Urinary Disorders

Objectives
- Review anatomy and physiology
- Discuss etiology, pathophysiology, manifestation, management and nursing diagnosis of:
  - Renal calculi
  - Polycystic kidney disease
  - Glomerulonephritis
  - Prostatitis
  - BPH

Urinary System A & P
- Organs include:
  - Paired kidneys
  - Paired ureters
  - Bladder
  - Urethra

Function of kidneys is to:
- Form urine
- Excrete metabolic waste
- Regulate acid base balance
- Secret hormones
- Nephrons
  - Glomerulus
  - Proximal convolute tubules
  - Loop of Henle
  - Distal convoluted tubules

Normal Lab values
- BUN: 8 to 25 mg/dl
- Creatinine: 0.6 to 1.5 mg/dl
- GFR: 120 mL/min
- Sodium: 135 to 145 mmol/L
- Potassium: 3.5-5.5 mEq/L
- Chloride: 97-110 mmol/L
- Glucose (fasting plasma) 70-110 mg/dl
- Hemoglobin
  - Male: 13.8-17.2 g/dl
  - Female: 12.1-15.1 g/dl
- HCT
  - Male: 40-50%
  - Female: 36-44%

Urinary calculi
- Incidence and risk factors
  - Industrialized country
  - In US – south or Midwest
  - males > females
  - Family hx
  - Dehydration
  - Immobility
  - Ca, oxalate, protein intake
  - Gout, urinary stasis, hyperparathyroidism
Renal Calculi - Pathophysiology

- 3 contributing factors:
  - Super saturation
  - Nucleation
  - Lack of inhibitory substances

- Composition:
  - 75-80% are calcium stones
  - 5-10% Uric acid stones
  - 15-20% Struvite stones
  - Cystine stones

Manifestation Renal Calculi

- Kidney stones:
  - Often asymptomatic
  - Dull aching flank pain
  - Microscopic hematuria
  - UTI

- Bladder stones:
  - May be asymptomatic
  - Dull suprapubic pain
  - Gross or microscopic hematuria
  - UTI

- Ureteral stones:
  - Renal colic
  - Acute severe flank pain
  - Radiates to suprapubic region, groin, and external genitals
  - N/V, pallor, cool clammy
  - UTI

Complication of Renal Calculi

- UTI
  - Chills, fever, urgency, frequency, dysuria

- Hydronephrosis
  - Acute
    - Acute colicky pain, may radiate into groin and abdomen
    - Hematuria, pyuria
    - Fever, N/V
  - Chronic
    - Dull, aching flank pain
    - Hematuria, pyuria
    - Fever
    - Palpable flank mass

Diagnosis Renal Calculi

- Symptoms
- Lab tests
  - UA
  - Serum calcium, phosphorus, uric acid levels
  - Urine calcium uric acid, oxalate levels
  - Chemical analysis of stones
- Radiology tests
  - KUB
  - Renal ultrasound
  - CT
  - IVP

Diagnosis - IVP

Management Renal Calculi

- Medication
  - Analgesic
  - Prevention of further calculi
  - Antibiotics
  - Nutrition and fluid
    - Oral and IV fluids
    - Limit foods that can contribute to stone formation
Management Renal Calculi
- **Extracorporeal shock wave lithotripsy (ESWL)**
  - Sound shock wave to break stone into small fragments
  - Under conscious sedation
  - Strain all urine to monitor passage of stone fragments
  - Bruising may occur on flank

Management Renal Calculi
- **Laser lithroscopy**
  - Nephroscope or ureteroscope
  - **Retrograde ureteroscopy**
    - Stones are manually removed
  - **Surgery - rare**

Management Renal Calculi
- **Percutaneous ultrasonic lithotripsy**
  - Nephroscope
  - Stone fragmented using ultrasonic waves

Nursing Care Renal Calculi
- **H & P**
- **Pain control**
- **Adequate fluid intake**
- **Strain urine**
- **Teaching:**
  - Dietary changes
  - Adequate fluid intake
  - Physical activity

Nursing Diagnosis – Renal Calculi
- **Acute pain**
- **Impaired urinary elimination**
- **Knowledge deficit**
- **Risk for infection**
- **Fluid volume deficit**

Polycystic Kidney Disease
- **Hereditary – cyst formation and kidney enlargement**
- **2 forms**
  - Autosomal recessive
  - Autosomal dominant
- **Incidence**
  - Autosomal dominant affects 1 in 300-1000 people in US
  - Accounts for 4% ESRD
Polycystic Kidney Disease

**Pathophysiology**
- Fluid filled cysts affect nephrons
- Renal blood vessels and nephrons compressed
- Fibrotic, atrophic, scarred tissue

**Manifestation**
- Slow progression
- Flank pain, hematuria, UTI, calculi, HTN, CRF

Polycystic Kidney Disease - Management

**Diagnosis**
- Renal US
- IVP
- CT
**Supportive management**
- Avoid further renal damage
- Stress increased fluid intake
- Control HTN

**Nursing Dx**
- Knowledge deficit
- Risk for ineffective coping
- Chronic /acute pain
- Constipation
- Risk for infection
- Potential for HTN
- Potential for renal failure
- Excess fluid volume

