Chapter 11

Word Definitions

1. ARF—acute renal failure
2. Anorexia—lack or loss of appetite
3. BUN—bilirubin urea nitrogen
4. Calculi—little stone
5. Casts—tiny structures formed by deposits of minerals or other substances in the walls of the renal tubules
6. Extracellular—occurring outside a cell or cell tissue
7. Flank—posterior portion of the body between the ribs and ilium
8. Intrarenal—occurring within the kidney
9. IVP—intravenous pyelography
10. Lethargic—state of sleepiness or sluggishness
11. Nephrolithotomy—surgical removal of renal calculi
12. Neuropathies—any inflammation or degeneration of the peripheral nerves
13. Oliguria—diminished urine output; less than 500 ml in 24 hours
14. Pitting edema—fluid in tissues characterized by a depression in the skin when pressed with a finger
15. Proteinuria—excessive protein in the urine
16. Renin—proteolytic enzyme formed in the kidney that affects blood pressure
17. Spontaneously—occurring naturally and without apparent cause
18. Urgency—feeling the need to void urine immediately

Glossary Terms
1. Azotemia—excess of urea or other nitrogenous bodies in the blood
2. Blood urea nitrogen (BUN)—measurement of urea nitrogen (a substance formed during protein breakdown) in the serum or plasma; an elevated BUN level may indicate impaired renal function
3. Calculi—stones usually composed of mineral salts (e.g., kidney stones and gallstones)
4. Clean-catch urine specimen—urine specimen obtained by cleaning the genitalia and then capturing a midstream urine sample for laboratory analysis
5. Dialysis—procedure that filters out unwanted substances from the blood, usually in cases of renal failure
6. Erythrocyte sedimentation rate (ESR)—measurable reflection of the acute-phase reaction in inflammation and infection
7. Fibrotic—abnormal formation of fibrous tissue
8. Glomerulosclerosis—hardening of the renal glomerulus
9. Glomeruli—tiny balls of microscopic blood vessels on the end of the renal tubules
10. Hematuria—blood in the urine
11. Hypoalbuminemia—low albumin levels in the blood
12. Idiopathic—disease without a known or recognizable cause
13. Intravenous pyelograms—diagnostic studies of the renal pelvis and ureter using injected dye
15. Malaise—feeling of discomfort, illness, or uneasiness
16. Metabolic acidosis—excessive acid in the body fluids caused by dehydration, diarrhea, vomiting, renal disease, or hepatic impairment

17. Nephrons—functioning units of the kidneys or renal tubules

18. Pyelonephritis—purulent infection of the kidney tissue and renal pelvis

19. Renal calculi—kidney stones

20. Uremia—toxic condition of excessive waste products, protein, and nitrogen in the blood caused by renal insufficiency

Short Answer

1. Yes

2. Urinalysis

3. An infection caused by Group A beta hemolytic streptococcus

4. Cystoscopy

5. Usually

6. Pyelonephritis

7. Insult to the brain, spinal cord, or the nerves supplying the lower urinary tract

8. Patient’s urine may appear dark or may be described as coffee-colored.

9. Producing, storing, and excreting urine, secretion of renin which regulates blood pressure, and erythropoietin which acts as a stimulus to red blood cell production

10. Hydronephrosis

11. Drugs, insecticides, organic solvents, and cleaning agents

12. Surgical removal

13. Nephrotic syndrome is a disease of the basement membrane of the glomerulus that is secondary to a number of renal diseases and a variety of systemic disorders
14. Diabetes mellitus

15. Ascending bacterial invasion of the urinary tract, sexually transmitted diseases, viruses, fungi, parasites, and inflammation as a result of chemotherapy or radiation

16. Empty the bladder before surgery, to obtain a sterile urine specimen, to relieve urinary retention, and to treat incontinence

17. Pus in urine

18. Proteinuria, edema, decreased urine volume, hematuria, hypertension, headaches, visual disturbances, malaise

19. Weakening of the pelvic floor muscles and the urethral structure, trauma from childbirth is the most common cause, pregnancy, hormone changes, medications, obesity

20. Environmental factors; occupational exposure to aniline dyes or diesel exhaust, cigarette smoking, and history of prior bladder cancer

21. There is a sudden and severe reduction in renal function, nitrogenous waste products begin to accumulate in the blood causing an acute uremic episode

22. 2 months

23. Analgesic therapy, fluid hydration, lithotripsy, surgical procedures

24. It is inherited

25. Multiple grapelike cysts form from dilated nephrons and collecting ducts and the kidneys enlarge

Fill in the Blanks

1. kidneys
2. producing, storing, excreting urine

3. nephron

4. filtration, reabsorption, secretion

5. bladder

6. urinalysis, blood tests

7. nausea, bloody urine, decreased urinary output, hypertension

8. acute glomerulonephritis

9. kidneys, ureters, urinary bladder, urethra

10. protein losing

11. oliguria, gastrointestinal disturbances, headache, drowsiness

12. antibiotics, penicillin, cephalosporin, 10

13. calcium, uric acid

14. failure, individualized

15. UTIs, normalcy

Anatomic Structures

1. Gross anatomy of the urinary system
2. Internal structure of the kidney
3. The nephron
4. **Formation of urine**

![Diagram of the kidney showing filtration, reabsorption, and secretion processes.](Image)

**Suggested Responses for Patient Screening**

1. **Possible acute glomerulonephritis**

   Patients complaining of bloody urine accompanied by edema, headache, and flank or pelvic pain require prompt medical attention. The child should be scheduled for
an appointment on the day of the call or referred to an urgent care or emergency care facility.

