

# Detailed Blood Flow Effects on Kidney & Heart

Factor	High Blood Flow (Detailed)	Low Blood Flow (Detailed)
GFR	↑ Strong increase in filtration rate due to high renal perfusion.	↓ Major decrease because kidneys sense low perfusion.
Filtration Pressure	↑ Increased hydrostatic pressure inside glomerulus.	↓ Reduced glomerular pressure → less filtration.
Urine Output	↑ Large urine volume (diuresis).	↓ Very low urine output (oliguria).
Renin	↓ Suppressed because perfusion is high.	↑ Strong renin release due to low pressure.
RAAS Activity	↓ Inactive RAAS.	↑ Full activation to restore BP.
Angiotensin II	↓ Low levels due to suppressed renin.	↑ High levels causing vasoconstriction.
Aldosterone	↓ Decreased secretion → less Na <sup>+</sup> retention.	↑ Strong secretion → high Na <sup>+</sup> retention.
ADH	↓ Low → more water excreted.	↑ High → water strongly reabsorbed.
ANP	↑ Released strongly due to atrial stretch.	↓ Low due to low atrial filling.
Na <sup>+</sup> in Blood	↓ Slight drop because ANP increases excretion.	↑ Increases due to aldosterone retaining sodium.
Na <sup>+</sup> in Urine	↑ More sodium lost in urine.	↓ Strong sodium retention.
K <sup>+</sup> in Blood	Normal or slight ↑.	↓ Hypokalemia due to aldosterone.
K <sup>+</sup> in Urine	↓ Mild secretion.	↑ Massive potassium secretion.
Preload	↑ Increased venous return.	↓ Decreased filling of ventricles.
Afterload	↑ Slightly elevated depending on BP.	↑↑ Strongly elevated (vasoconstriction).
Stroke Volume	↑ Better ventricular filling + force.	↓ Weak pumping ability.
Cardiac Output	↑ Increased CO.	↓ Low CO.
Blood Pressure	↑ Higher BP.	↓ Lower BP.
Venous Return	↑ Strong venous return.	↓ Poor return.
Perfusion	Good perfusion to organs.	Poor perfusion → ischemia risk.
SNS Activity	↓ Suppressed.	↑ Activated strongly.
Parasympathetic	↑ Higher parasympathetic tone.	↓ Reduced.
Afferent Arteriole	Dilated → improved renal flow.	Constricted → reduces GFR.
Efferent Arteriole	Normal.	Constricted by Angiotensin II.
Urine Concentration	Dilute urine.	Concentrated urine.
Water Retention	↓ Minimal retention.	↑ Strong water retention.
Osmolarity	↓ Lower plasma osmolarity.	↑ Higher plasma osmolarity.
Tubular Reabsorption	↑ Moderate reabsorption of Na <sup>+</sup> and water due to high flow + ANP balancing.	↑↑ Very strong Na <sup>+</sup> and water reabsorption (RAAS + ADH fully active).

Tubular Secretion	↑ Increased secretion of K <sup>+</sup> and H <sup>+</sup> because flow washes solutes quickly.	↑↑ Massive K <sup>+</sup> and H <sup>+</sup> secretion due to high aldosterone.
-------------------	---	---