High Blood Pressure (Hypertension): Clinical Breakdown

Pathophysiology, Blood Pressure Classification, Primary vs. Secondary Etiology, Target Organ Damage, and Therapeutic Management

Hypertension (high blood pressure) is a chronic medical condition in which the systemic arterial blood pressure is elevated. Often designated the "silent killer," sustained hypertension forces the heart to work against increased afterload while subjecting arterial endothelium to continuous mechanical stress, substantially increasing the risk of myocardial infarction, cerebrovascular accidents (stroke), heart failure, and chronic kidney disease.

> **Core Clinical Principle:** Blood pressure is determined by the product of cardiac output and systemic vascular resistance (BP = CO × SVR). Chronic hypertension is typically driven by sustained increases in peripheral vascular resistance and neurohormonal dysregulation.

1. Blood Pressure Classification & Staging

Standardized clinical guidelines categorize blood pressure measurements based on systolic (upper) and diastolic (lower) thresholds.

Blood Pressure Category	Systolic (mmHg)	Diastolic (mmHg)
Normal	Less than 120	and Less than 80
Elevated	120–129	and Less than 80
Hypertension Stage 1	130–139	or 80–89
Hypertension Stage 2	140 or higher	or 90 or higher
Hypertensive Crisis	Higher than 180	and/or Higher than 120

2. Primary vs. Secondary Etiology

Understanding the underlying origin of hypertension dictates diagnostic workups and therapeutic approaches.

- **Primary (Essential) Hypertension:** Accounts for 90% to 95% of all cases. It has no single identifiable organic cause but arises from a multifactorial interaction of genetics, sympathetic nervous system overactivity, renin-angiotensin-aldosterone system (RAAS) dysfunction, endothelial stiffness, and environmental factors.
- **Secondary Hypertension:** Accounts for 5% to 10% of cases and is caused by an identifiable, potentially correctable underlying pathology, such as renovascular disease, primary hyperaldosteronism, obstructive sleep apnea, chronic kidney disease, or endocrine disorders (e.g., pheochromocytoma).

3. Target Organ Damage & Management Principles

Prolonged untreated or poorly controlled hypertension inflicts progressive damage on vital microvascular and macrovascular beds.

- **Target Organ Consequences:** Results in left ventricular hypertrophy (LVH), coronary artery disease, ischemic or hemorrhagic strokes, hypertensive nephrosclerosis (renal failure), and retinopathy.
- **Comprehensive Management:** Combines lifestyle interventions (DASH diet, sodium restriction, weight management, aerobic exercise) with targeted pharmacotherapy (thiazide diuretics, ACE inhibitors, ARBs, and calcium channel blockers) under regular clinical supervision.