosis

Coronary Atherosclerosis

- abnormal **accumulation** of lipid, or fatty substances, and fibrous tissue in the lining of coronary arterial walls resulting to **reduction of blood flow** to the myocardium

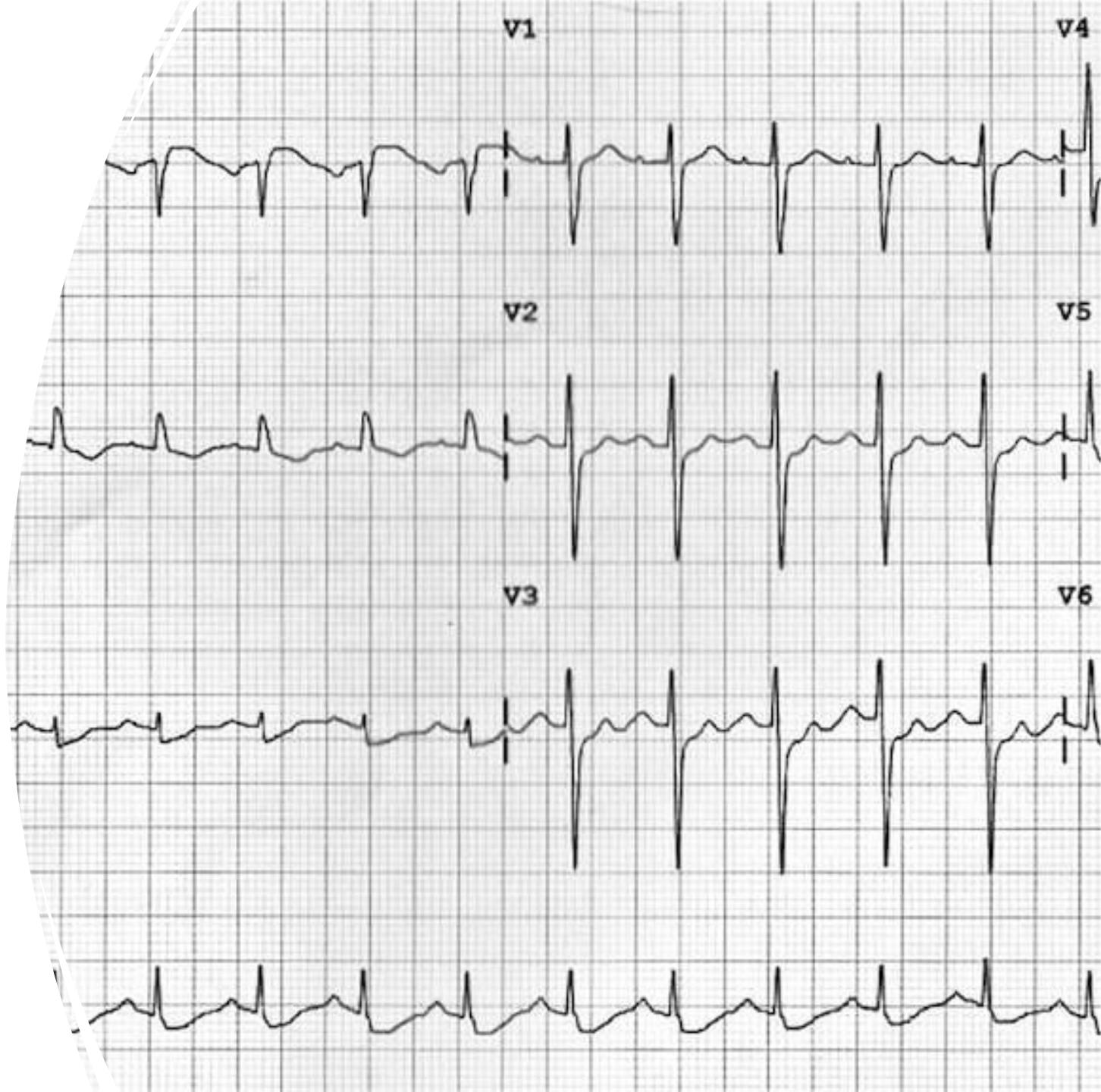


PATHOPHYSIOLOGY

- See diagram

DIAGNOSTICS

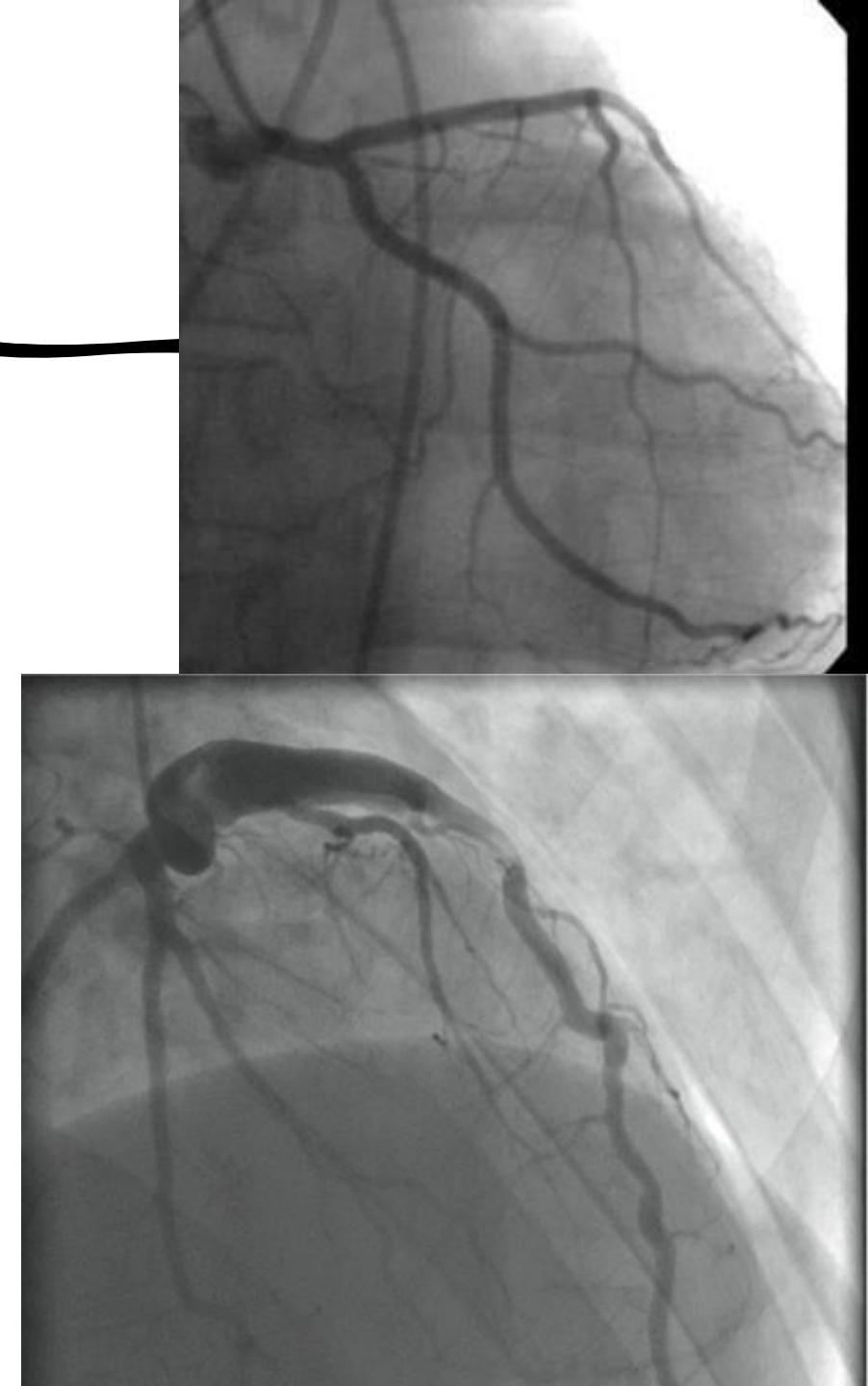
- **Electrocardiography**
- **Ischemia:** ST-segment depression, T-wave inversion, or both is noted
- **Infarction:** ST segment elevation, followed by T wave inversion and an abnormal Q wave.

