Renal Disease

Please refer to the assignment page
Three online modules
TBLs
Renal Embryology
Lab Tests

- UA
- CBC
- Enzymes
- Creatinine
- Creatinine clearance
- Ammonia
- Abs
- C'
- Bx
BUN
Creatinine
Creatinine Clearance

Clearance of anything = \[\text{Urine of } x \text{ (vol in ml/min)}\]
\[\text{Plasma of } x\]

- Expressed in ml/min.
- Note the concentrations drop out.
- How many minutes in a day?

Urinalysis
- Don’t use old dipsticks
- Microscopic

Azotemia
- Nitrogenous wastes
- Asymptomatic
- Causes
  - Pre-renal
  - Renal
  - Post renal
- Uremia
  - Symptomatic of all renal related systems

Nephritic Syndrome
Nephritic Syndrome

Nephrotic Syndrome

Uremia vs. Azotemia

Glomerular Disease, Common Features
- Cellularity
- Membrane thickening
- Mesangial proliferation
- Scarring

Tubulointestinal Injury with GN

REDUCTIONS IN RENAL MASS
- Systemic hypertension
- Intraglomerular hypertension
- Glomerular hypertrophy
- Mesangial cell hyperplasia/ECM deposition
- Intraglomerular coagulation
- Epithelial/endothelial injury

Focal Glomerulosclerosis
Proteinuria
Types of immunological injury....again

- Ag/Ab complex
  - Foreign or
  - Internal (SLE)
- Cross reacting
- 'Planted' antigen

Acute Proliferative GN
Mebranoproliferative GN

Membranoproliferative GN

Membranoproliferative GN

Membranoproliferative GN

Membranoproliferative GN

Tram Track

Focal Segmental GN

MISTAKES
if you see that my fungus is out of control, call someone as a warning to others.
IgA Nephropathy

- Recurrent hematuria
- Eventually proteinuria and renal failure.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Uptake Sites</th>
<th>Clinical Manifestations</th>
<th>Pathogens</th>
<th>Light Microscopy</th>
<th>Immunofluorescence</th>
<th>Electron Microscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgA nephropathy</td>
<td>Bowman's capsule</td>
<td>Recurrent hematuria</td>
<td>Staphylococci, streptococci</td>
<td>Membranous glomerulopathy</td>
<td>IgA deposits, C3 deposits</td>
<td>Focal segmental glomerulosclerosis</td>
</tr>
</tbody>
</table>

**Tubular Disease**

- Microscopic hematuria
- Proteinuria
- Renal failure

**ARF**

1. **Schema**
   - Endothelial dysfunction
   - Tubule injury
   - Renal vasoconstriction
   - Loss of GFR
   - Oliguria

2. **Pathophysiological processes**
   - Renal vasoconstriction
   - Tubular injury
   - Renal tubule dysfunction
   - Reduced GFR → Oliguria
Chronic Pyelonephritis

Renal Papillary Necrosis

Urinary Reflux
Renal Artery Stenosis

Clotting and Microangiopathy
- Small vessels
  - Arterioles
  - Capillaries
- Endothelial injury
- Either platelet or protein activation
- Small vessel thrombosis
- Goes on everywhere
  - Kidneys
  - CNS
  - GI

DIC, Disseminated Intravascular Coagulation
- Many causes
  - Infection, gr-
  - Trauma
    - Tissue thromboplastin
- Coag protein activation
- Endothelial injury
- Clotting all over the place

Hemolytic Uremic Syndromes
- Endothelial injury
- Platelet aggregation
- Childhood
  - E. coli O157
  - Verocytotoxin
  - Shigella
- Adult
  - Infection
  - Antiphospholipid
  - TTP

Hemolytic Uremic Syndrome
Emboli

Cortical Necrosis

Congenital Abnormalities

Vascular
Renal Cystic Disease
Medullary Cystic Disease

Dialysis patients
Renal Cystic Dysplasia

Prune Belly

- Boys with a thin or lax abdominal wall
- Prostatic urethra is long and dilated as a result of prostatic hypoplasia.
- Large, vertically oriented, thick-walled dome bladder
- Tortuous and dilated ureters.
- Varying amounts of hydronephrosis and varying degrees of renal dysplasia
- Cryptorchidism.
Obstructive Uropathy

Tubulointerstitial Disease

Other Evidence

Urinary Reflux

UPJ Obstruction
Renal Stones

Lithotripter
Von Hippel Lindau

- Von Hippel-Lindau (VHL) disease is an inherited disorder that affects one in 32,000 people worldwide.
- Adults with VHL have frequent recurrent tumors in kidneys, retinas, central nervous system.
- VHL disease is caused by mutations in the VHL tumor suppressor gene.

Von Hippel Lindau disease is an inherited disorder that affects one in 32,000 people worldwide. Adults with VHL have frequent recurrent tumors in kidneys, retinas, central nervous system. VHL disease is caused by mutations in the VHL tumor suppressor gene.
Wilm’s Tumor

Transition Cell Carcinomas of the Kidney
Lower Urinary Tract

Congenital Abnormalities

Hunner Ulcer
- Interstitial Cystitis
- Autoimmune?
- SLE
- Women
- Persistent
- Painful
- Chronic cystitis
- Fibrosis

Malcoplakia
Transition Cell Carcinoma

- Smoking
- Industrial
  - Arylamines
  - Long time
- Schistosome
- Analgesic
- Radiation
- Chemo
  - Cyclophosphomides

Trabeculation
Congenital Abnormalities

- Hypospadius
  - Urethral opening on ventral surface of penis.
- Epispadius
  - Urethral opening on dorsal surface of penis.
- Both associated with undescended testis

Urethral Cancer