1 ## Selected Genitourinary Topics

- Cystitis
- Pyelonephritis
- Glomerulonephritis
- Renal colic
- Bladder cancer
- Urinary diversions
- Polycystic kidney disease

2 ## Types of Cystitis

Inflammation/infection of the urinary bladder

- Infectious
  - Bacterial (majority of cases E. Coli) viral, fungal, parasitic
- Non infectious cystitis
  - Radiation, medications, food, drinks, chemicals
- Interstitial cystitis
  - Rare, idiopathic chronic inflammatory process, not caused by bacteria
- Asymptomatic bacteruria

3 ## Etiology and Contributing Factors

- Genitourinary factors
  - Obstruction, calculi, vesicoureteral reflux, incomplete emptying
- Disease factors
  - Diabetes, cancer, neurological stressors, AIDS, SLE, hormonal imbalance
- Urine characteristics
  - Alkaline, concentrated urine
- Environmental factors
  - Instrumentation, sexual activity, hygiene
- Anatomical factors
  - Maturational age, length of urethra

Review table 73-1

4 ## Pathophysiology

- Inflammation, infectious process or irritant entering the sterile environment of the bladder
- Undiagnosed structural abnormality
- Abnormal urodynamics
- Nephritis and sepsis are primary complications

5 ## Clinical Manifestations

- Dysuria
- Frequency
- Urgency
- Hesitancy
- Cloudy, malodorous urine
- Lower abdominal pain
- Mild fever <101°F, chills, malaise
- In upper UTI (pyelonephritis) see rapid onset of high fever >102°F, shaking chills, N/V, flank pain
- In elderly: fever or hypothermia, anorexia, lethargy, mental status changes may be only signs

6 ## Labs and Diagnostics

- Identification of infection
  - Urinalysis (clean catch) and C&S
  - WBC count, CBC, BMP, CMP
- Identification of contributing causes
  - Renal/bladder ultrasound
  - Voiding cystourethrogram (VCUG)
  - Intravenous pyelogram (IVP)
  - Postvoid residual volume
  - Radionuclide scan
  - Cystoscopy

7 ## Nursing diagnoses and PC's

- PC:urosepsis
- PC:pyelonephritis
- Acute pain
- PC: antibiotic therapy adverse effects
- Impaired urinary elimination: Urge incontinence
- Risk for ineffective therapeutic regimen management

8 ## Management of Cystitis

Eradication of infectious agent

- Antifolates/Sulfonamides
  - Trimethoprim-sulfamethoxazole D.S. (TMP/SMZ, Bactrim). First choice and effective against most UTI pathogens. Check sulfa allergy. Drink large amounts of fluids to prevent sediment and calculi. Do not give Vitamin C, it increases calculi risk.
- Fluoroquinolones/antimicrobials
  - Ciprofloxacin (cipro) used for pseudomonas and other multi-drug resistant organisms
  - Levofloxacin (levaquin)
- Cephalosporins - cephalexin (keflex), duracef
- Penicillins: amoxicillin, augmentin
- Urinary antiseptics - Nitrofurantoin (macrobid)
- Refer to chart 73-3 in text for further discussion

9 ## Management of Cystitis

Acute pain

- Pain management
  - Bladder anesthetic - Phenazopyridine (pyridium) decreases burning, give with food, turns urine red or orange
  - Antispasmodic
    - Anticholinergic – hyoscamine (anaspaz)
      - **Watch for urinary retention**
      - **Safety issues**
  - **Increase fluid intake**
    - 3-4 L/day, avoiding caffeine, alcohol, tea (bladder irritants).
      take cranberry juice and Vitamin C to acidify urine
  - Heating pad to abdomen
  - Some sources recommend baths to relieve acute pain

10 ## PC: Urosepsis/Pyelonephritis

- Assess for s/s of urosepsis: fever <101°F. tachycardia, tachypnea, hypotension, AMS
- Assess for s/s of pyelonephritis: fever >102°F, shaking chills, N/V, malaise, flank pain

- Assess CVA tenderness q4hrs & PRN
- Check VS q4h and PRN

11 Acute and Chronic Pyelonephritis

12

13 PC: Urosepsis/Pyelonephritis
- Monitor CBC, renal function labs, blood & urine cultures
- Administer antibiotics (outpatient for chronic)
- Administer IV fluids and Monitor intake and output; check for hematuria, cloudy urine (inpatient for acute)
- Obtain dietary consult
- Bedrest until stable
- Follow-up urine cultures
- Assess s/s of septic shock, initiate emergency intervention and consult MD

