Chapter 30 Clients with Renal or Male Reproductive System Disorders

Renal System

Structure and Function [corresponds to Figure 30-1]

- Kidneys
  - Nephron – functional unit
    - Glomerulus
    - Bowman's capsule [corresponds to Figure 30-2]
    - Loop of Henle
    - Reabsorption controlled by hormones (antidiuretic hormone, aldosterone); regulates fluids and electrolytes

- Ureters

- Bladder [corresponds to Figures 30-3, 30-4, and 30-5]

- Urethra: meatus, internal sphincter, external sphincter

- Urination – micturition; stretch receptors

Factors affecting urinary function [corresponds to Table 30-1]

- Age
- Activity level
- Food and fluid intake
- Medications
- Muscle tone
- Developmental level
- Psychosocial factors

Altered Urinary Elimination [Corresponds to Table 30-2]

- Diagnostic tests:
  - Blood urea nitrogen (BUN)
  - Creatinine clearance test to determine glomerular filtration rate (GFR)
  - X-ray of kidneys, ureters, and bladder (KUB)
  - Intravenous pyelography (IVP)
  - Computed tomography (CT) scan
  - Renal ultrasonography
  - Cytoscopy

- Urine characteristics [corresponds to Table 30-3]

- Promoting fluid intake
- Incontinence

Basic Skills for Urinary Care

- Collecting urine specimens [corresponds to Box 30-1 and Procedure 30-1]
  - Clean voided specimen
  - Clean-catch or midstream specimen [corresponds to Figure 30-6]
  - Timed urine specimen
  - Indwelling catheter specimen – sterile needle attached to syringe; taken through drainage port with self-sealing rubber catheter

- Urine testing
  - Specific gravity – normal is 1.010 to 1.025
    - Measured with urinometer or hydrometer in a cylinder of urine [corresponds to Figure 30-7]
    - Steps to measure specific gravity [corresponds to Box 30-2]
• Dipsticks used to measure pH, glucose, ketones, protein, occult blood
  o Urinary pH – normal is 6
  o Glucose – normally no glucose in urine
  o Ketones – ketones bodies normally not present, indicate breakdown of fatty acids
  o Protein - normally not in urine
  o Occult blood normally not in urine

° Measuring residual urine - catheter
° External urinary drainage devices
  o Condom or external catheter [corresponds to Procedure 30-2]
  o Drainage condom [Corresponds to Procedure 30-2]

° Urinary catheterization
  o Guidelines to prevent catheter-associated urinary infections
  o Straight catheter [corresponds to Figure 30-8A]
  o Coudé catheter [corresponds to Figure 30-8B]
  o Straight catheterization [corresponds to Procedure 30-3]
  o Retention or Foley catheter, double-lumen (double tube) catheter
    [corresponds to Figure 30-9A and Procedure 30-4]
  o Three-way Foley catheter [corresponds to Figure 30-9B]
  o Catheter selection [corresponds to Box 30-4]

° Removing retention catheters – usually by order of physician [corresponds to Procedure 30-5]
  o After prolonged period with catheter, urethral swelling may interfere with voiding; client may need to regain bladder muscle tone.
  o Urinary irrigations –
    o To wash out bladder, apply medication, or restore patency of catheter
    o Closed method preferred to reduce risk of infection; can be continuous or intermittent [corresponds to Procedure 30-6]
    o Open irrigation done when it is undesirable to change catheter [corresponds to Box 30-6]

° Suprapubic catheter care [corresponds to Figure 30-12] – involves regular assessment of urine, fluid intake, and comfort; skin care around site; maintenance of patent drainage system, clean dressings