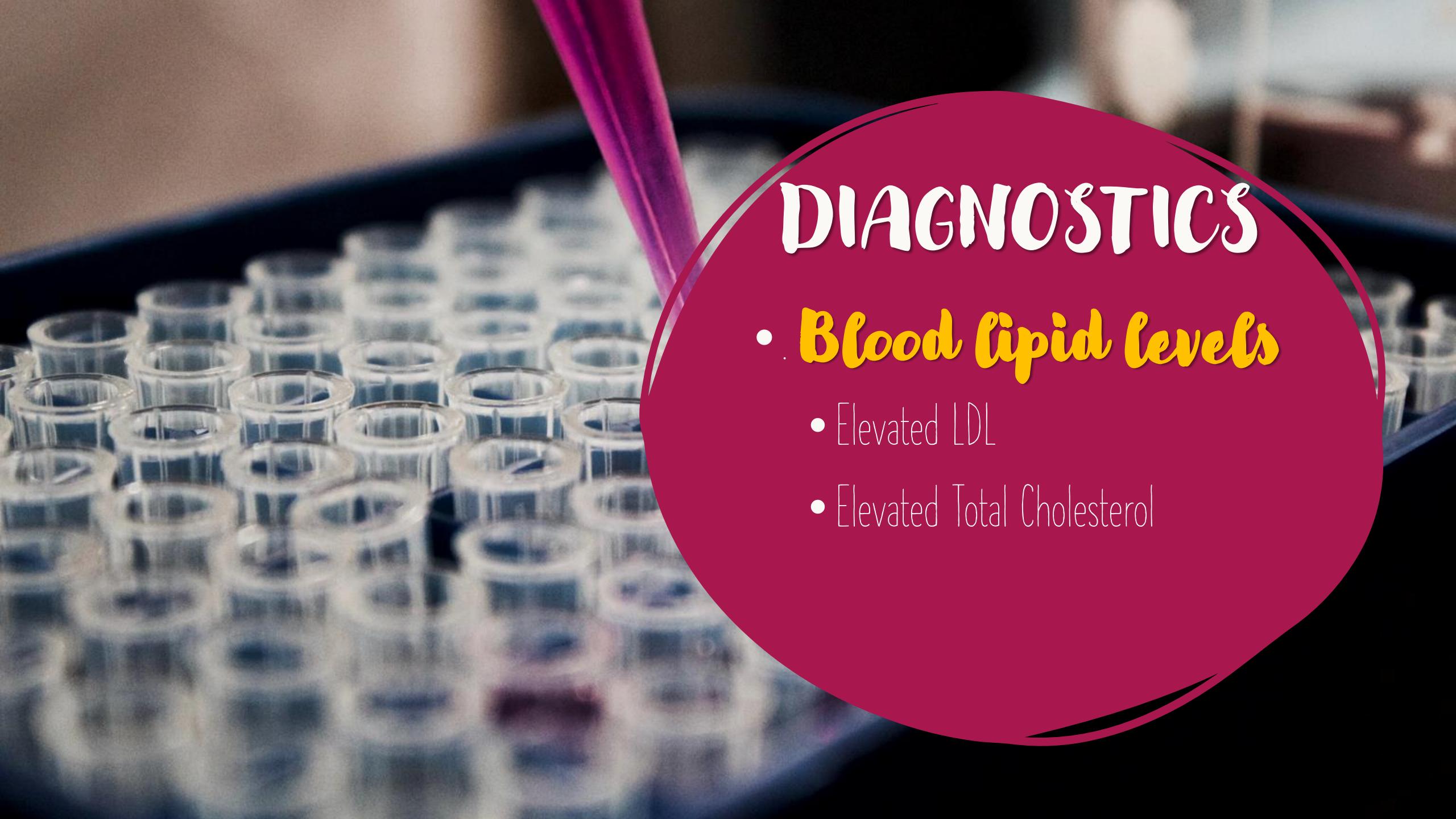


DIAGNOSTICS

Cardiac catheterization

- **most definitive source** for diagnosis.
- shows the presence of atherosclerotic lesions





