

Hypertension: Mechanisms, Clinical Impact, and Management

Abstract

Hypertension is a chronic cardiovascular condition characterized by persistently elevated arterial blood pressure. It is a major risk factor for cardiovascular disease, stroke, renal failure, and premature mortality worldwide.

1. Introduction

Hypertension affects over one billion individuals globally and represents a leading cause of preventable disease. Blood pressure is determined by cardiac output and systemic vascular resistance, both of which are influenced by genetic and environmental factors.

2. Definition and Classification

Clinically, hypertension is defined as systolic blood pressure ≥ 130 mmHg or diastolic blood pressure ≥ 80 mmHg. Primary hypertension has no identifiable cause, whereas secondary hypertension results from underlying conditions such as renal or endocrine disorders.

3. Pathophysiology

A central mechanism in blood pressure regulation is the renin-angiotensin-aldosterone system (RAAS). Activation of RAAS leads to vasoconstriction, sodium retention, and increased blood volume, contributing to elevated blood pressure.

4. Target Organ Damage

Chronic uncontrolled hypertension damages multiple organ systems, including the heart, kidneys, brain, and eyes. These effects increase the risk of myocardial infarction, stroke, chronic kidney disease, and vision loss.

5. Management Strategies

Management of hypertension includes lifestyle modifications such as dietary sodium reduction, regular physical activity, weight management, and pharmacological therapy when necessary.

6. Clinical Outcomes and Public Health Impact

Hypertension significantly increases cardiovascular morbidity and mortality. Effective population-level blood pressure control is essential for reducing the global burden of cardiovascular disease.

7. Conclusion

Hypertension is a multifactorial disease with serious long-term consequences if untreated. Early detection and comprehensive management are critical to improving clinical outcomes.