Kidney Disorders
° Pyelonephritis – inflammation of kidney; acute or chronic; associated with other disorders
  o Risk factors: obstruction, pregnancy, congenital malformations, *E. coli*
  o Manifestations: temperature, chills, malaise, vomiting, possible flank pain
  o Treatment: antibiotics or antimicrobials; urinary anti-infectives for resistant or recurring infections
° Polycystic kidney disease – familial disease characterized by enlarged kidney, with fluid-filled cysts; found in children and adults
Manifestations: kidney pain in flank, hematuria, proteinuria, polyuria; possible hypertension, URI, calculi; kidneys are palpable; possible kidney failure

Treatment: increased fluid intake to help prevent URI and calculi; antihypertensives; later, possible hemodialysis; kidney transplantation

Glomerulonephritis – inflammatory disease of glomerulus; acute or chronic

- Manifestations of acute glomerulonephritis: abrupt onset, often after URI or other infection; proteinuria, hematuria, azotemia, oliguria (< 400 mL in 24 hr); fatigue, headache, hypertension, nausea, vomiting; pain over kidney area, generalized edema and facial puffiness, periorbital edema; symptoms resolving in 2 weeks in some, renal impairment in others

- Manifestations of chronic glomerulonephritis: slow, progressive inflammation resulting in sclerosis and scarring; kidneys atrophy; symptoms appear when disease is advanced; microproteinuria

- Treatment: steroids to reduce inflammation, antibiotics for infection; antihypertensives and diuretics to reduce BP and edema

- Nursing care: daily weights, I&O readings; provide diet low in sodium and protein and high in iron and carbohydrates

Urinary obstructions – caused by tumors, stones, cysts, stenosis, ureteral spasms, enlarge prostate, congenital strictures, surgery

- Nursing care: assess for signs of infection; monitor for fluid overload (< 30 mL of urine output per hour, crackles in lungs, edema of feet, hands, face); measure I&O, observe urine for blood, mucus, cloudiness

Renal failure – kidneys unable to function normally; characterized by:

- Uremia: accumulation of urea and other nitrogenous wastes in blood

- Azotemia: increased urea and creatinine in blood

- Acute renal failure: sudden reversible decrease in or lack of kidney function

  - Risk factors: dehydration or fluid volume deficit; glomerulonephritis, nephrotoxin exposure, allergic reactions; urinary obstruction

  - Manifestations of acute renal failure: sudden decrease in urine output to < 400 mL in 24 hr; confusion, disorientation, fluid volume excess; hypertension and heart failure; hyperkalemia; possible metabolic acidosis and anemia

  - Manifestations of chronic renal failure: irreversible (end-stage renal disease): polyuria, lowered specific gravity, polydipsia, enlargement of functioning nephrons; possible anuria, oliguria, weight gain, hypertension, pulmonary edema, congestive heart failure, dyspnea, hypervolemia; nausea, fatigue, apathy, generalized weakness.

  - Treatment: sodium restriction, increased calorie intake and low protein intake; diuretics; vitamin supplements and iron; dialysis to eliminate nephrotoxins and retained fluids in blood; depression; kidney transplant

  ↑ Hemodialysis or peritoneal dialysis [corresponds to Figure 30-14]
• Nursing care: focus on alleviating complications and promoting comfort; do NOT take BP or do venipuncture in arm with shunt; measure and record fluid intake; follow fluid restrictions exactly.

° Renal cancer
  o Bladder cancer 10th leading cause of death, more common in people over 50 and in men
  o Risk factors: smoking, obesity, dialysis, exposure to industrial pollutants
  o Manifestations: may be absent until tumor is advanced
  o Treatment (see Ch 34 for care of clients with cancer)

Disorders of the Ureters
  ° Calculi (urinary stones) – salts in urine precipitate
    o Manifestations: pain related to size of stone; flank pain; deep dull aching; nausea and vomiting; hematuria; elevated temperature, chills, and hypotension, possible pyuria, anuria, urine retention; dysuria, hesitancy, frequency, dribbling, noxia, decreased urinary force
    o Treatment: medications for pain, nausea, vomiting; ambulation to promote peristalsis and move stone; surgical stone removal; extracorporeal shock wave lithotripsy (ESWL) [corresponds to Figure 30-16]
    o Prevention of further stone formation: medication to prevent stone formation (potassium citrate, allopurinol, cellulose phosphate, or thiazide diuretics depending on composition and cause of stones); diet modifications; increased fluid intake
    o Nursing care: focus on managing pain, maintaining adequate urinary output, and preventing infection; assist client to position of comfort; strain all urine to isolate stones and sediment for analysis