DIAGNOSTICS

- **Blood lipid levels**
 - Elevated LDL
 - Elevated Total Cholesterol

Management



MEDICAL



PHARMACOLOGICAL



NURSING

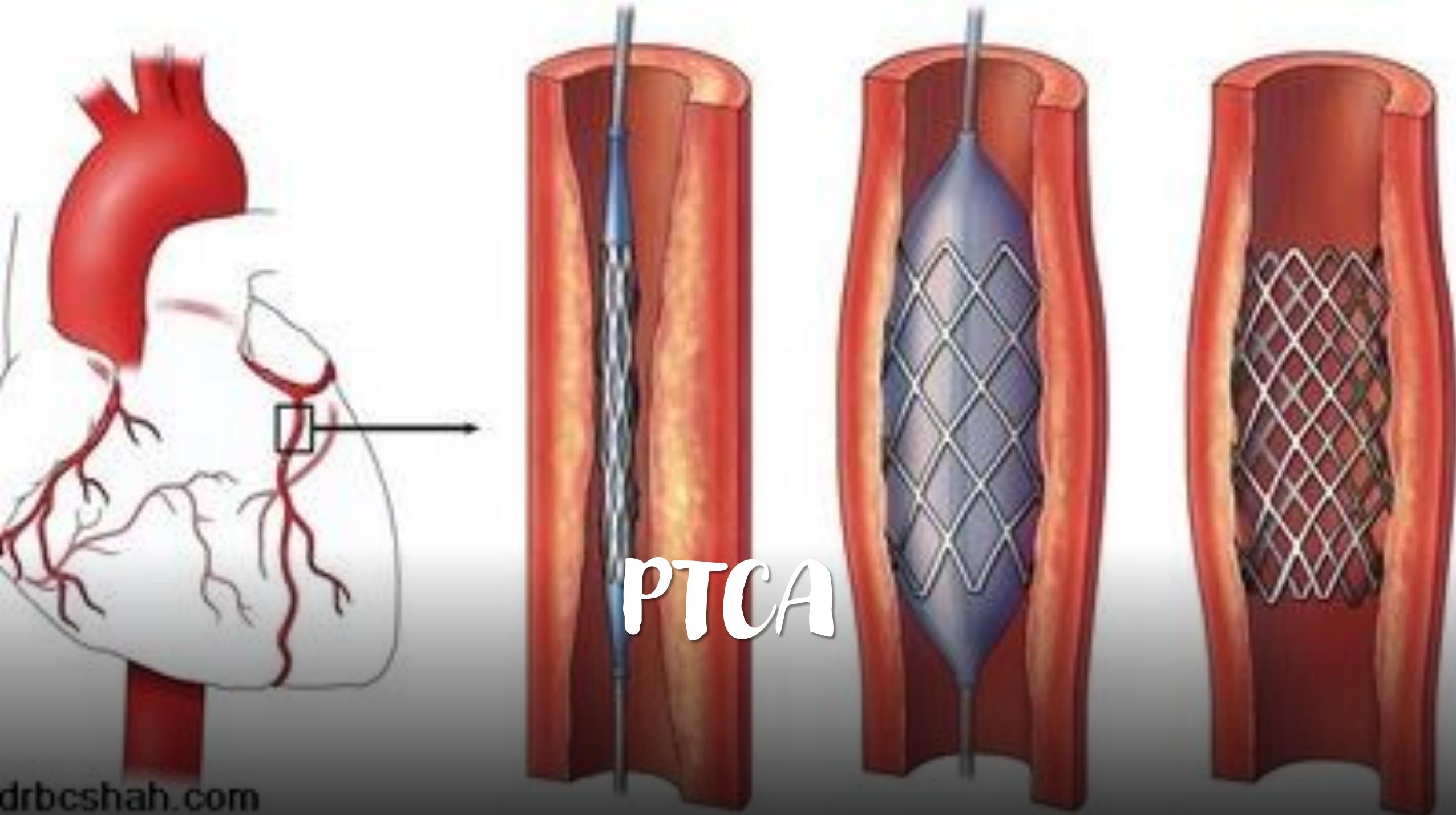


Medical Management

- GOAL: decrease myocardial O₂ demand, increase O₂ supply
 - Oxygen supplementation
 - Coronary revascularization
 - Percutaneous Coronary Intervention (PCI)
 - Coronary Artery Bypass Graft (CABG)

Medical Management

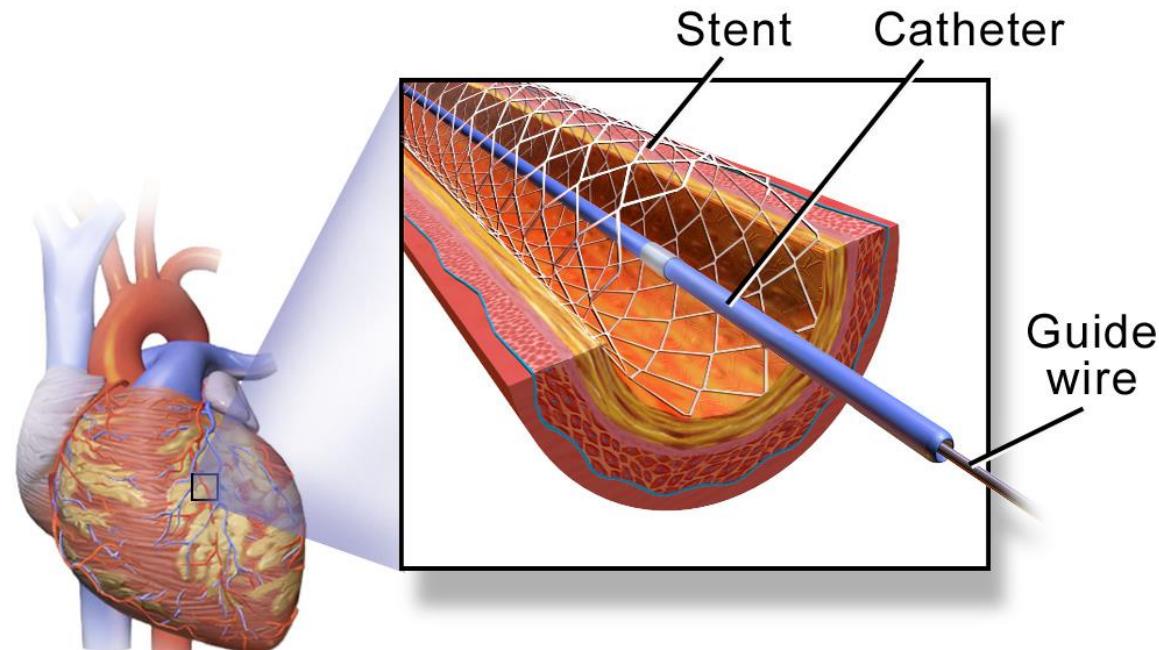
- PCI
 - percutaneous transluminal coronary angioplasty [PTCA]
 - intracoronary stents
 - atherectomy
- CABG



