NURS 821 Alterations in Reproduction; Alterations in Elimination

Lecture 10

Part 4 Intrarenal Causes of Renal Failure

Renal Failure Classification

- Intra-renal
  - those resulting from actual renal pathology
  - may also result from an unresolved pre-renal or post-renal condition.
  - Cortical involvement may be vascular, infectious, or immunologic in origin.

Causes of Renal Failure cont'd

- Intra-Renal

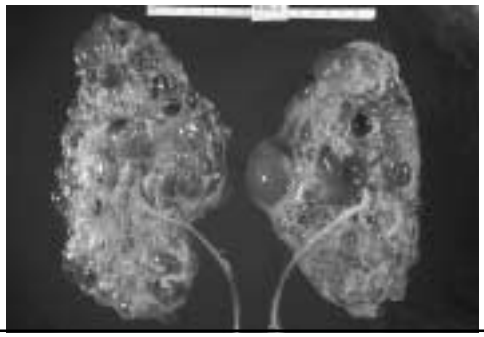
- **Pyelonephritis**
- **Acute glomerulonephritis**
- **Rapidly progressive glomerulonephritis**
- **Membranous glomerulonephritis**
- **Goodpasture's syndrome**
- **Systemic lupus erythmatosis**
- **Polyarteritis nodosa**
- **Scleroderma**
- **Diabetes mellitus**
- **Amyloidosis**
- **Nephrocalcinosis**
- **Gout**
- **Hereditary nephropathy**
- **Polycystic kidneys**
- **Renal hypoplasia**
- **Drugs**
- **Heavy metals**
- **Industrial solvents**
- **Acute Tubular necrosis**
- **Bilateral cortical necrosis**
- **Sickle cell disease**
- **Radiation Nephritis**

Polycystic Kidney Disease (PKD)

- Definition: Genetic disease in which numerous fluid-filled cysts fill the kidneys; affects other organs also

- Incidence: 500,000
- 4th leading cause of ESRD
- Affects all races, M=F
- Infantile form-rare, but rapidly progresses
- May have slight increase in women and Whites (NIDDK, 2000)

Polycystic Kidney Disease



PKD Pathophysiology

- Large fluid-filled cysts grow from nephrons
- Separate and enlarge
- Encroach upon total kidney mass and function-decreasing GFR
- Thousands may develop
- Kidney may weigh up to 22 lbs.!
- HTN usually develops before cysts appear (NIDDK, 2000)

Calcium-Phosphate Metabolism

- Dietary intake is approximately 1 gm/day
- Kidney excretes 200 mg Ca and 400 mg PO_4 daily for homeostasis
- Hypocalcemia-
  - Parathyroid secretes parathormone causing renal excretion of PO_4
  - Bone release of calcium

PKD Forms

- Autosomal dominant
  - More common form
  - 90%
  - Symptomatic between age 30-40
- Autosomal recessive
  - Rare
  - May develop in womb or early infancy

PKD

- May have multi-organ system problems-cysts in liver, pancreas; diverticula; aneurysms in brain; abnormal cardiac valves
- Associated renal problems-kidney stones, hematuria, UTI, HTN
- DX with ultrasound

Hallmark Manifestations of Glomerular Disease

- Proteinuria
- Proteinemia
- Hematuria
- Edema-may be marked, including anasarca

Nephrotic Syndrome

- Vicious Cycle of Edema and Anasarca
  - Low oncotic pressure
  - Aldosterone secreted by adrenal cortex
  - Na reabsorbed
  - Increased plasma hydrostatic pressure
  - Inadequated serum oncotic pressure
  - edema

Glomerulonephritis

- Inflammation of membrane in kidney which filters wastes and fluid from blood
- Etiology
  - Primary-immune responses
    - Strept, staph, hepatitis
  - Secondary to systemic diseases
    - Autoimmune disorders such as SLE-lupus nephritis
    - Goodpasture's syndrome
    - Post-partum
    - (NIDDK, 2000)

Glomerulonephritis

- Etiology
  - Acute post-streptococcal glomerulo-nephritis (PSGN)
  - Bacterial endocarditis
  - HIV infection

