

1. Etiopathogenesis of Cardiovascular Diseases

Cardiovascular diseases (CVDs) include conditions affecting the **heart and blood vessels**. The main categories are:

- **Coronary artery disease (CAD)/Ischemic heart disease**
- **Heart failure**
- **Hypertension**
- **Cardiomyopathies**
- **Valvular heart disease**
- **Arrhythmias**

A. Common Etiologic Factors

1. **Atherosclerosis**

- Chronic inflammatory process in arterial walls leading to plaque formation.
- Triggered by endothelial injury from risk factors:
 - Hypertension
 - Hyperlipidemia (↑LDL, ↓HDL)
 - Smoking
 - Diabetes mellitus
 - Obesity and sedentary lifestyle
 - Genetic predisposition

2. **Hypertension**

- Increased systemic vascular resistance damages vascular endothelium and left ventricle.

3. **Diabetes Mellitus**

- Glycosylation of vascular endothelium → accelerated atherosclerosis.

4. **Inflammatory and Infectious Causes**

- Rheumatic fever → rheumatic heart disease.
- Viral myocarditis → dilated cardiomyopathy.

5. **Genetic and Congenital Factors**

- Hypertrophic cardiomyopathy, congenital heart defects, familial hypercholesterolemia.

2. Clinical Manifestations

A. Common Cardiovascular Symptoms

Symptom	Possible Cause
Chest pain/angina	Myocardial ischemia or infarction
Dyspnea	Heart failure, pulmonary congestion

Symptom	Possible Cause
Palpitations	Arrhythmias
Syncope	Arrhythmia, valvular disease
Edema (ankle, sacral)	Right-sided heart failure
Fatigue, weakness	Low cardiac output

B. System-Specific Findings

- **Cardiac:** Murmurs, gallops, displaced apex beat, tachycardia/bradycardia.
- **Vascular:** Elevated JVP, carotid bruits, diminished pulses.
- **Pulmonary:** Crackles (pulmonary congestion).
- **Peripheral:** Cyanosis, clubbing, varicosities.

3. Management of Cardiovascular Diseases

Management involves **lifestyle modification**, **pharmacological therapy**, and sometimes **interventional/surgical** treatment.

A. Non-Pharmacological Management

1. Lifestyle Modification

- **Diet:**
 - DASH or Mediterranean diet (low salt, low saturated fat, high fiber, fruits, vegetables).
- **Exercise:**
 - Regular aerobic exercise (30–45 minutes, ≥ 5 days/week).
- **Weight Control:**
 - BMI target: $< 25 \text{ kg/m}^2$.
- **Smoking Cessation**
- **Alcohol Moderation:**
 - Limit to ≤ 1 drink/day (women), ≤ 2 (men).
- **Stress Management:**
 - Mindfulness, yoga, counseling.

2. Risk Factor Control

- Maintain BP $< 130/80 \text{ mmHg}$.
- LDL cholesterol $< 70 \text{ mg/dL}$ (for high-risk patients).
- Optimal glucose control in diabetes (HbA1c $< 7\%$).

3. Patient Education

- Adherence to therapy.

- Recognizing warning symptoms (e.g., chest pain, dyspnea).

B. Pharmacological Management

Condition	Drug Classes	Examples	Mechanism / Notes
Hypertension	ACE inhibitors, ARBs, Beta-blockers, Calcium channel blockers, Diuretics	Enalapril, Losartan, Amlodipine, Hydrochlorothiazide	Reduce BP and cardiac workload
Coronary Artery Disease (Angina)	Nitrates, Beta-blockers, Calcium channel blockers, Antiplatelets, Statins	Nitroglycerin, Metoprolol, Aspirin, Atorvastatin	Improve myocardial oxygen supply-demand balance
Heart Failure	ACE inhibitors/ARBs/ARNIs, Beta-blockers, Diuretics, Aldosterone antagonists, SGLT2 inhibitors	Sacubitril/valsartan, Carvedilol, Furosemide, Spironolactone, Dapagliflozin	Improve survival, reduce preload/afterload
Arrhythmias	Antiarrhythmic drugs (Class I–IV), Beta-blockers, Amiodarone, Digoxin	—	Control rate/rhythm
Hyperlipidemia	Statins, Ezetimibe, PCSK9 inhibitors, Fibrates	Atorvastatin, Evolocumab	Reduce LDL and triglycerides
Thromboembolic Disease	Antiplatelets, Anticoagulants	Aspirin, Clopidogrel, Warfarin, DOACs	Prevent thrombosis

C. Interventional/Surgical Management

- **Percutaneous coronary intervention (PCI)** – angioplasty/stent.
- **Coronary artery bypass graft (CABG).**
- **Valve repair/replacement.**
- **Pacemaker or implantable cardioverter-defibrillator (ICD)** for arrhythmias.
- **Heart transplantation** (in end-stage heart failure).