PTCA

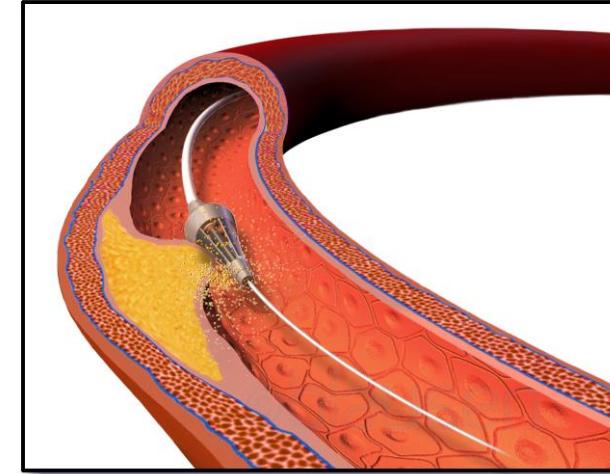
Intracoronary Stent

Stent in Coronary Artery

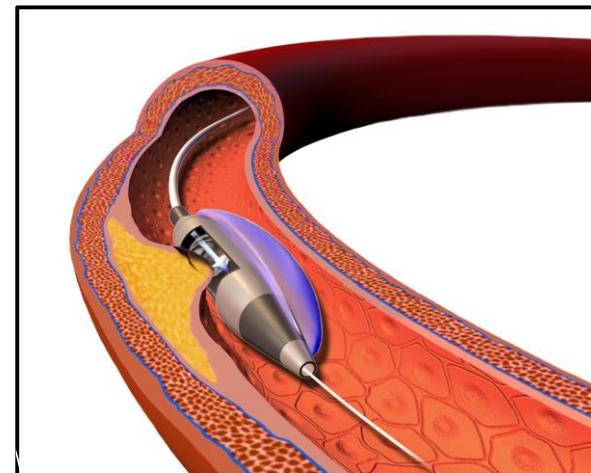


Atherectomy

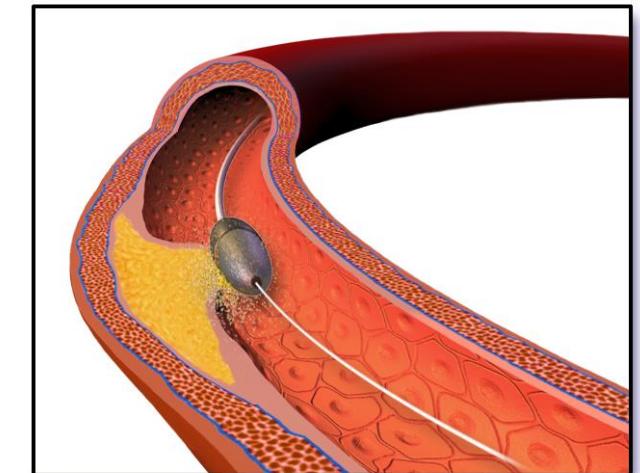
Transluminal Catheter



Directional

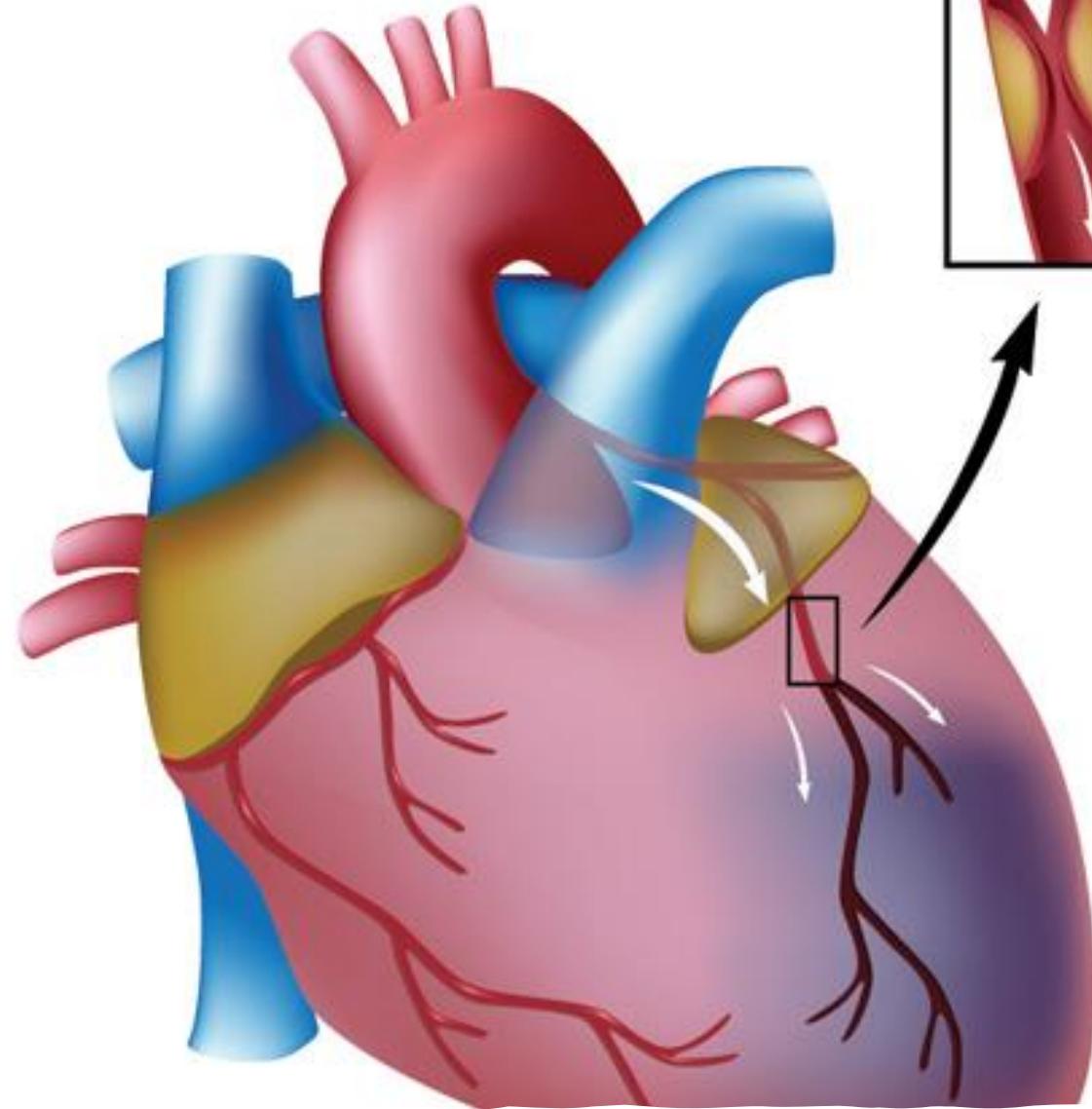
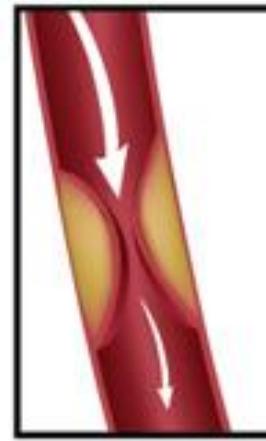


Rotational

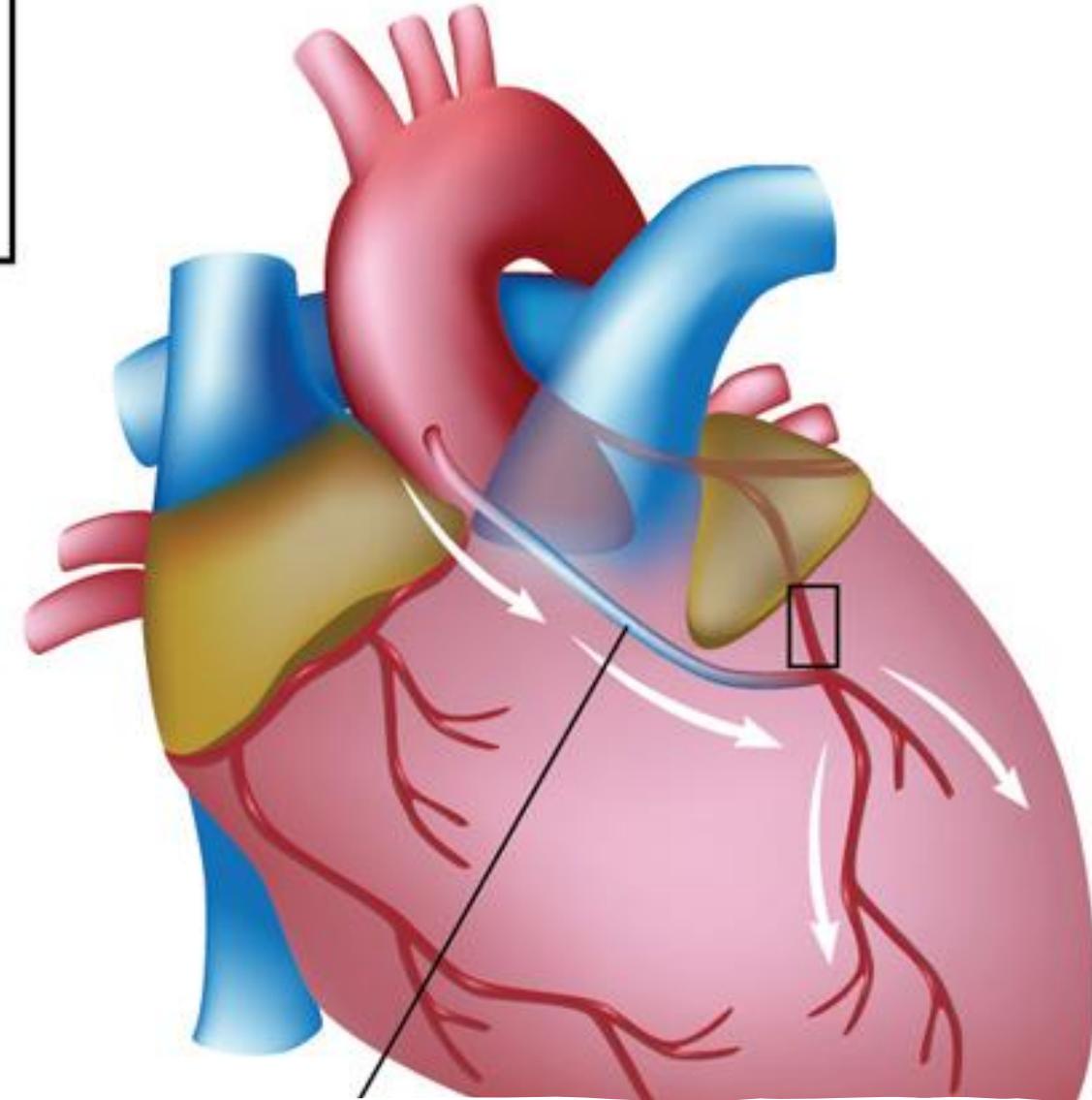


Types of Atherectomy

before



after





Pharmacological Management

- GOAL: Control Dyslipidemia

1. Antilipidemics

- Atorvastatin
- Rosuvastatin
- Simvastatin

2. Omega-3 Acid Esters

- Fish oil

Pharmacological Management

- **GOAL:** control DM

- Insulin
- Metformin



A vibrant collage of various healthy foods, including green beans, dried goji berries, blueberries, a pomegranate, broccoli, an apple, an avocado, cherries, a kiwi, a beetroot, a bowl of chia seeds, lentils, pistachios, and ginger, arranged on a dark surface.