(NIDDK, 2000)

Acute Post-streptococcal Glomerulonephritis

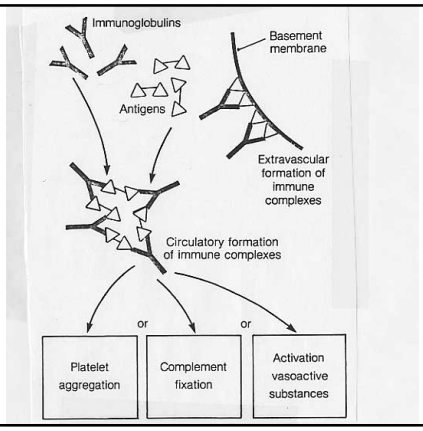
- Etiology-streptococcal infection-throat or impetigo (rare)
- Increased incidence in boys, age 3-7
- One of most common causes of Acute Renal Failure (ARF)
  - occurs 2-3 weeks post-infection
  - many have no long-term sequelae

(NIDDK, 2000)

Acute Post-streptococcal Glomerulonephritis

- Pathophysiology-
  - Type III hypersensitivity response
  - Results in attack of glomeruli

Type III Hypersensitivity Response



HIV Glomerulonephritis

- Incidence-5-10% of PWA develop prior to full blown AIDS
- Manifestations-starts with heavy proteinuria and rapidly progresses to ESRD

(NIDDK, 2000)

Glomerulosclerosis

- Definition-Scarring or hardening of the blood vessels in the kidneys

Glomerulosclerosis

- **Definition**-Scarring or hardening of the blood vessels in the kidneys
- Etiology
  - DM-leading cause of diabetic nephropathy
    - Scarring of kidney
    - Increases speed of processing of blood due to glycemia
    - HTN
  - Unknown-growth factors released by glomerulus or circulating to the glomerulus from elsewhere
  - (NIDDK, 2000)

Pyelonephritis

- Definition: Unilateral or bilateral infection of renal pelvis and interstitium
- Etiology: usually bacterial in origin, ascending from urethra
- Incidence: F>M
- Pathophysiology: Infection and inflammation ascend and worsen prognosis from renal medulla to cortex to necrosis of renal papilla
  - Glomerulus unaffected
  - Renal tubules usually affected

Pyelonephritis

- Pathophysiology:
  - Resolution of acute phase
  - Scarring
  - Tubular atrophy

Manifestations

- Fever and chills
- Flank pain, costovertebral tenderness
- Frequency, dysuria

Chronic Pyelonephritis (Interstitial Nephritis)

- Etiology:
  - Recurrent acute pyelonephritis
  - Ischemia
  - Radiation
  - Immune complex diseases
  - Drugs=aspirin, acetaminophen, phenacetin

Chronic Pyelonephritis

Pathophysiology

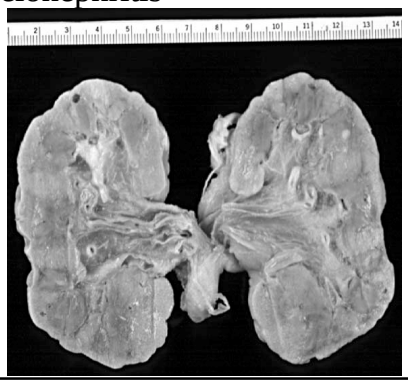
Initially, inflammation and fibrosis occurs in interstitium between tubules

- Gradual tubular atrophy, dilation, destruction and scarring
- May affect renal concentrating ability

Manifestations

- Initially, none
- HTN
- Frequency, dysuria, flank pain

Pyelonephritis



IgA Nephropathy

- Etiology-Deposition of IgA in glomeruli-origin unknown
- Increased incidence in males
- NIDDK studying impact of fish oil capsules and steroids

(NIDDK, 2000)

Goodpasture's Syndrome

- Etiology-
  - Unknown
  - Autoantibodies attack kidneys and lungs
- Lungs not as affected
- Increased incidence in young men

(NIDDK, 2000)