Overview of Anatomy and Physiology
Functions of the urinary system
   Excretion of waste products
   Regulation of water, electrolytes, and acid-base balance
Kidneys (two)
   Nephron: Functional unit of kidneys
Urine composition and characteristics
   95% water; remainder is nitrogenous wastes and salts
Urine abnormalities
   Albumin; glucose; erythrocytes; ketones; leukocytes

Figure 50-2
Figure 50-3

Overview of Anatomy and Physiology
Ureters (two)
   Passageway for urine from the kidneys to the urinary bladder
Urinary bladder (one)
   Temporary storage pouch for urine
Urethra (one)
   Carries urine by peristalsis from the urinary bladder out to its external opening

Figure 50-5

Laboratory and Diagnostic Examinations
Urinalysis
   Blood urea nitrogen (BUN)
   Blood creatinine
   Creatinine clearance
   Prostate-specific antigen (PSA)
   Osmolality
   Kidney-ureter-bladder radiography (KUB)
   Intravenous pyelogram (IVP)
   Retrograde pyelography
   Voiding cystourethrography

Laboratory and Diagnostic Examinations
Endoscopic procedures
   Renal angiography
   Renal venogram
   Computed tomography (CT)
   Magnetic resonance imaging (MRI)
   Renal scan
   Ultrasonography
   Transrectal ultrasound
   Renal biopsy
   Urodynamic studies

Medication Considerations
Diuretics to enhance urinary output
   Thiazide diuretics
   Loop (or high-ceiling) diuretics
   Potassium-sparing diuretics
   Osmotic diuretics
   Carbonic anhydrase inhibitor diuretics

Medications for urinary tract infections
   Quinolone
Nitrofurantoin
Methenamine
Fluoroquinolone

Maintaining Adequate Urinary Drainage

Types of catheters
- Coudé catheter
- Foley catheter
- Malecot, Pezzer, or mushroom catheters
- Robinson catheter
- Ureteral catheters
- Whistle-tip catheter
- Cystostomy, vescostomy, or suprapubic catheter
- External (Texas or condom) catheter

Disorders of the Urinary System

Urinary retention
- Etiology/pathophysiology
  - The inability to void despite an urge to void
- Clinical manifestations/assessment
  - Distended bladder
  - Discomfort in pelvic region
  - Voiding frequent, small amounts

Disorders of the Urinary System (continued)
- Medical management/nursing interventions
  - Warm shower or sitz bath
  - Natural voiding position if possible
  - Urinary catheter
  - Surgical removal of obstruction
  - Analgesics

Disorders of the Urinary System

Urinary incontinence
- Etiology/pathophysiology
  - Involuntary loss of urine from the bladder
    - Total incontinence; dribbling; stress incontinence
  - Secondary
    - Infection; loss of sphincter control; sudden change in pressure in the abdomen
  - Permanent or temporary

Disorders of the Urinary System (continued)
- Clinical manifestations/assessment
  - Involuntary loss of urine
    - Leaking with coughing, sneezing, or lifting
- Medical management/nursing interventions
  - Treat underlying cause
  - Surgical repair of bladder
  - Temporary or permanent catheter
  - Bladder training
  - Kegel exercises

Disorders of the Urinary System
Neurogenic bladder
Etiology/pathophysiology
Loss of voluntary voiding control
Results in urinary retention or incontinence
Lesion of the nervous system that interferes with normal nerve conduction to the urinary bladder
Two types
  Spastic
  Flaccid

Disorders of the Urinary System
Neurogenic bladder (continued)
Clinical manifestations/assessment
Infrequent voiding
Incontinence
Diaphoresis, flushing, nausea prior to reflex incontinence
Medical management/nursing interventions
Antibiotics; urecholine
Intermittent catheterization
Bladder training

Disorders of the Urinary System
Urinary tract infections
Etiology/pathophysiology
Type depends on location
Pathogens enter the urinary tract
Nosocomial infection
Bladder obstruction
Insufficient bladder emptying
Decreased bactericidal secretions of the prostate
Perineal soiling in females
Sexual intercourse

Disorders of the Urinary System
Urinary tract infections (continued)
Clinical manifestations/assessment
Urgency; frequency; burning on urination
Nocturia
Abdominal discomfort; perineal or back pain
Cloudy or blood-tinged urine
Medical management/nursing interventions
Pharmacological management
Antibiotics; urinary antiseptics/analgesics
Encourage fluids
Perineal care