Nursing Management

- Diet adjustment
 - Mediterranean diet
 - Strict Vegetarian
 - High fiber

A photograph of two women jogging on a paved path in a park. The woman in the foreground is smiling and wearing a pink headband, a white cardigan over a striped shirt, and blue leggings. The woman in the background is wearing a grey headband and blue jeans. The background is filled with green trees.

Nursing Management

- Physical activity adjustment
 - Weight reduction
 - Increased physical activity

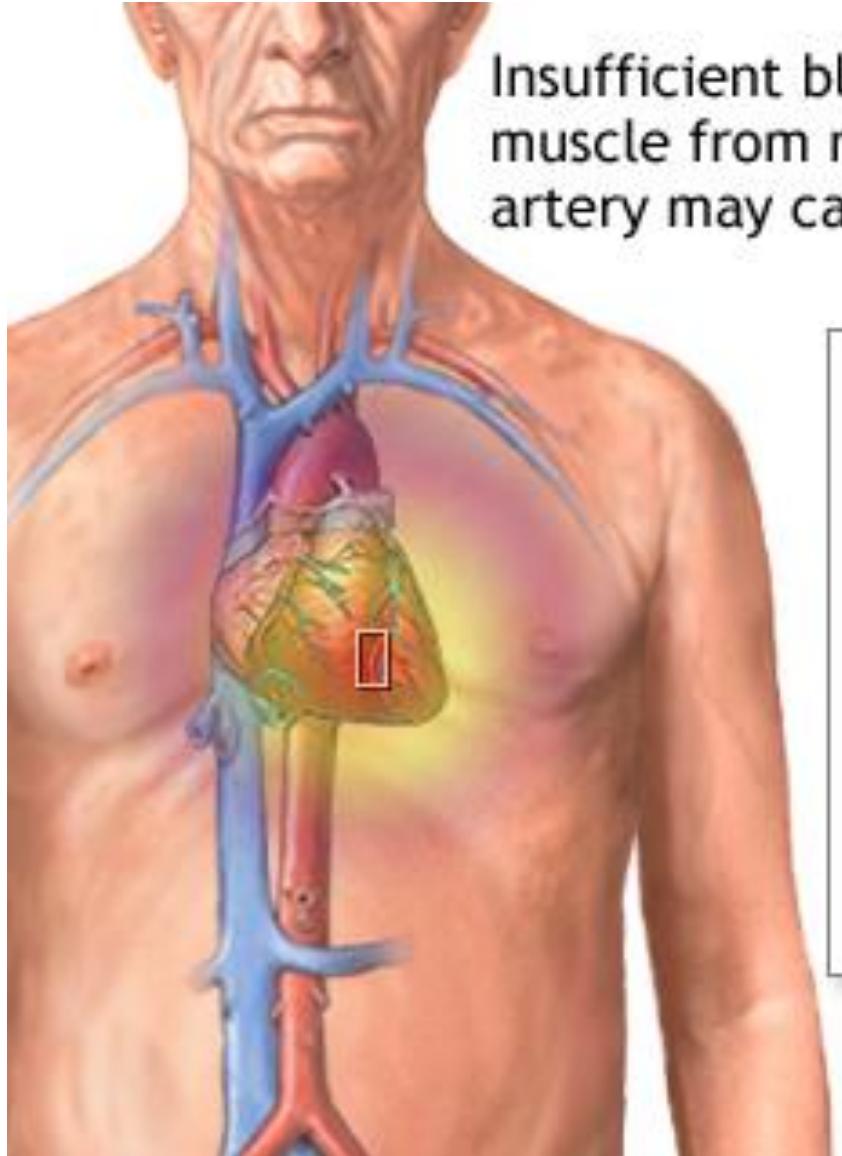
Nursing Management

- **Smoking cessation**
 - Educational programs
 - Counseling
 - Consistent motivation and reinforcement messages
 - Support groups

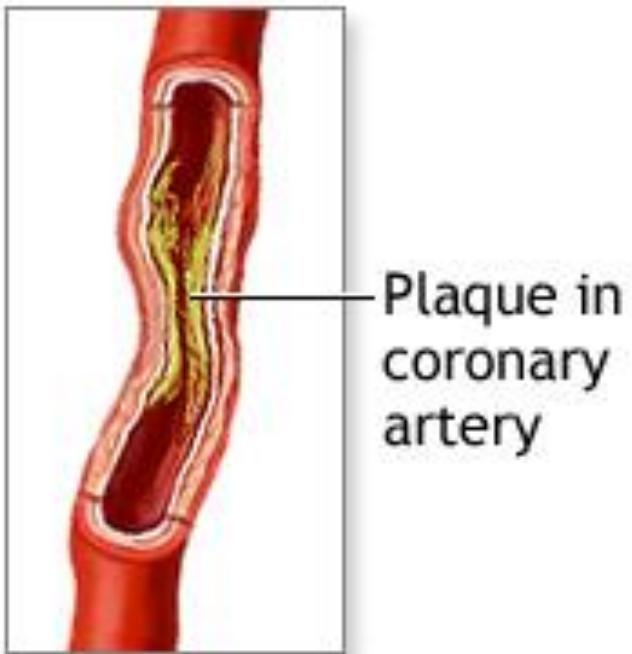




Angina Pectoris



Insufficient blood flow to the heart muscle from narrowing of coronary artery may cause angina (chest pain)



ADAM.

Angina Pectoris

- clinical syndrome usually characterized by episodes or paroxysms of pain or pressure in the anterior chest d/t insufficient coronary blood flow (O_2 demand > supply)



- **Stable angina:** predictable and consistent pain that occurs on exertion and is relieved by rest and/or nitroglycerin
- **Unstable angina** (also called preinfarction angina or crescendo angina): symptoms increase in frequency and severity; may not be relieved with rest or nitroglycerin
- **Intractable or refractory angina:** severe incapacitating chest pain
- **Variant angina** (also called Prinzmetal's angina): pain at rest with reversible ST-segment elevation; thought to be caused by coronary artery vasospasm
- **Silent ischemia:** objective evidence of ischemia (such as electrocardiographic changes with a stress test), but patient reports no pain

