OBJECTIVES

26.1 Define key terms introduced in this chapter. Slides 13–14, 21–22, 24–26, 31
26.2 Describe the structure and function of the hematologic system. Slides 11–12
26.3 Identify medications that can interfere with blood clotting. Slide 12

continued
OBJECTIVES

26.4 Explain the pathophysiology and complications of sickle cell anemia. Slides 14–15

26.5 Discuss assessment and management for patients with emergencies related to sickle cell anemia. Slide 16

26.6 Describe the structure and function of the renal system. Slide 20

continued
OBJECTIVES

26.7 Describe the causes and consequences of acute and chronic renal failure. Slides 21–22
26.8 Explain the purpose of hemodialysis and peritoneal dialysis. Slides 24–26

continued
26.9 Recognize patients with complications of end-stage renal disease, dialysis, and missed dialysis. Slides 27–30

26.10 Provide treatment for patients with complications of end-stage renal disease, dialysis, and missed dialysis. Slide 31

continued
26.11 Describe special considerations for patients who have received a kidney transplant. Slide 32
MULTIMEDIA

- Slide 18  Sickle Cell Anemia Video
- Slide 33  Information About Renal Failure Video
• Disorders of the hematologic system
• Disorders of the renal system
Topics

• The Hematologic System
• The Renal System
The Hematologic System
Blood

- Represents its own organ system
- Has specific functions
  - Clotting
  - Delivery of oxygen and removal of CO₂
  - Removal and delivery of waste products to organs that remove them
Blood

- Made up of solid components
  - Red blood cells
  - White blood cells
  - Platelets
  - Plasma
- Medications can affect some components of blood
Anemia

• Lower-than-normal amount of red blood cells
• Acute anemia
  – Sudden blood loss
• Chronic
  – Excessive menstrual periods
  – Slow gastrointestinal bleeding
  – Diseases affecting bone marrow
Sickle Cell Anemia

- Genetic disease affecting RBCs
- More prevalent in certain ethnicities
  - African Americans
  - Indian or Middle Eastern descent
- Defective shape resembles a sickle
- Cells have a short life span leading to anemia
Complications of Sickle Cell Anemia

- Destruction of spleen
- Sickle pain crisis
- Acute chest syndrome
- Priapism
- Stroke
Treatment of Sickle Cell Anemia

- High flow supplemental oxygen
- Monitor for respiratory distress
- Monitor for signs of hypoperfusion
- Transport to stroke center if stroke is suspected
Think About It

• One in twelve African Americans have the sickle cell trait.
• Sickle cell trait doesn’t always lead to complications.
• Possible to lead a normal life with sickle cell trait.
Sickle Cell Anemia Video

Click here to view a video on the subject of sickle cell anemia.
The Renal System
Components and Functions

• Components
  – Two kidneys
  – Two ureters
  – One urethra

• Responsible for filtering blood and removing waste

• Maintains fluid balance

• Maintains acid/base balance
Renal Failure

- Occurs when kidneys lose ability to adequately filter and remove toxins
- Acute failure typically results from shock or toxic ingestion
- Chronic failure may be inherited or secondary to damage from uncontrolled diabetes or hypertension
End-Stage Renal Disease (ESRD)

- Irreversible renal failure
- Requires dialysis
  - Hemodialysis
  - Peritoneal dialysis
- 90% receive hemodialysis in specialized centers
Think About It

• More than 350,000 people in America receive some type of treatment for ESRD.
• Only 8% treat themselves at home.
• ESRD patients often rely on EMS for transport to and from dialysis.
Hemodialysis

- Patient connected to a machine that pumps blood through specialized membranes
- Treatments last several hours, multiple times a week

continued
Hemodialysis

• Two types of access to blood circulation
  – Two-port catheter
  – A-V fistula

Two-port catheter

A-V fistula
Peritoneal Dialysis

- Uses peritoneal cavity’s large surface area
- Special fluid infused into abdominal cavity and left for several hours to absorb waste and excess fluid
- Fluid is removed and discarded
Medical Emergencies in ESRD

• Two broad groups
  – Loss of kidney function
  – Complication of dialysis

• Most dialysis patients have underlying medical factors
  – Diabetes
  – Hypertension
Complications of ESRD

- Usually relate to patient missing dialysis
- Present with signs and symptoms similar to congestive heart failure
  - Shortness of breath
  - Edema
  - Electrolyte disturbances
Missed Dialysis

- Assess ABC’s
- Be aware of fistulas
- Administer oxygen
- Monitor vital signs closely and have AED ready
- Transport to facility capable of dialysis
Complications of Dialysis

- Bleeding from A-V fistula
- Clotting and loss of A-V fistula function
- Infection
  - Peritonitis
Treatment of Dialysis Complications

- Assess ABC’s
- Control bleeding
  - Contact medical control if necessary
- Administer oxygen
- Treat for shock
  - Keep patient supine and warm
- If peritonitis is suspected, transport dialysis fluid for confirmation
Kidney Transplant Patients

- Kidneys are the most-transplanted organs
  - Approximately 16,000 transplants per year
- Patients spend their lives on specialized medications
  - Help prevent organ rejection
  - Increased susceptibility to infections
Information About Renal Failure Video

Click [here](#) to view a video on the subject of renal failure.
Chapter Review
Chapter Review

• Blood consists of red cells, white cells, and plasma.
• Anemia is lack of red blood cells in circulation.
Sickle cell anemia is an inherited disease in which a defect in the hemoglobin results in “sickle” shape to red blood cells. This misshaping inhibits movement of red blood cells through capillaries, causing “sludging” and blockages in smaller blood vessels.
Chapter Review

• The renal system is comprised of the kidneys, ureters, and urethra.
• The kidneys perform vital filtering of the blood to remove waste products. They also help maintain water balance within the body.

continued
Chapter Review

• Problems with the renal system include infection, kidney stones, and renal failure.
• Renal failure is a condition in which the kidneys are unable to filter waste and provide a balance of fluids in the body.
In dialysis, an external system filters the blood and removes excess fluid from the body. Dialysis may be performed in either of two ways: hemodialysis or peritoneal dialysis.
Chapter Review

- Dialysis at dialysis centers is generally performed three times per week.
- The main complications with patients in end stage renal disease generally occur after the patient has missed a dialysis appointment.
Remember

- Blood has specific cellular components.
- Abnormal blood cells can significantly affect patients.
- The renal system is critical to maintaining homeostasis.
- Renal failure can be chronic or acute.
- End stage renal disease is managed through dialysis.
Questions to Consider

• Does my patient have a history of sickle cell disease or ESRD?
• Does my patient have an A-V fistula?
• Will I need to make an early request for ALS because of complications from a missed dialysis appointment?
Critical Thinking

- You have a patient who is transported routinely for dialysis three times per week. She was sick and canceled the trip yesterday. Now she calls saying she can’t breathe and feels like she is going to die. Is it possible that she has a legitimate complaint after missing dialysis by only one day?
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