

Definition, etiopathogenesis, clinical manifestations, nonpharmacological and pharmacological management of the diseases associated with Cardiovascular System

Hypertension

Definition

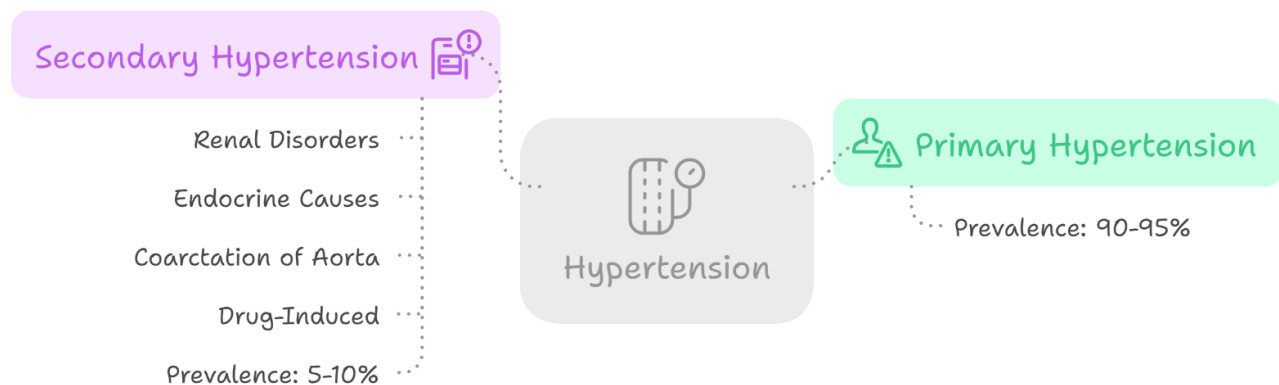
- Hypertension is defined as persistently elevated arterial blood pressure, generally with systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg, measured on two or more occasions.

Classification (Based on JNC 8 / ACC/AHA guidelines)

- **Normal:** $<120/80$ mmHg
- **Elevated:** $120-129/<80$ mmHg
- **Stage 1 Hypertension:** $130-139/80-89$ mmHg
- **Stage 2 Hypertension:** $\geq 140/90$ mmHg

Etiopathogenesis

Types:



- Primary (Essential) Hypertension** – ~90–95% cases, cause unknown but multifactorial.
- Secondary Hypertension** – ~5–10% cases, due to identifiable causes like:
 - **Renal disorders** (e.g., renal artery stenosis)
 - **Endocrine causes** (e.g., Cushing's syndrome, pheochromocytoma)
 - **Coarctation of aorta**
 - **Drug-induced** (NSAIDs, oral contraceptives, steroids)

Pathophysiological mechanisms:

- Increased sympathetic nervous system activity
- Overactivation of renin-angiotensin-aldosterone system (RAAS)
- Endothelial dysfunction
- Sodium retention
- Vascular remodeling and increased peripheral resistance

Clinical Manifestations

- Often called the "**silent killer**" because it is asymptomatic in early stages. When symptoms occur:
 - Headache (especially in the morning)
 - Dizziness
 - Palpitations
 - Blurred vision
 - Chest pain
 - Fatigue
 - Nosebleeds (epistaxis)

Complications:

- **Heart:** Left ventricular hypertrophy, heart failure
- **Brain:** Stroke, hypertensive encephalopathy
- **Kidneys:** Chronic kidney disease
- **Eyes:** Hypertensive retinopathy

Nonpharmacological Management

- **Lifestyle Modifications (DASH diet):**
 - Reduce salt intake (<2.4 g/day sodium)
 - Weight loss (BMI <25 kg/m²)
 - Regular aerobic exercise (30–40 minutes/day)
 - Limit alcohol and quit smoking
 - Increase intake of fruits, vegetables, low-fat dairy
 - Stress reduction (yoga, meditation)

Pharmacological Management

- Classes of antihypertensive drugs:

1. **Diuretics:** Thiazides (hydrochlorothiazide), loop diuretics
2. **ACE inhibitors:** Enalapril, Ramipril
3. **ARBs:** Losartan, Valsartan
4. **Beta-blockers:** Atenolol, Metoprolol
5. **Calcium channel blockers (CCBs):** Amlodipine, Verapamil
6. **Others:** Alpha-blockers, centrally acting drugs (clonidine), vasodilators

