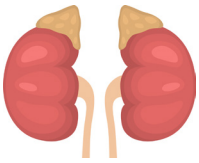
An abrupt decrease in kidney function characterized by an increase in the serum creatinine level or a urine output of < 0.5 mL/kg/hr for 6 hours (in adults) or < 1.0 mL/kg/hr (in children)



	PRE-RENAL	INTRARENAL (a.k.a. INTRINSIC)	POST-RENAL
Pathophysiology	Hypoperfusion of normal kidneys due to hypovolemia or pump (heart) failure	A disease process or treatment that damages renal tissue and impairs kidney function	An outflow obstruction anywhere in the renal system that prevents adequate urine drainage
Etiologies	**True volume depletion** Hemorrhage Poor oral intake GI losses Third space losses (edema) High renal losses (over-diuresis) **Impaired cardiopulmonary function** Congestive heart failure Pericardial tamponade Pulmonary embolism Myocardial infarction **Decreased vascular resistance** Systemic vasodilation Sepsis Neurogenic shock Anaphylaxis Hepatorenal syndrome **Intrarenal hemodynamic changes** Medications Hypercalcemia	**Tubular damage** Renal ischemia Nephrotoxins Endogenous: myoglobin Exogenous: medications, IV contrast **Glomerular damage** Acute glomerulonephritis Vasculitis Malignant hypertension **Interstitial damage** Infections (bacterial, viral) Medications (antibiotics, NSAIDs) **Vascular damage** Renal artery/vein thrombosis Vasculitis Renal trauma	**Intrarenal obstruction** Nephrolithiasis (kidney stones) Ureteroplevic junction obstruction **Extrarenal obstruction, traumatic** Bladder rupture Urethral tears (usually in males) Ureter injury (rare) **Extrarenal obstruction, non-traumatic** Acute neurogenic bladder (post SCI) Benign prostate hypertrophy Ureterolithiasis Urethral stenosis or clotting Urinary obstruction (tumors, etc.)
Clinical Findings	**Signs of shock** Tachycardia Hypotension Elevated shock index Narrow pulse pressure Widened pulse pressure Decreased urine output Postural hypotension Pale, cool, clammy skin Delayed capillary refill	**Signs of fluid overload** Dyspnea, tachycardia, and hypertension Dysrhythmias Edema Nausea and vomiting Weakness and fatigue Muscle cramps Seizures Low or high urine output	**Signs of pelvic trauma** Blood at the urinary meatus Hematuria Lower abdominal distension Inability to urinate Perineal, rectal, or vaginal injury Pelvic fractures
Diagnostics & Laboratory Tests	Type and crossmatch for transfusion Lactate level Hemoglobin and hematocrit Blood urea nitrogen (BUN) and creatinine Electrolytes: sodium, potassium, calcium, chloride Serum glucose	Electrolytes: sodium, potassium, calcium, chloride, phosphorus, bicarbonate Blood urea nitrogen (BUN) and creatinine Urinalysis and urine electrolytes Serum glucose	Urinalysis Kidney, ureter, and bladder (KUB) radiographs Retrograde urethrogram (RUG) CT Cystogram

Acute Kidney Injury in the Trauma Patient *(continued)*

US Version

	PRE-RENAL	INTRARENAL (a.k.a. INTRINSIC)	POST-RENAL
Treatments	Halt fluid depletion (e.g., hemorrhage, GI loss) Replace lost fluid volume with blood products or crystalloids; refill the tank! Re-establish hemodynamic stability Improve renal perfusion with medications and mechanical cardiac support in patients with pump failure	Diuretics Renal replacement therapy: Intermittent hemodialysis Continuous hemodialysis (CRRT) Eliminate nephrotoxic medications Treat reversible causes	Urology consultation Mechanical interventions to relieve the obstruction: Urethral catheterization Suprapubic catheter insertion Stent placement Surgical repair
Nursing Interventions	Closely evaluate vital signs Provide continuous cardiac monitoring Place an indwelling urinary catheter (if the urethra is not obstructed), as ordered Carefully measure hourly intake and output Replace fluids and electrolytes Monitor laboratory values Weigh patients daily FOLLOW THE TRENDS!		