14 Impaired urinary elimination, Urge incontinence
- Assess urinary elimination pattern
  - Consider intake
- Encourage adequate hydration PO in addition to IV fluids
- Inform client of bladder irritants and how to avoid them
- Reinforce voiding as needed, do not wait
- Provide bladder anesthetics as ordered

15 Risk for ineffective therapeutic regimen management/recurrent UTI
- Teach s/s of UTI, when to call PCP
- Complete the course of medications
- Void when you have the urge
- Empty bladder completely
- 6-8 glasses of fluid per day
- Cleanse perineum, front to back
- Use white toilet paper
- No perfumes to perineal area

16 Risk for ineffective therapeutic regimen management/recurrent UTI
- Void before and after sexual intercourse
- Prophylactic single dose of antibiotics after intercourse if risk of chronic UTI high
- Daily low dose of TMP/SMZ or nitrofurantoin for 6 months or longer for high risk chronic UTI's
- Showers better than baths
- Aseptic technique during catheterization
- Perineal cleansing around catheter
- Cranberry juice and Vitamin C

17 ☐ **Acute Glomerulonephritis**

- Inflammatory reaction in the glomeruli, 2ndry to systemic infections or stressors.
- Molecules formed from antigen-antibody reaction; renal tissue, bacteria, viruses, drugs, toxins lodge in glomeruli and cause injury
- See table 74-2 and 74-3 for systemic stressors/syndromes & infectious causes

18 ☐ Pathophysiology

- Kidneys enlarged, swollen, scarred
- Increased capillary permeability in kidneys
- Decreased GFR
- Azotemia –(elevated protein and BUN) nitogenous waste products in blood

19 ☐ Collaborative Management: Assessment

- History of recent infection or illness
- Change in urine volume and color
- Fluid overload, s/s often confused with CHF
- Labs and diagnostics:
  - Hematuria, proteinuria
  - 24 hr urine for creatinine clearance shows decreased creatinine and ↓GFR
  - **↑BUN, ↓serum albumin**
  - **Positive autoimmune inflammatory tests**
  - **Renal biopsy identifies cell type, trissue deposits and presence of immunoglobulins**

20 ☐ Collaborative management Interventions

- Antibiotics based on C & S, and gram stain: Penicillin, erythromycin
- Bed rest, energy conserving measures
- Monitor CMP
- Restrict Na
- ↓ protein if azotemia (↑BUN & protein)
- Loop diuretics , I & O
- Antihypertensive medications
- Corticosteroids for autoimmune inflammation
- Plasmapheresis to remove antibodies
- May need short term dialysis

21 ☐ Recovery phase of Acute Glomerulonephritis

- Diuresis begins 1-2 weeks after onset of symptoms
- Edema and Hypertension subside
- Proteinuria and microscopic hematuria persist for months

22 ☐ Client Education

- Regular check ups
- Report early signs of infection
- Report signs of renal failure: decreased urinary output-N&V, weight gain
- Medication instructions

23 ☐ **Chronic Glomerulonephritis**

- Develops over 20-30 years
- May be caused by acute form or may represent a milder type of antigen-antibody reaction
- Biopsy will show atrophic changes in kidney with greatly reduced functional nephrons
- Same s/s as acute GN, develop slowly
- Treatments same as acute GN, based on assessment of H & P, labs and diagnostics

24 ☐ Urolithiasis

- Common stressor
- Calculi formation originating in kidney, travels through ureters causing spasm and pain
- Acute pain referred to as renal colic
- Stone may lodge leading to hyroureter, hydronephrosis, infection, and permanent kidney damage

25 ☐ Urolithiasis

- Precipitators of calculi:
  - Slow urine flow-urine saturates with calcium or other stone forming element
  - Damage to lining of urinary tract
  - Decreased inhibitor substances
  - Hypercalcemia
  - Dehydration
  - Hyperuricemia (gout)
  - Drugs: triamterene, indinavir,diamox
- In this scenario, the rolling stone gathers moss

26 ☐ Urolithiasis

Types of Stones

- Ca Phosphate or Ca Oxalate comprise 80% of stones
- Uric Acid
- Cystine- genetic autosomal recessive.
- Struvite stones- triple phosphate-Ca, Mag, and Ammonium Phosphate-bacteria

27 ☐ Collaborative Management Assessment

- Family or client history of urolithiasis
- Severe pain (Renal colic)
- Urinary obstruction or bladder distension
- tissue trauma with secondary hemorrhage and infection.
- Renal Colic- originates deep in lumbar region and radiates around the side and down toward the testicle in the male, labia and bladder in the female.
- N/V, diaphoresis 2ndry to pain

