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

Hypertension

Definition

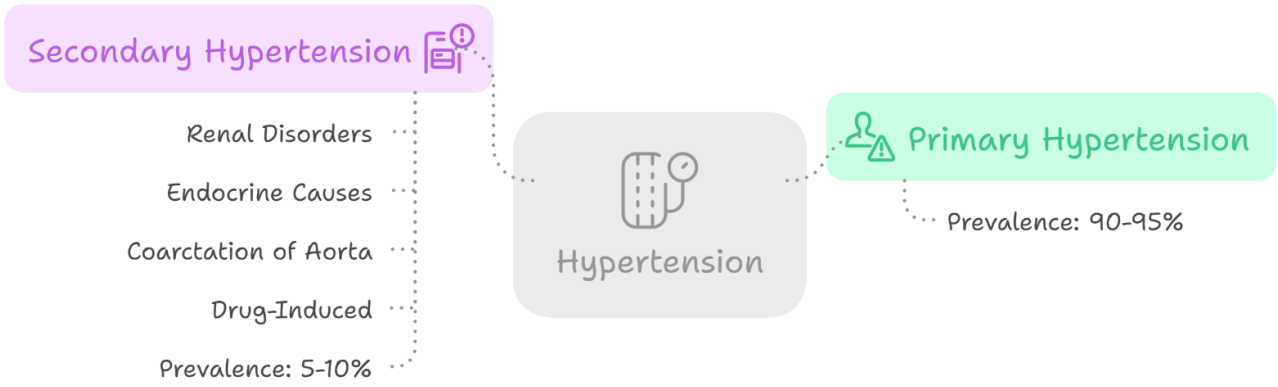
- Hypertension is defined as persistently elevated arterial blood pressure, generally with systolic blood pressure (SBP) ≥140 mmHg and/or diastolic blood pressure (DBP) ≥90 mmHg, measured on two or more occasions.

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:** ≥140/90 mmHg

Etiopathogenesis

Types:



1. **Primary (Essential) Hypertension** – ~90–95% cases, cause unknown but multifactorial.
2. **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:

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- 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/m^2)
  - 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:

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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

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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

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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)

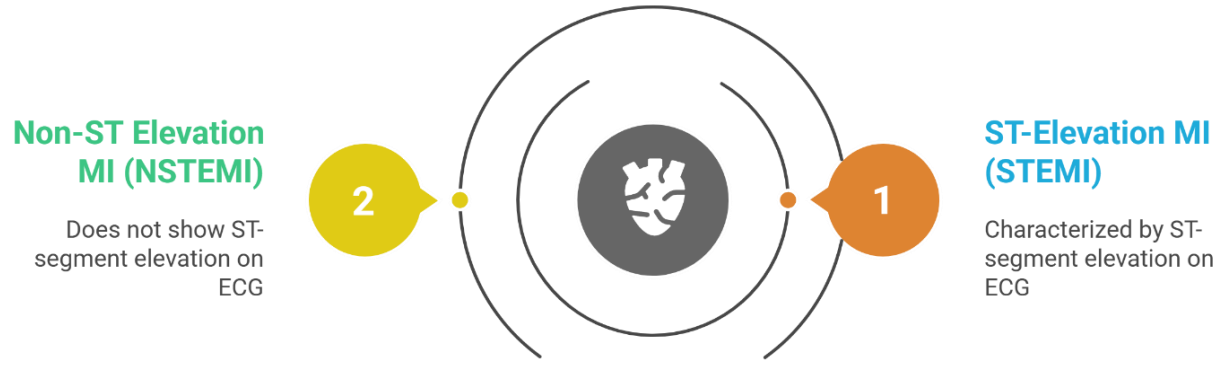
Definition

- 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:



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