° Urinary diversions – rerouting of urine, usually because of bladder removal due to cancer; ureters brought to skin surface to form stomas. Note, mucous shreds in urine are normal.
  o Ileal conduit (ileal loop) most common; pouch for urine created from segment of bowel; urine drains continuously
  o Kock pouch for continent urinary diversion in highly motivated clients; valve to contain urine; client catheterizes pouch q 4 hr
  o Priorities in nursing care for clients with ureteral diversions: meticulous skin care (aseptic technique with Kock pouch); monitor for UTI and report symptoms immediately; record I&O carefully

Bladder Disorders
  ° Bladder infection
    o Common, especially in women (UTI = 40% of nosocomial infections)
    o Manifestations: urgency, frequency, urgency, incontinence, dysuria, nocturia, hematuria; possible burning on urination, warmth, bladder cramps, low-grade fever; later perineal and suprapubic pain
    o Treatment: increased fluids and antibiotics; possible sitz baths; fluids (like cranberry juice) to acidify urine
    o Nursing care: manage pain and promote healthy bladder function; encourage fluids (unless contraindicated)
Bladder cancer (see Ch 34)
- Manifestations: painless hematuria most frequent symptom; urinary frequency, urgency, dysuria; kidney cancer: painless hematuria, dull pain in flank, mass in kidney
- Treatment: chemotherapy, radiation, immunotherapy, surgery to remove bladder or kidney

Urinary retention - inability to empty bladder completely, sometimes related to supine position in clients confined to bed
- Manifestations: urinary frequency, sensation of incomplete voiding
- Treatment: position changes; cholinergic drugs to stimulate bladder contraction; urinary catheterization (Foley, intermittent straight, suprapubic)
- Nursing care: anticipate orders for catheterization to drain residual urine; record and report amount; use sterile technique; teach clients how to prevent UTIs [corresponds to Box 30-7]
- Nursing Process Care Plan: Client with Urinary Tract Infection

Disorders of the Urethra
- Urethritis – inflammation
  - Manifestations: redness, irritation, edema of mucosa, urethral discharge, dysuria; when associated with STI drainage is thick and purulent; possible pruritis
  - Treatment: antibiotics, increased fluid intake, analgesics, sitz baths
  - Nursing care: use only sterile technique for catheterization; report urethral redness, swelling, irritation, or discharge; encourage increased fluid intake

Male Reproductive System
Structure and Function
- Primary organs
  - Testes – gonads, produce sperm (male gametes)
    - Anterior pituitary hormones -- follicle-stimulating hormone (FSH) and interstitial cell-stimulating hormone or luteinizing hormone (ICSH/LH) – stimulate testes to release testosterone
    - Testosterone also causes secondary sex characteristics (deeper voice, broader shoulders, more muscle mass)
- Accessory organs
  - Epididymis, ductus deferens, seminal vesicles (which provide energy source for sperm), prostate gland (with ducts that carry semen into urethra), bulbourethral glands (Cowper’s glands that neutralize acid and lubricate urethra), scrotum (holds testes; allows sperm formation at less than body temperature; has muscles to aid erection), penis (urethra for urine or sperm, erectile tissue)

Male Reproductive System Disorders
- Prostate disorders
  - Benign prostatic hypertrophy – usually begins about 50 years
    - Manifestations: urinary pattern changes, difficulty starting urinary stream, decreased urine force; feeling of incomplete emptying;
leaking, dribbling, incontinence; possible urgency, dysuria, hematuria, nocturia