28 ☐ Labs/Diagnostics

- Urine studies
- WBC's elevated

- Serum Ca. PHOS, Uric acid elevated
- KUB, IVP
- MRI, ultrasound
- Noncontrast helical CT (preferred radiological procedure)

29 ☐ Collaborative Management

- Pain management and facilitation of stone passage
  - Toradol
  - Morphine sulfate
  - Calcium channel blockers
    - Procardia relaxes smooth muscle
  - Spasmolytics: Ditropan, Pro-Banthine
- Identification and management of complications
  - Infection- Antibiotics
  - Obstruction
    - Extracorporeal shock-wavelithotripsy (ESWL)
    - Ureteroscopy with ureteral stent placement
    - Percutaneous nephrolithotomy

30 ☐ Collaborative Management

- Interventions to prevent recurring stones
  - Medications according to type of stone
    - Thiazide diuretics promote calcium restoration into the body
    - Allopurinol for uric acid stones
    - Allopurinol and Vit B6 for oxalate stones
  - Diet
    - Calcium, uric acid, oxalate restriction according to stone type
    - Avoid excessive salt and protein
    - Increase fluid intake
    - Moderate calcium consumption

31 ☐ Collaborative Management

- Nursing priorities
  - Care of client with UTI plus…..
  - PC: hydronephrosis/hydroureter
  - Acute pain
  - Risk for ineffective therapeutic regimen management

32 ☐ Hydronephrosis/Hydroureter

33 ☐ Extracorporeal shock-wave Lithotripsy

- Use of shockwaves to break stones.
- Client under minimal anesthesia
- Contraindicated with sepsis, bleeding, obesity (>300lbs) and pregnancy
- 90% effective
- Complications
  - Perinephric hematoma
    - Assess for severe pain, hypotension post-procedure and notify urologist if present
  - Hematuria and stone fragments
    - Strain all urine
    - Hydrate client

34 ☐ Ureteroscopy with stent placement

- Direct visualization for clients who are not candidates for ESWL
- Removes stones and restores patency of ureter
- Potential complications
  - Ureteral wall tears
- Done in OR

35 ☐ Percutaneous Nephrostomy

- For clients who require drainage of kidney that cannot be done by other means
- Nephrostomy tube placed in kidney and connected to drainage bag
- Monitor for infection, patency, hematuria
- Never clamp nephrostomy tube
- May instill sterile NS, but do not irrigate

36 ☐ Client teaching R/T renal calculi

- Refer to table 73-6 for dietary management
- Refer to chart 73-12 for further teaching with client

37 ☐ Bladder Cancer and Urinary Diversions

- Risk Factors
  - exposure to cigarette smoke
  - High fat fried food diet
  - men>women
  - Pelvic irradiation
  - use of cytoxan for other cancers
  - chronic cystitis
  - pyelonephritis
  - ureteral and renal calculi
  - exposure to carcinogens

38 ☐ Collaborative Management Assessment

- Hematuria: slightly rusty to bright red in color, first symptom, may be intermittent initially
- Dysuria & gross hematuria
- Obstruction from tumor with inability to void
- Pain during urinating
- Lower back pain

39 ☐ Collaborative Management Assessment

Labs and diagnostics

- Urine cytology
- Cystoscopy
- Biopsy
- IVP,CAT scan, MRI

40 ☐ Collaborative Management

Treatment

Treatment is according to stage

- Radiation –radium seed implants
- Chemotherapy instilled intravesically
  - Thiotepa
  - Mitomycin (Mutamycin)
  - Doxorubicin (Adriamycin)
- BCG administered intravesically for 6 weeks
- Systemic chemotherapy
- Systemic chemotherapy
  - Combination of drugs- (CM-VAC Cisplatin, Methotrexate, Vinblastine, (Adraimycin) and

Cyclophosphamide -transitional cell type responds poorly.
- Doxorubicin

41 Collaborative Management

Treatment

- **Surgical intervention**
  - Local resection of tumors-Bladder Fulguration-transurethral resection-TURBT
  - Nephrostomy and insertion of catheter into renal pelvis, urine drains directly from kidney
  - Radical cystoprostatectomy (men) urine diverted
    - **Remove the bladder, prostate, seminal vesicles and pelvic lymph nodes**
    - **Radical cystectomy**
  - Anterior pelvic exenteration (women) urine diverted
    - **Removal of bladder, urethra, uterus, ovaries and anterior vaginal wall**