Types of Angina

PATHOPHYSIOLOGY

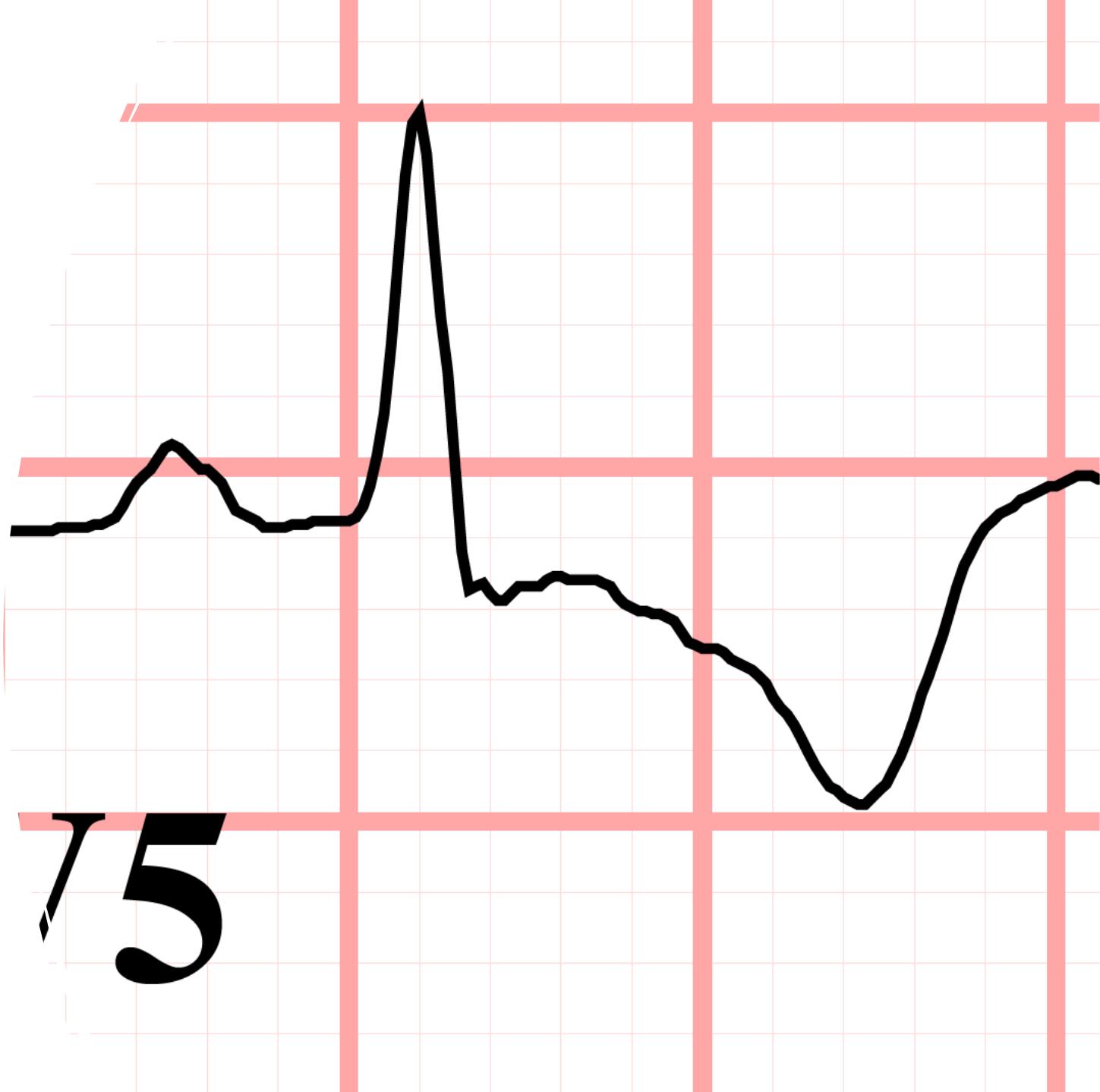
- See diagram

Characteristics of the Pain

1. Mild indigestion to choking to heavy sensation
2. With severe apprehension and feeling of impending death
3. Poorly located
4. May radiate to neck, jaw, shoulders, inner aspects of the upper arm (L)
5. Vise-like quality
6. Subsides with rest or NTG

Diagnostics

- 12-lead ECG: **T-wave inversion (UA)**
- NTG test: **relief of pain with NTG (SA)**
- CRP and cardiac biomarker values: **elevated**
- exercise or pharmacologic stress test : **ST changes**
- nuclear scan or invasive procedures



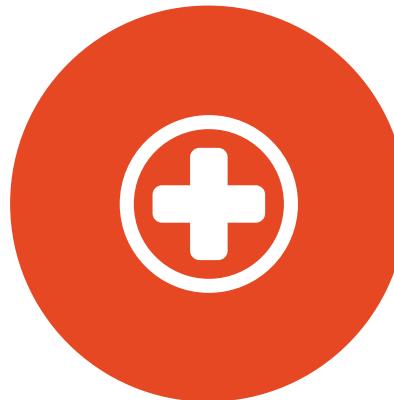
Management



MEDICAL



PHARMACOLOGICAL



NURSING



Medical Management

- **GOAL:** decrease myocardial O₂ demand, increase O₂ supply
- **Coronary revascularization**
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Table 28-3**SUMMARY OF MEDICATIONS USED TO TREAT ANGINA**

Medications	Major Indications
Nitrates Nitroglycerin (Nitrostat, Nitro-Bid)	Short-term and long-term reduction of myocardial oxygen consumption through selective vasodilation
Beta-Adrenergic Blocking Agents (beta-blockers) Metoprolol (Lopressor, Toprol) Atenolol (Tenormin)	Reduction of myocardial oxygen consumption by blocking beta-adrenergic stimulation of the heart
Calcium Ion Antagonists (calcium channel blockers) Amlodipine (Norvasc) Diltiazem (Cardizem, Tiazac) Felodipine (Plendil)	Negative inotropic effects; indicated in patients not responsive to beta-blockers used as primary treatment for vasospasm
Antiplatelet Medications Aspirin Clopidogrel (Plavix) Glycoprotein IIb/IIIa agents: Abciximab (ReoPro) Tirofiban (Aggrastat) Eptifibatide (Integrilin)	Prevention of platelet aggregation
Anticoagulants Heparin (unfractionated) Low-molecular-weight heparins (LMWHs): Enoxaparin (Lovenox) Dalteparin (Fragmin)	Prevention of thrombus formation

Nursing Management

Cardiac Output

Angina

Anxiety

Maintaining Cardiac Output

- Monitor response to drug therapy
 - BP and HR
 - Headaches or dizziness
 - Continuous ECG monitoring
- Remove previous nitrate patch before applying new one
- Be alert to adverse reactions