• Diagnosis: prostate-specific antigen (PSA) test to rule out bladder cancer; BUN, serum creatinine, digital rectal exam; urinary function tests

• Treatment:
  ↑ Medications to relax smooth muscles of prostate and bladder sphincter; finasteride (Proscar) to block testosterone secretion; saw palmetto – herbal remedy
  ↑ Transurethral surgery, as in transurethral resection of prostate (TURP) [corresponds to Figure 30-21A]
  ↑ Suprapubic, retropubic, or perineal resection [corresponds to Figure 30-21B]
  ↑ Nonsurgical treatment – transurethral microwave antenna (TUMA) heats and destroys hypertrophic tissue; balloons and stents prevent obstruction

○ Prostatitis – inflammation of prostate from bacteria or virus
  • Manifestations: fever, chills, urinary frequency, nocturia; back pain, dysuria, urgency, obstruction; possible pain after ejaculation
  • Treatment: antibiotics; anti-inflammatories for pain, anticholinergics to aid voiding; possible stool softeners and sitz baths; frequent ejaculation recommended to eliminate prostate gland congestion

○ Prostate cancer – second leading cause of cancer death after lung cancer
  • Risk factors: age, family history, high-fat diet, chemical exposure, increased testosterone levels
  ↑ Prostate cancer and African American men [corresponds to Box 30-8]
  • Manifestations: initially asymptomatic; signs of urinary obstruction (dysuria, hesitancy, frequency, nocturia); hardened prostate found on digital rectal exam; possible bone pain, backaches, elimination problems
  • Diagnosis by digital rectal exam and PSA test
  • Treatment: determined by biopsy and cytology; hormone therapy to slow tumor growth; possible bilateral orchiectomy (removal of testes); prostatectomy (simple or radical); cryosurgery; radiation including possible radioactive seed implantation
  • Complications: urinary incontinence and impotence after prostatectomy; incontinence, impotence, and rectal impairment after cryosurgery
  • Nursing care: focus on maintaining urine output, preventing skin breakdown, managing pain, and preserving client’s dignity; after surgery, assess color and clarity of output from 3-way catheter and flush tubing if very bloody or clots; use aseptic technique to change irrigation bags; empty drainage bag often; record I&O carefully and also record amount of irrigation fluid used; be matter-of-fact in
assisting clients after incontinent episodes; assess skin often and keep it clean

° Disorders of the testes and penis:
  o Cryptorchidism – one or both testes do not descend before birth; surgical correction before age 3 to preserve fertility
  o Hydrocele – fluid in scrotum [corresponds to Figure 30-22]; surgical closure if doesn’t resolve spontaneously by 1 year
  o Hypospadias and epispidias (see Figure 43-19) – urethral meatus on ventral or dorsal side of penis; usually corrected surgically before 1 year
  o Testicular cancer – most common in men aged 15 to 35 and in men with cryptorchidism
    • Self-examination [corresponds to Figure 30-23]
    • Manifestations: thickened tissue or lump in testicle
    • Diagnosed with ultrasound; elevated serum acid or alkaline phosphatase; biopsy NOT done because it increases metastasis
    • Treatment: surgical removal of testis, epididymus, spermatic cord, and possibly lymph nodes in groin; possible chemotherapy or radiation

° Reproductive issues
  o Contraception – permanent contraception by vasectomy
  o Infertility – may be caused by varicocele (dilated blood vessels in testis); sperm may be implanted artificially to begin pregnancy
  o Erectile dysfunction – impotence; cause determines treatment; may be medication side effect or result of chronic disease
    • Treatment:
      ↑ Oral medications sildenafil citrate (Viagra) and vardenafil hydrochloride (Levitra); may have serious hypotensive side effect
      ↑ Injectable alprostadil; local action so fewer side effects
      ↑ Penile implants
  • Nursing care: be sensitive to client’s feelings; offer supportive care.

Critical Thinking Care Map: Caring for a Client with Altered Urinary Elimination