

# Comparative Pharmacokinetics and Pharmacodynamics of Furosemide and Atenolol for the Treatment of Blood Pressure

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**Abstract:** *This study provides a comparative overview of the pharmacokinetics and pharmacodynamics of furosemide and atenolol in the management of hypertension. Furosemide, a loop diuretic, exerts its antihypertensive effects by promoting diuresis through inhibition of sodium and chloride reabsorption in the ascending loop of Henle, leading to a rapid but short-lived decrease in plasma volume and blood pressure. It exhibits variable oral bioavailability, a short half-life, and necessitates multiple daily dosing. Atenolol, a selective beta-1 adrenergic blocker, reduces blood pressure by decreasing heart rate, myocardial contractility, and renin secretion. It has a more consistent oral bioavailability, longer half-life, and is typically administered once daily. While furosemide is more suitable for hypertensive patients with fluid retention or comorbid heart failure, atenolol is often preferred for patients with heightened sympathetic activity or coexisting cardiovascular conditions. Understanding these pharmacologic differences is essential for tailoring antihypertensive therapy to individual patient needs.*

**Keywords:** Hypertension, Furosemide, Atenolol, Pharmacokinetics, Pharmacodynamics, Antihypertensive agents, Blood pressure management