Angina

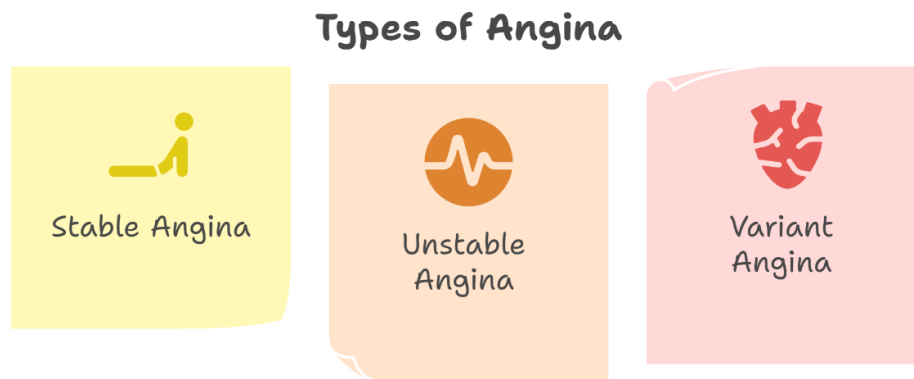
Definition

- Angina pectoris is a symptom complex caused by transient myocardial ischemia without myocardial cell death, usually due to atherosclerotic coronary artery disease.

Etiopathogenesis

- **Atherosclerosis:** Main cause; plaques narrow coronary arteries
- **Coronary vasospasm**
- **Increased myocardial oxygen demand** (e.g., during exertion, emotional stress)

Types of angina:



- **Stable angina:** Predictable, occurs on exertion, relieved by rest
- **Unstable angina:** More frequent, at rest, may lead to MI
- **Variant (Prinzmetal's) angina:** Due to coronary artery spasm

Clinical Manifestations

- Chest pain: Retrosternal, pressure or squeezing, radiates to left arm/jaw
- Pain lasts <20 minutes (instable angina)
- Associated with nausea, dyspnea, diaphoresis

Nonpharmacological Management

- Risk factor modification:
 - Smoking cessation
 - Weight reduction
 - Regular exercise
 - Control of diabetes, hypertension, and lipids

Pharmacological Management

- **Nitrates:** Nitroglycerin (short acting), isosorbide mononitrate
- **Beta-blockers:** Reduce myocardial oxygen demand
- **CCBs:** Especially in variant angina
- **Antiplatelet drugs:** Aspirin, Clopidogrel
- **Statins:** Lower cholesterol
- **Ranolazine:** Antianginal drug for chronic stable angina

Myocardial Infarction (MI)

Definition

- MI is necrosis of myocardium due to prolonged ischemia, most commonly from complete coronary artery occlusion.

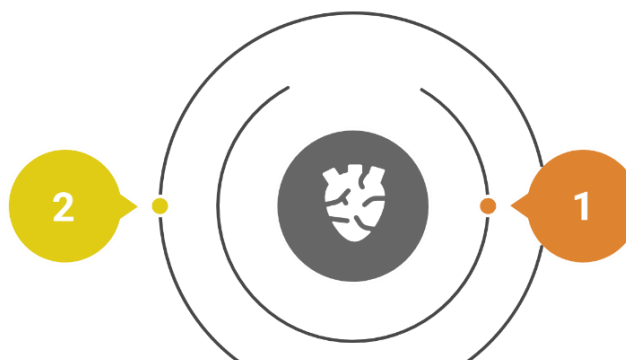
Etiopathogenesis

- **Atherosclerotic plaque rupture** → thrombus formation → occlusion
- Reduced blood flow → oxygen supply-demand mismatch
- Inflammatory and thrombotic response

Types:

Non-ST Elevation MI (NSTEMI)

Does not show ST-segment elevation on ECG



ST-Elevation MI (STEMI)

Characterized by ST-segment elevation on ECG

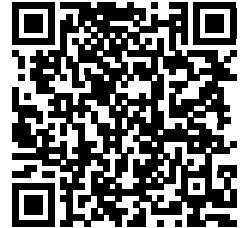


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