Glomerulonephritis

**Inflammation of glomerular capillary membrane**
- Streptococcal or viral infection
- Immune complexes trapped in glomerular membrane
- Leading cause of CRF in US

Glomerulonephritis - Manifestation

**Acute disease onset rapid**
- Hematuria, proteinuria, salt and H2O retention
- Brown urine
- Edema
- HTN
- Fatigue
- Anorexia
- N/V
- Pulmonary infiltrates
Glomerulonephritis
- Nephrotic syndrome
  - Proteinuria, hypoalbinemia, hyperlipidemia,
  - Glomerulonephropathy
  - Edema
  - Risk of thromboemboli
  - Risk for renal impairment

- Good-pasture syndrome
  - Auto-immune disorder
  - Unknown etiology
  - Antibodies form
  - Mainly affects young men
  - Causes hematuria, proteinuria, edema

- Chronic glomerulonephritis
  - Progressive
  - Kidneys decrease in size
  - Course varies

- Diagnosis
  - Streptococci detection
    - Throat or skin culture
    - Antistreptolysin O (ASO) titer
  - ESR
  - KUB
  - Kidney scan
  - Biopsy
  - BUN
  - Creatinine
  - Creatinine clearance
  - Serum electrolytes
  - UA

- Management
  - Medication
    - Antibiotics
    - Immunosuppressive therapy
  - Treatment
    - Bedrest
    - Na+, K, and protein restriction
    - Diuretics
    - Plasmapheresis
    - Dialysis

- Nursing Dx
  - Excess fluid volume
  - Ineffective tissue perfusion
  - Risk for imbalanced nutrition
  - Ineffective protection
  - Risk for ineffective therapeutic regimen management
  - Fatigue
  - Ineffective role performance
Prostatitis

- Inflammation of prostate gland
- Acute bacterial prostatitis
- Chronic bacterial prostatitis
- Chronic prostatitis
- Prostatodynia

Prostatitis

- Diagnosis
  - Cultures
  - X-ray, US

- Medications
  - Antibiotics
  - NSAIDS
  - Anticholinergics
  - Muscle relaxants

Prostatitis

- Nursing care
  - Symptom management
    - Sitz bath or local heat
    - NSAIDS
    - Increase fluid intake
    - Regular BM
    - Finish antibiotic therapy

Benign Prostate Hyperplasia (BPH)

- Age related non-malignant enlargement of the prostate gland
- Begins age 40-45
- Affects 50% men >60 years

Risk factors:
  - Age
  - Family Hx
  - Race
  - Diet

BPH - Pathophysiology

- Precondition:
  - age>50
  - Testes
  - Hyperplasia
  - Hypertrophy

BPH- Manifestation

- Diminished force of urinary stream
- Hesitancy in initiating urinary stream
- Post void dribble
- Sensation of incomplete emptying
- Urinary retention
- Nocturia
- Frequency
- Urgency and urge incontinence
- Dysuria
BPH - Complications
- Bladder distension
- Infection
- Hydronephrosis
- Renal insufficiency

BPH - Diagnosis
- Physical examination
- DRE
- Post-void catheterization
- Tests
  - BMP
  - UA
  - PSA
  - KUB/IVP

BPH - Management
- Medication
  - Anti-androgen
  - Alpha-adrenergic antagonist
  - Herbal
  - Meds to avoid: antihistamines, anticholinergics
- Surgery
  - Criteria:
    - Chronic bladder infection
    - Acute urinary retention
    - Hematuria
    - Hydronephrosis
    - Bladder neck obstruction syndrome (frequency, urgency)

BPH - Surgery
- Transurethral microwave thermotheray
- TUNA
- TURP
- TUIP
- YAG

BPH - Surgery
- Open surgery
  - Large prostate
  - Abdominal wall
  - Perineal floor

BPH – Nursing Care
- Pre – op
  - Assess knowledge of procedure
  - Explain procedure and post op expectations
- Post-op
  - VS
  - I+O
  - Catheter patency
  - Pain management
  - Labs
  - SCD
  - Encourage fluid intake
BPH – Nursing Care

- Continuous bladder irrigation (CBI)
  - Purpose:
    - Traction on prostate
    - Wash out clots
  - Care
    - Accurate I+O
    - Explain CBI to pt
    - Assess catheter q 1-2 hrs
    - Assess labs: H/H, Na

BPH – Nursing Diagnosis

- Knowledge deficit
- Acute pain
- Urinary retention
- Risk for infection
- Risk for imbalanced fluid volume

Questions???????

Renal calculi – case study

- David Foster, 28 y/o carpenter admitted w/ severe right sided flank pain
- Tests ordered?
- Assessment findings?
- Management?
- Nursing Dx?

Nursing care of client having Lithotripsy

Glomerulonephritis – Case study

- Tanesha Johnson 29 y/o student teacher presents to her provider w/ c/o brown frothy urine.
- Tests ordered?
- Assessment findings?
- Management?
- Nursing Dx?
Benign Prostate Hyperplasia

- Frank Johnson 65 y/o retired bank manager c/o urinary frequency – small amounts only
- Tests ordered?
- Assessment findings?
- Management?
- Nursing Dx?