Guide to Acute Kidney Injury (AKI)

“Pre-Renal”
FeNa typically < 1%, FeUrea < 35% (but has limitations!)
• Hypovolemia
• Hypotension
• Congestive heart failure
• Cirrhosis
• Nephrotic syndrome
• NSAIDs, ACEi/ARB

“Renal”

• Tubular (e.g. ATN)
• Interstitial (e.g. AIN)
• Glomerular (e.g. nephritic, nephrotic)

“Post-Renal”
• Malpositioned foley catheter
• Neurogenic bladder
• Medication related urinary retention
• Nephrolithiasis
• Benign prostate hyperplasia (BPH)
• Retroperitoneal fibrosis
• Malignancy/ureteral obstruction

CASTS: Cylindrical structures formed in distal convoluted tubule/collecting ducts via precipitation of Tamm-Horsfall mucoprotein (secreted by renal tubule cells) or albumin (if proteinuria)
• WBC – AIN, pyelonephritis, glomerulonephritis
• RBC – glomerulonephritis, sometimes AIN
• Granular – ATN (degenerated cellular casts, protein aggregation in cast)
• Waxy – CKD/AKI, sharp indentations on edges, nonspecific
• Hyaline – empty appearing, nonspecific
• Fatty – lipid droplets within casts
• Pigment – hemolysis/rhabdomyolysis
• Broad – large dilated tubules, advanced CKD

Urine sediment should be active! (WBCs/RBCs/casts/protein)

What to ask & look for:
• Thorough history & physical exam
• Nephrotoxins (e.g. NSAIDs, contrast, OTCs, herbas, abx, illicit drug use, chemotherapy, immunosuppression)
• History of AKI/CKD, DM, HTN, stones
• Recent hypo/hypertension?
• TTE/liver function tests?

Start with:
# 1 – Urinalysis with microscopy
# 2 – Labs: BMP, Ca/P, CBC w/ diff
# 3 – Urine studies (Urine Na/K/Cl/urea/protein/Cr)
# 4 – Kidney Ultrasounds with Post Void Residual (if concern for obstruction)

KDIGO AKI Definition (modification of the RIFLE & AKIN Criteria)
• ↑ in serum Cr ≥0.3 mg/dL within 48 hours or...
• ↑ in serum Cr to ≥1.5x baseline serum Cr over 7 days or...
• UOP <0.5 mL/kg/h for 6 hrs