2. Possible acute glomerulonephritis

Patients complaining of bloody or foul smelling urine accompanied by fever, chills, nausea, vomiting, and pelvic and flank pain require prompt medical attention.

3. Possible kidney stones

The patient experiencing pain from a kidney stone should be considered an emergency situation. If these individuals cannot be examined in the office as soon as possible, they should be referred to an emergency care facility where they can receive analgesic intervention. The patient who is experiencing sudden onset of severe flank pain and pelvic pressure and pain that is accompanied by nausea and vomiting requires immediate observation and treatment.

4. Possible cystitis

Patients experiencing pelvic and low back pain accompanied by fever and chills, along with the classic symptoms of frequency and urgency, require prompt attention. Advise them they will need to provide a urine specimen upon arrival at the office.

5. Possible stress incontinence

Although not a urologic emergency, stress incontinence can seem like an emergency for the individual experiencing it. Therefore the patient should be scheduled for an appointment as soon as possible.

Patient Teaching
1. **Acute glomerulonephritis**

Review the printed information with the patient and family, and then explain the underlying cause. Reinforce that patients have been instructed to take medications as prescribed—especially antibiotics—until all are gone. During the acute stage, bedrest should be instituted along with sodium intake restriction. A review of the symptoms to be reported to the physician is helpful. These symptoms include weight gain, decreased urinary output, changes in urine color, and an increase in blood pressure. Pregnant women with a history of acute glomerulonephritis require frequent medical evaluation.

2. **Pyelonephritis**

After reviewing the printed information with the patient, confirm they have an understanding of the information. Advise women to void after engaging in sexual intercourse. In addition, patients who begin to experience symptoms should increase fluid intake, especially water. Women should be encouraged to wipe the perineum from the front to the back to avoid spreading fecal matter from the rectum to the urinary meatus.

3. **Renal calculi**

After reviewing the printed information with the patient, instruct them to strain urine for stones, making sure they have an appropriate strainer to use. Encourage intake of at least eight glasses of water per day. Explain risk factors such as a urinary tract infection (UTI), stasis of urine, prolonged dehydration, prolonged immobilization, and long-term ingestion of certain medications. Patients should avoid foods high in oxalates, purine, and phosphorus. Some physicians prefer
limiting the intake of calcium, whereas others place no restrictions on calcium intake.

4. Diabetic nephropathy

After reviewing the printed information with the patient, make an attempt to make patients with diabetes aware of the importance of maintaining blood glucose at appropriate levels. They also should be advised about the importance of monitoring their blood pressure and keeping it at acceptable levels. Compliance with prescribed drug therapy is also important.

5. Stress incontinence

The printed material contains information about methods of coping with the condition. Patient teaching involves providing information on Kegel exercises and other methods to strengthen pelvic and perineal muscles. Diet and fluid intake may be discussed. Assistance with locating community or other resource agencies and information is helpful. Provide information to help with locating community support groups.

Essay Question

Compare hemodialysis and peritoneal dialysis.

Hemodialysis removes the waste products from the blood by using an artificial kidney. It can be done at home or at a hospital. Making an internal fistula in the arm or leg surgically creates access to the bloodstream. This allows the blood to travel from the patients’ body to the semipermeable membrane in the machine. After the blood is cleansed, it returns to the patient. The procedure takes 8 to 12 hours per week and is divided into several sessions.
Peritoneal dialysis is carried out by the patient’s own body using a dialysate solution and the peritoneal membrane to filter out the toxins and excessive fluid. A permanent indwelling peritoneal catheter is placed into the patient’s abdomen. The clean dialyzing fluid passes into the cavity, then the waste products diffuse across the peritoneal membrane into the fluid. The contaminated fluid is drained and replaced with clean fluid. Peritoneal dialysis can be continuous ambulatory, continuous cycling, or intermittent.

Continuous ambulatory peritoneal dialysis takes place without the use of a machine by allowing the solution to drain by gravity into a dialysis bag that the patient wears around the waist. It takes about 15 minutes per session and is done three or four times per day and once at night.

Continuous cycling peritoneal dialysis takes place while the patient is asleep, using a cycling machine. Intermittent peritoneal dialysis takes several hours. It is usually done at a clinic three to five times a week.

Certification Examination Review

1. b
2. c
3. d
4. c
5. b
6. c
7. b
8. c
9. a
10. b
11. b
12. b
13. b
14. c