Treating and Preventing Angina

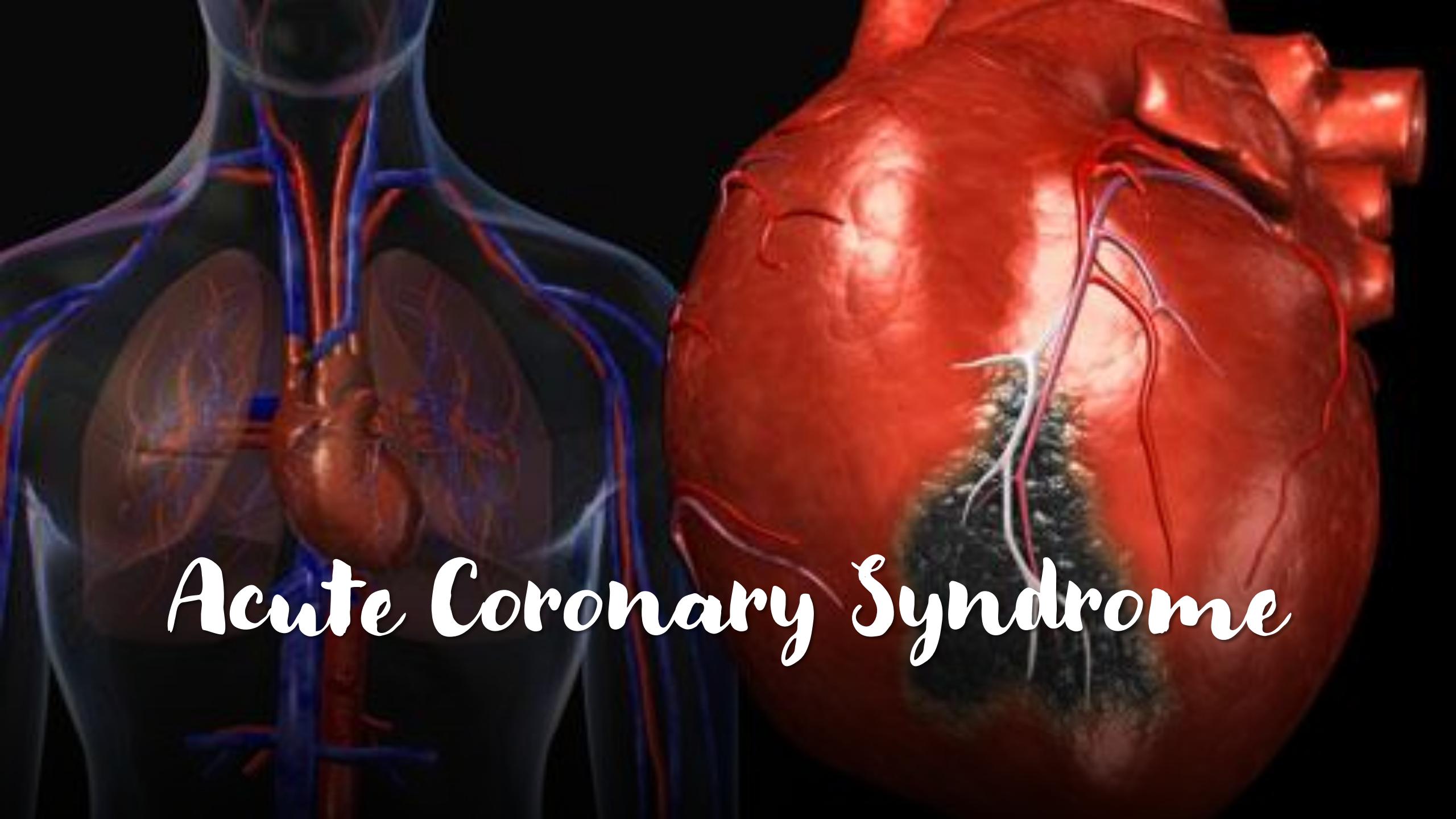
- **STOP** all activities and promote rest
- Sitting or Semi-Fowler's position
- Low-flow O₂ supplementation



Reducing Anxiety

- Providing information about the illness, its treatment, and methods of preventing its progression
- Encourage verbalization
- Guided imagery or music therapy





Acute Coronary Syndrome

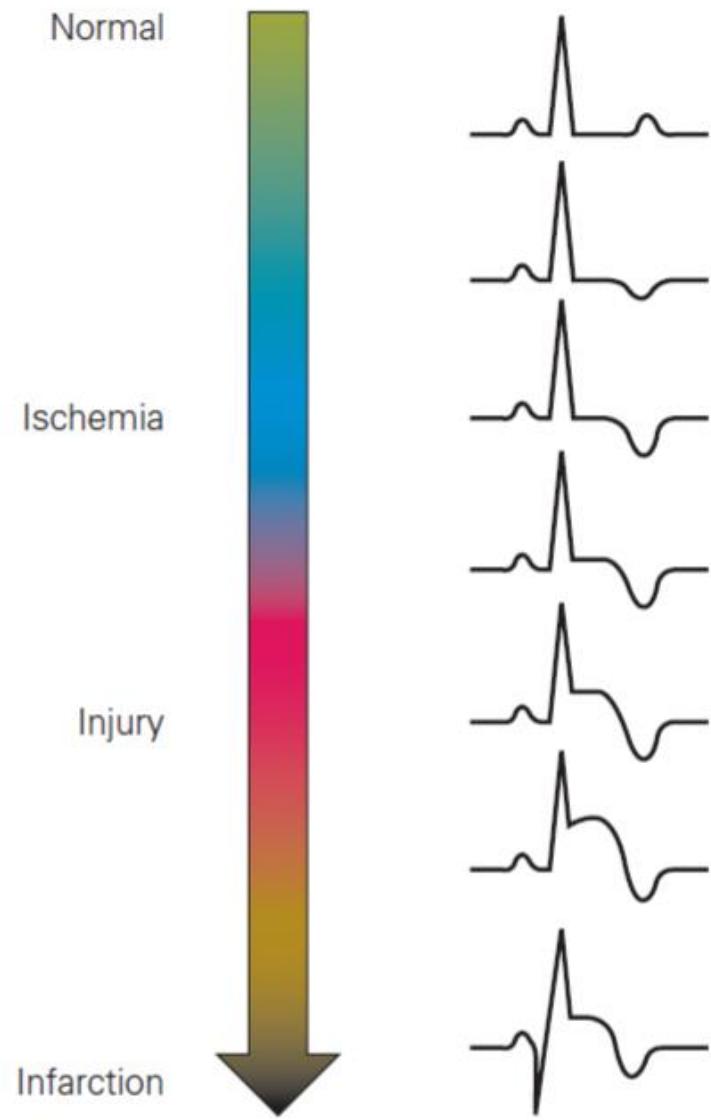


ACS

- a spectrum of conditions compatible with acute myocardial **ischemia** and/or **infarction** that are usually due to an abrupt reduction in coronary blood flow (AHA 2015)

Ischemia vs Infarction

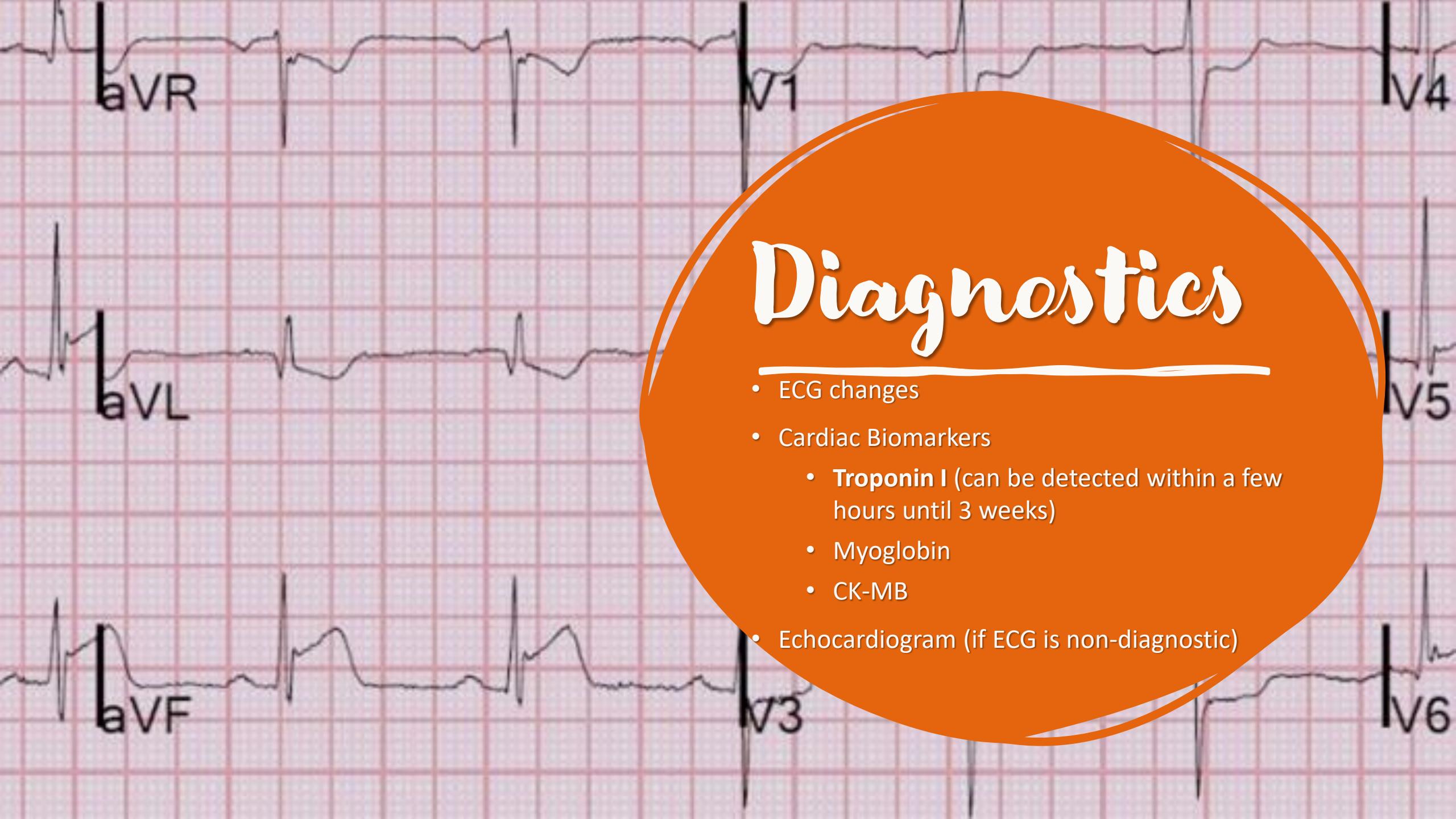
- Ischemia denotes **diminished volume** of perfusion, while infarction is the cellular response to lack of perfusion (aka **tissue death**)