42 Urinary diversions

The ideal bladder substitute should:
- maintain continence;
- maintain sterile urine;
- warn against overdistention;
- empty completely;
- protect the kidneys;
- prevent absorption of waste products;
- be socially acceptable;
- Allow client to maintain a high quality of life

43 Urinary Diversions for treatment of bladder cancer
- Ureterostomies –single, bilateral, double-barrel (ureterureterostomy)
- Ileal Conduit (ureteroileostomy)
- Colon conduit-pouch
- Ureterosigmoidostomy-void through rectum
- Ureteroiliosigmoidostomy-void through rectum

44 Urinary Diversions for treatment of bladder cancer

Complications of incontinent diversions:
- PC: wound infection, dehiscence
- PC: anastomotic leak
- PC: urinary leakage
- PC: ureteral obstruction
- PC: small bowel obstruction
- PC: stomal gangrene.
- Delayed complications- ureteral obstruction, stomal stenosis, pyelonephritis, hydronephrosis and renal calculi.

Assess, monitor, intervene to prevent complications and call physician at earliest sign.
An ounce of prevention is worth a pound of cure

45 Urinary Diversions for treatment of bladder cancer

Management of incontinent diversions:

- Drainage bag constantly worn.
- Stoma will shrink a little –use appropriate size appliance
- Bag is not changed unless leakage
- Hourly urines in early post-op period
- Urinary stoma smaller than bowel stoma
- Assess stoma for edema, bleeding, irritation and circulation- dark purple indicates impaired circulation.

46 Urinary Diversions for treatment of bladder cancer

Management of incontinent diversions:

- Inspect peristomal skin
- Proper fitting appliance and high fluid diet
- Alkaline skin crusting- from alkaline urine maintain acid urine to prevent alkaline irritation to skin. Ascorbic acid or cranberry juice (maintain urine ph at 6.5).
- wound infection: redness, drainage, odor
- Increase fluid intake
- Instruct pt to avoid gas forming foods

47 Urinary Diversions

- Variation of Kock- pouch (orthotopic bladder-ileocystoplasty) Neobladder
  - Pouch attached to urethra
  - Voids through urethra
  - Post-op: foley catheter , suprapubic catheter
  - Adequate output before removal of catheters
  - Performed mostly in men, urethra is spared
  - Some centers are also offering the procedure to females; neourethra with sphincter is created in addition to neobladder. Client has volitional control of urination and voids by Valsalva
  - Mucous production expected

48 Polycystic Kidney Disease (PKD)

- Fluid filled cysts develop in the epithelial cells of the nephrons of the kidney .
- Cysts can grow very large, affecting kidney function (filtration, reabsorption, secretion)
- Kidney tissue is replaced by non-functioning kidney cysts
- Kidneys can enlarge to 3X normal
- Kidney failure can occur

49 Etiology-Polycystic Kidney Disease

- Inherited disorder
  - Autosomal dominant trait (most common form). Offspring of parents have 50% chance of inheriting the gene. 100% of these children will develop renal cysts by age 30, and half will develop renal failure by age 50
  - Autosomal recessive trait (rare). To inherit this gene, both parents must carry a copy of the mutated allele and both must be inherited by child. Each child has 1 in 4 chance of inheriting ARPKD
- No way to prevent PKD at present

50 Clinical Manifestations

Polycystic Disease

- Hypertension
- Abdominal and flank pain
- Nocturia –(early sign)
- Dysuria
- Bright red or cola colored urine if cyst ruptures
- Increased abdominal girth

51 Clinical Manifestations

Polycystic Disease cont'd

- Kidney stones
- Constipation
- Easily palpated kidneys
- As renal function decreases –symptoms of renal failure occur

52 Diagnosis of PKD

- UA-protein in urine, hematuria
- C&S -bacteria
- BUN and Creatinine elevated as kidney function decreases
- 24 hour creatinine clearance-decreases –no creatinine in urine , staying in the blood
- Sonogram, CT scan, MRI

53 Collaborative Management

Nursing priorities

- Acute pain
- Chronic pain
- Constipation
- Risk for infection
- PC: sepsis
- PC: hypertension
- PC: renal calculi
- PC: renal failure

54 Collaborative Management

Interventions

- Review chart 74-2 for NIC interventions for clients with renal stressors
- Review plan of care for clients with UTI's, Cystitis, renal calculi and renal failure, infection, sepsis
- Review plan of care for clients with acute and chronic pain, constipation, and hypertension