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ASSESSMENT OF GFR ⇒ "PRIMARY METRIC" OF RENAL FUNCTION

DIRECT MEASUREMENT

- Radioactive Isotope
- Inulin or Iothalate
- Filtered at Glomerulus
- Neither Reabsorbed nor Secreted
- Ideal

INDIRECT MEASUREMENT

- Urea or Creatinine or Cystatin C
- Creatinine Clearance=
- Cons:
 - Overestimates GFR
 - ↑ Plasma Creatinine due to dietary ingestion
 - Advanced CKD- PCT secretion of Creat- Overestimation of GFR
 - Assumes steady state
- Cockcroft-Gault Formula
GFR (ml/min)=

$$CL_I = \frac{U_{INULIN} \times VOL. OF URINE}{P_{INULIN}} \quad (24 HR)$$

APPROACH

- Acute vs Chronic Renal Failure →
- Chronic Renal Failure
 - ✓ C/F- Edema, Pallor, Weakness, Nausea, Metallic Taste, Skin Changes
 - ✓ Lab- Anemia, Hypocalcemia, Hyperphosphatemia →
 - ✓ Radiology Renal Osteodystrophy, USG- Small Kidneys, ↑ Echogenicity, Cortical Thinning
↳ LAFC (ESRD)
 - ✓ Urine Analysis- Proteinuria, Isosthenuria → ATN ✓



PRERENAL AZOTEMIA → MCC of ARF.

- 40-80 % of all cases of ARF
- Readily reversible if treated

Causes

- ✓ MCC- ↓ Hydrostatic Pressure (Hypovolemia)
- ✓ ↓ Cardiac Output → LVF, CARDIAC TAMPOONAD-
- ✓ Alteration of Systemic : Renal Vascular Diameter
 - ☐ Systemic Vasodilatation → SEPTIC S., ANAPHYLACTIC
 - ☐ Renal Vasoconstriction → ↑ Ca²⁺, AMPHOTERICIN B
 - ☐ Both → HRS.
- ✓ Afferent : Efferent Arteriole diameter alteration
 - ☐ Prostaglandin Inhibition
 - ☐ Angiotensin II Inhibition

- H₂O LOSS (DIARRHEA, VOMITING)
- BLOOD LOSS (HMG)
- PLASMA LOSS (BURNS, A. PARVOXITIS, DENGUE)
- LOSS INTO 3rd SPACES (ASCITES, PE)



INTRINSIC RENAL DISEASE

✓ LARGE VESSELS (RA, RV)
✓ SMALL VESSELS
✓ GLOMERULI
✓ TUBULOINTERSTITIUM

• 20-50% of all cases of ARF

• Causes :

✓ MCC - Acute Tubular Necrosis (90% of Intrinsic Causes) ✓

✓ Acute Renal Artery Embolization

✓ Acute Renal Vein Thrombosis

✓ Small Vessel Disease - HUS, TTP

✓ Acute Glomerulonephritis

• Ischemic ATN = PreRenal Causes + Structural Tubular Injury

PRC ca



V  TUBULI: (N)

TUBULI - DAMAGI -

Vizle PRERENAL vs INTRINSIC RENAL (ATN)

INDEX	PRERENAL AZOTEMIA	INTRINSIC ARF
1) <u>F_eNa</u>		
Urine Na		
BUN/s.Creat		
U _{Cr} /P _{Cr}		
Urine Osmolality (mOsm/L)		
Specific Gravity		
Casts		



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POST RENAL AZOTEMIA

- <5 % of all cases of ARF
- Usually Reversible
- Causes:
 - Obstruction at common tract i.e. Bladder or Urethra
 - Bilateral Ureteral Obstruction
 - Unilateral Obstruction in Single functioning kidney



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