Progression of an MI

UA vs NSTEMI vs STEMI

PARAMETER	UA	NSTEMI	STEMI
S/sx of ischemia?	Yes	Yes	Yes
Elevated Troponin?	No	Yes	Yes
ECG Changes	ST depression and/or T wave inversion	T wave inversion, Q wave*	ST elevation, T wave inversion, Q wave



Diagnostics

- ECG changes
- Cardiac Biomarkers
 - **Troponin I** (can be detected within a few hours until 3 weeks)
 - Myoglobin
 - CK-MB
- Echocardiogram (if ECG is non-diagnostic)



Management

- GOALS:

- to minimize myocardial damage
- preserve myocardial function
- prevent complications

1

Symptoms suggestive of ischemia or infarction



2

EMS assessment and care and hospital preparation:

- Monitor, support ABCs. Be prepared to provide CPR and defibrillation
- Administer aspirin and consider oxygen, nitroglycerin, and morphine if needed
- Obtain 12-lead ECG; if ST elevation:
 - Notify receiving hospital with transmission or interpretation; note time of onset and first medical contact
- Notified hospital should mobilize hospital resources to respond to STEMI
- If considering prehospital fibrinolysis, use fibrinolytic checklist



3

Concurrent ED assessment (<10 minutes)

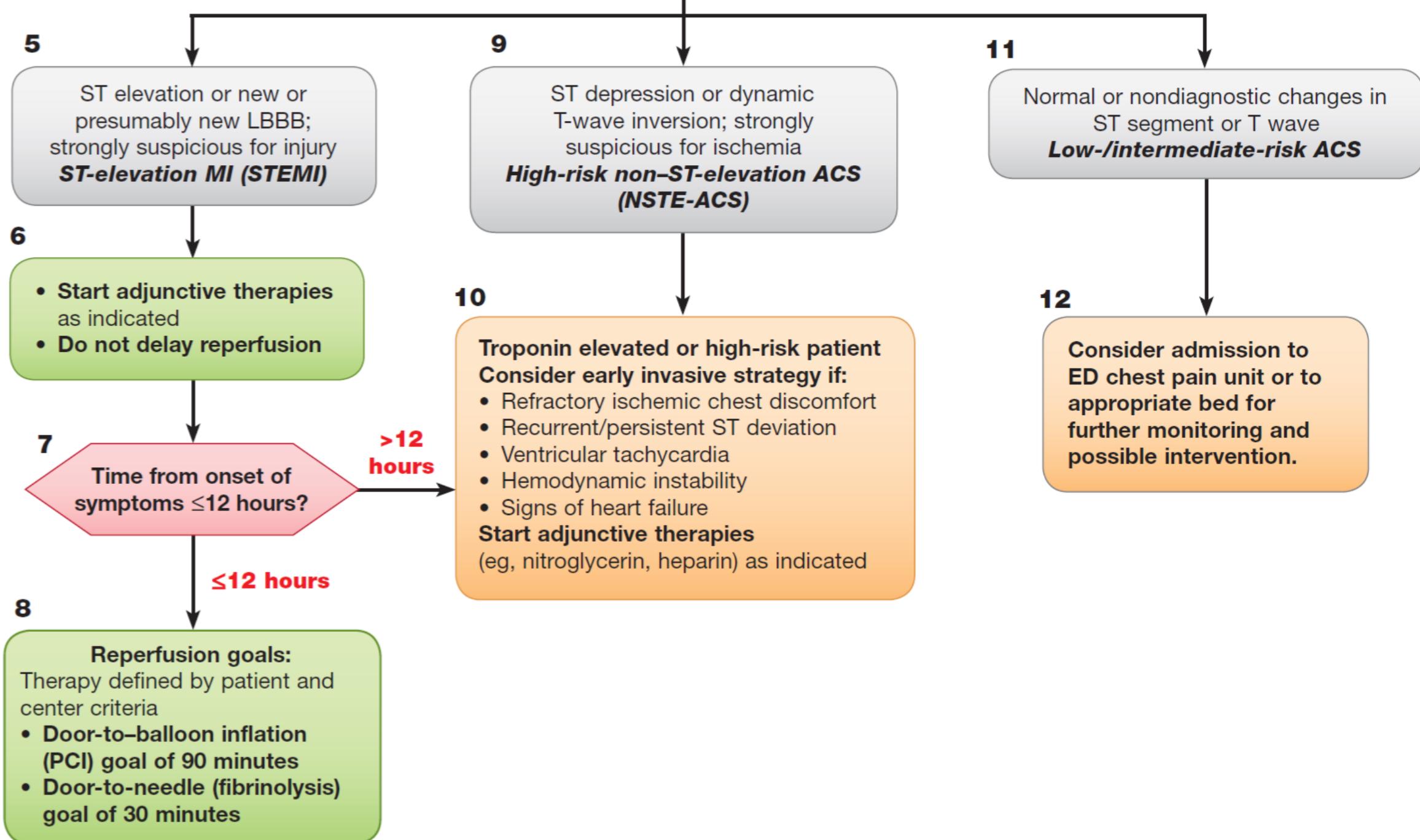
- Check vital signs; evaluate oxygen saturation
- Establish IV access
- Perform brief, targeted history, physical exam
- Review/complete fibrinolytic checklist; check contraindications
- Obtain initial cardiac marker levels, initial electrolyte and coagulation studies
- Obtain portable chest x-ray (<30 minutes)

Immediate ED general treatment

- If O₂ sat <90%, start **oxygen** at 4 L/min, titrate
- **Aspirin** 160 to 325 mg (if not given by EMS)
- **Nitroglycerin** sublingual or spray
- **Morphine** IV if discomfort not relieved by nitroglycerin

4

ECG interpretation



Thrombolytics

- Alteplase
(Activase)
- Reteplase (r-PA,
TNKase)

DC 50242-044-13

List No.: 4413

ALTEPLASE

recombinant

ACTIVASE®

for intravenous use

50 mg (29 million IU)

a tissue plasminogen activator

US License No.:

1048

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South San Francisco, CA 94080

Nursing Management

1

Relieving Pain
and Other S/Sx
of Ischemia

2

Improving
Respiratory
Function

3

Promoting
Adequate Tissue
Perfusion

4

Reducing
Anxiety