

ACUTE RENAL FAILURE

PRERENAL AZOTEMIA

I. Volume low

- A. Acute hemorrhage
- B. Plasma volume loss
 - 1. 3rd Spacing
 - 2. ↑ Capillary permeability
- C. Excess water and electrolyte loss
 - 1. Inadequate fluid and Na intake
 - 2. Skin losses
 - 3. GI losses
 - 4. Renal losses

II. Cardiac output low

- A. Heart
 - 1. Valves
 - 2. Myocardium
 - 3. Conduction system
 - 4. Coronaries
 - 5. Pericardium
- B. Obstructive vascular
 - 1. Pulmonary hypertension
 - 2. Massive PE
 - 3. Positive pressure ventilation

III. Renal - systemic vascular resistance ratio altered

- A. Systemic vasodilatation
 - 1. Sepsis
 - 2. Anaphylaxis
 - 3. Afterload reducers
 - 4. Anaesthesia
 - 5. Antihypertensives
- B. Renal vasoconstriction
 - 1. Hypercalcemia
 - 2. Norepinephrine
 - 3. Epinephrine
 - 4. Cyclosporine
 - 5. Amphotericin B
- C. Cirrhosis with ascites (hepatorenal syn.)

IV. Renal hypoperfusion w/ impairment of renal autoregulatory responses

- A. Cyclo-oxygenase inhibitors
- B. ACE inhibitors

V. Viscosity elevated

- A. Multiple myeloma
- B. Macroglobulinemia
- C. Polycythemia

INTRINSIC RENAL AZOTEMIA

D Disease of glomeruli or renal microvasculature

- A. Glomerulitis and vasculitis (see bottom right)
- B. Microangiopathic
 - 1. HUS - TTP
 - 2. SLE, PSS
 - 3. Accelerated hypertension
 - 4. Toxemia pregnancy
 - 5. DIC
 - 6. Radiation nephritis

R Renovascular obstruction

- A. Bilateral renal artery occlusion
 - 1. Atherosclerotic plaque
 - 2. Thrombosis
 - 3. Embolism
 - 4. Dissecting aneurysm
 - 5. Vasculitis
- B. Bilateral renal vein occlusion
 - 1. Thrombosis
 - 2. Compression

A Acute tubular necrosis

- A. Ischemia
 - 1. Prerenal azotemia
 - 2. Obstetric complications
 - Abruptio placentae
 - Postpartum hemorrhage
- B. Toxins
 - 1. Exogenous
 - Acetaminophen
 - Antibiotics
 - Radiocontrast
 - Chemotherapy
 - Cyclosporine
 - Organic solvents
 - Illegal abortifacients

- 2. Endogenous
 - Rhabdomyolysis
 - Hemolysis
 - Uric acid
 - Oxalate
 - Plasma cell dyscrasia

R Renal allograft rejection

I Intratubular deposition and obstruction

- 1. Uric acid
- 2. Acyclovir
- 3. Oxalate
- 3. Methotrexate
- 5. Myeloma
- Sulpha

A Acute interstitial nephritis

- A. Allergic
 - 1. Antibiotics
 - 2. NSAIDs
 - 3. Diuretics
 - 4. Other
- B. Infection
 - 1. Viral
 - 2. Bacterial
 - 3. Fungal
- C. Infiltration
- D. Idiopathic

POSTRENAL AZOTEMIA

I. Ureteric

- 1. Calculi
- 2. Blood clot
- 3. Cancer
- 4. Sloughed papillae
- 5. External compression

II. Bladder neck

- 1. Calculi
- 2. Blood clot
- 3. Cancer
- 4. Neurogenic bladder
- 5. Prostatic hypertrophy

III. Urethra

- 1. Congenital valve
- 2. Stricture
- 3. Phimosis

II A. Causes glomerulitis and vasculitis

- 1. Idiopathic RPGN
- 2. Anti-GBM disease
- 3. Goodpasture's disease
- 4. IgA nephropathy
- 5. Cryoglobulinemia
- 6. Postpartum glomerulosclerosis