Obstructive Disorders of the Urinary System
Urinary obstruction
Etiology/pathophysiology
Strictures; kinks
Cysts; tumors
Calculi
Prostatic hypertrophy
Clinical manifestations/assessment
Continuous need to void
Voiding small amounts frequently
Pain
Nausea

Urinary obstruction (continued)
Medical management/nursing interventions
Establish urinary drainage
   Indwelling catheter
   Suprapubic cystostomy
   Ureterostomy
   Nephrostomy
Pharmacological management
   Pain relief
      Narcotics
      Anticholinergics

Hydronephrosis
   Etiology/pathophysiology
      Dilation of the renal pelvis and calyces
      Unilateral or bilateral
      Obstruction of the urinary tract
Clinical manifestations/assessment
   Dull flank pain (slow onset)
   Severe stabbing pain (sudden onset)
   Nausea and vomiting
   Frequency, dribbling, burning, and difficulty starting urination

Hydronephrosis (continued)
Medical management/nursing interventions
Pharmacological management
   Antibiotics
   Narcotic analgesics
Surgery to relieve obstruction
   Nephrectomy
      Severely damaged kidney

Urolithiasis
   Etiology/pathophysiology
      Formation of urinary calculi (stones)
      Develops from minerals
      Identified according to location
         Nephrolithiasis; ureterolithiasis; cystolithiasis
Clinical manifestations/assessment
   Flank or pelvic pain
   Nausea and vomiting
   Hematuria

Urolithiasis (continued)
Medical management/nursing interventions
   Antibiotics
   Encourage fluids
   Ambulate
   STRAIN ALL URINE
   Surgical procedures
      Cystoscopy; ureterolithotomy; pyelolithotomy; nephrolithotomy
   Lithotripsy
Renal Tumors

Etiology/pathophysiology
- Adenocarcinomas that develop unilaterally
- Renal cell carcinomas arise from cells of the proximal convoluted tubules

Clinical manifestations/assessment
- Early: Intermittent painless hematuria
- Late: Weight loss, Dull flank pain, Palpable mass in flank area, Gross hematuria

Medical management/nursing interventions
- Radical nephrectomy
- Radiation
- Chemotherapy

Renal Cysts

Etiology/pathophysiology
- Cysts form in the kidneys
- Polycystic kidney disease
- Cysts cause pressure on the kidney structures and compromise function

Clinical manifestations/assessment
- Abdominal and flank pain
- Voiding disturbances
- Recurrent UTIs
- Hematuria
- Hypertension

Medical management/nursing interventions
- No specific treatment
- Pharmacological management
  - Analgesics
  - Antibiotics
  - Antihypertensives
- Relieve pain
- Heat (unless bleeding)
- Dialysis
- Renal transplant

Tumors of the Urinary Bladder

Etiology/pathophysiology
- Most common site of cancer in the urinary tract
- Range from benign papillomas to invasive carcinoma

Clinical manifestations/assessment
- Painless intermittent hematuria
- Changes in voiding patterns

Medical management/nursing interventions
- Localized—remove tissue by burning
- Invasive lesions—partial or total cystectomy

Conditions Affecting the Prostate Gland

Benign prostatic hypertrophy
Etiology/pathophysiology
Enlargement of the prostate gland
Common in men 50 years old and older
Cause is unknown

Conditions Affecting the Prostate Gland
Benign prostatic hypertrophy (continued)
Clinical manifestations/assessment
Frequent urination
Difficulty starting urination
Dysuria
Frequent UTIs
Hematuria
Oliguria
Nocturia

Medical management/nursing interventions
Relieve obstruction—Foley catheter
Prostatectomy
Postoperative
TURP
Bladder irrigations
Urine will be pink to cherry red
Suprapubic or abdominal
Assess dressings

Cancer of the prostate
Etiology/pathophysiology
Malignant tumor of the prostate gland
Clinical manifestations/assessment
Initially
No symptoms
Advanced stages
Urinary obstruction

Medical management/nursing interventions
Localized: radiation and/or surgery
Men over 70 years old: Radiation and hormone therapy
Advanced
Estrogen therapy
Orchiectomy
Radiation therapy
Chemotherapy

Urethral strictures
Etiology/pathophysiology
Narrowing of the lumen of the urethra that interferes with urine flow; congenital or acquired
Clinical manifestations/assessment
Dysuria; nocturia
Weak urinary stream
Pain with bladder distention
Medical management/nursing interventions
Correction of stricture
Analgesics
Urinary Tract Trauma
Urinary tract trauma
  Etiology and pathophysiology
  Injury to the urinary tract may result from accidents, surgical intervention, and fractures
  Clinical manifestations
  Hematuria
  Abdominal pain and tenderness
Medical management/nursing interventions
Immunological Disorders of the Kidney
Nephrotic syndrome
  Etiology/pathophysiology
  Physiologic changes of the glomeruli interfere with selective permeability
  Clinical manifestations/assessment
  Proteinuria; hypoalbuminemia
  Generalized edema
  Anorexia
  Fatigue
  Oliguria
Immunological Disorders of the Kidney
Nephritis (acute glomerulonephritis)
  Etiology/pathophysiology
  Previous infection with β-hemolytic streptococcus (2-3 weeks prior)
  Preexisting multisystem diseases
Immunological Disorders of the Kidney
Nephritis (acute glomerulonephritis) (continued)
  Clinical manifestations/assessment
  Edema of the face
  Pallor
  Malaise
  Anorexia
  Dyspnea with exertion
  Hematuria
  Changes in voiding patterns
  Oliguria; dysuria
Immunological Disorders of the Kidney
Nephritis (acute glomerulonephritis) (continued)
Medical management/nursing interventions
Pharmacological management
  Antibiotics
  Diuretics
  Antihypertensives
Supportive management
Diet
  Protein and sodium restrictions
  Increase calories

Immunological Disorders of the Kidney
Nephritis (chronic glomerulonephritis)
Etiology/pathophysiology
  Slow, progressive destruction of glomeruli
  Commonly caused by other chronic illnesses
    Diabetes mellitus
    Systemic lupus erythematosus

Immunological Disorders of the Kidney
Nephritis (chronic glomerulonephritis) (continued)
Clinical manifestations/assessment
  Malaise; morning headaches
  Dyspnea with exertion
  Visual and digestive disturbances
  Generalized edema
  Weight loss
  Fatigue
  Hypertension
  Anemia
  Proteinuria

Immunological Disorders of the Kidney
Nephritis (chronic glomerulonephritis) (continued)
Medical management/nursing interventions
  Same as acute glomerulonephritis
  Renal dialysis
  Kidney transplant

Renal Failure
Acute renal failure
Etiology/pathophysiology
  Kidney function altered
    Interference with ability to filter blood
    Decrease in blood flow to the kidney
  Three phases
    Oliguric phase
    Diuretic phase
    Recovery phase

Renal Failure
Acute renal failure (continued)
Clinical manifestations/assessment
  Anorexia
  Nausea
  Vomiting
  Edema
Dry mucous membranes
Poor skin turgor
Urine output less than 400 mL/24 hours (oliguric phase)

Renal Failure
Acute renal failure (continued)
Medical management/nursing interventions
Pharmacological management
   Diuretics
   Antibiotics
   Kayexalate
Administer fluids
Assess for and treat electrolyte imbalances
Dialysis
Diet: High in carbohydrates; low in protein, potassium, and sodium

Renal Failure
Chronic renal failure
Etiology/pathophysiology
   End-stage renal failure
   Kidneys are unable to regain normal function
   Develops slowly over an extended period of time
   Result of kidney disease or other disease process that compromises renal blood flow

Renal Failure
Chronic renal failure (continued)
Clinical manifestations/assessment
   Headache
   Lethargy; decreased strength
   Anorexia
   Pruritus
   Anuria
   Muscle cramps or twitching
   Dusky yellow-tan or gray skin color
   Disorientation and mental lapses
   Anemia

Renal Failure
Chronic renal failure (continued)
Medical management/nursing interventions
   Dialysis
   Renal transplant
   Medications to treat symptoms
   Diet: High in calories; restricted protein, potassium, and sodium
   Restricted fluids
       300 to 600 mL above urine output

Care of the Patient Requiring Dialysis
A medical procedure for the removal of certain elements from the blood through a semi-permeable membrane (external or peritoneum)
Mimics kidney function
Two types
   Hemodialysis
   Peritoneal dialysis
Surgical Procedures for Urinary Disorders
Nephrectomy
Nephrostomy
Kidney transplantation
Urinary diversion
   Ileal conduit
   Continent ileal urinary reservoir or Kock pouch
Figure 50-12
Figure 50-13