

Case Studies and Practice Questions

The case studies and questions have been written by content experts. They have been reviewed by practicing nurses in each specific specialty, and they reflect areas of practice that may be addressed in the actual examination. Patients described in the case studies are fictional and in no way reflect any persons living or deceased.

Section 4 (page 32) contains an answer sheet that can be used to note your responses to the Practice Questions, while page 33 contains all the answers. Then in Section 5, starting on page 35, you will find each correct answer written out, with a rationale explaining the reason for the answer. If there is evidence, then the reference is included. If there is no evidence cited, then the answer is based on expert opinion.

There are additional suggested readings at the end of the study guide (Section 6).

A. Acute Care

Gladys Howe, a 67-year-old female in congestive heart failure, was admitted to the hospital ICU. Incidence data indicate that hospitalized elderly patients are susceptible to developing acute kidney injury (AKI).

- The percentage of all hospitalized patients who may develop AKI is
 - 5–8%
 - 8–12%
 - 13–18%
 - 22–25%
- Approximately 20–60% of hospitalized patients who develop AKI require dialysis. Scoring systems are used to predict patient outcomes. The system that classifies patients based on their glomerular filtration rate (GFR) and/or urine output in mL/kg/hr is the
 - APACHE II.
 - SOFA.
 - SHARF.
 - RIFLE.
- The diagnosis of acute tubular necrosis (ATN), a type of ischemic intrarenal acute kidney injury, has been discussed with Ms. Howe and her family. ATN is usually associated with
 - oliguria and concentrated urine.
 - oliguria and inability to concentrate urine.
 - nonoliguria and sodium retention.
 - nonoliguria and sodium wasting.
- In preparing the acute dialysis station for Ms. Howe, the nurse notices she is now in contact isolation for VRE. This will include performing which of the following?
 - Maintain standard precautions and contact precautions if the wound or bodily excretions are not contained.
 - Arrange for a dedicated blood pressure cuff and stethoscope.
 - Dialyze the patient at a station with as few adjacent stations as possible.
 - Perform all of the above.
- While Ms. Howe has been receiving dialysis in the acute unit, the staff has been following the Centers for Disease Control and Prevention (CDC) guidelines. These guidelines include
 - changing her dialysis catheter and fistula dressings at the same time.
 - wearing gloves when caring for the patient OR touching the patient's equipment.
 - using a mask and face shield to avoid airborne VRE contamination.
 - performing all tasks before washing their hands.
- The nurse knows that the overuse of vancomycin (Vancocin) has been reported as a risk factor for patients developing VRE. Which is the best indication for using this drug?
 - Routine surgical prophylaxis.
 - Single positive blood cultures for coagulase-negative *staphylococcus*.
 - Eradication of methicillin-resistant *Staphylococcus aureus* colonization (MRSA).
 - Infections due to beta-lactam-resistant gram-positive microorganisms.

It is determined that Ms. Howe will require kidney replacement therapy (KRT), also known as renal replacement therapy (RRT). The patient and family have decided on hemodialysis. A dual lumen dialysis catheter has been placed. During the hospitalization, she develops a vancomycin-resistant *enterococci* (VRE) infection.

7. Currently the staff is following routine standard precautions with Ms. Howe. However, during the assessment, Ms. Howe complains of having uncontrolled diarrhea. Ms. Howe's plan of care will have the
- dialysis treatment set up in a separate room or area.
 - staff use the automated blood pressure cuff.
 - patient wear gloves while in the unit.
 - equipment cleansed with 1:1000 diluted bleach.

William Day, a 65-year-old retired laborer, was diagnosed with proteinuria 10 years ago. He has a long history of hypertension, congestive heart failure, and decreasing GFR. He takes furosemide (Lasix) 80 mg daily. He is admitted to the emergency room in acute fluid overload.

8. When doing a physical assessment of Mr. Day, one clinical sign the nurse may find is
- hypotension.
 - liver congestion.
 - epigastric pain.
 - a dry oral cavity.
9. Mr. Day has declining kidney function due to hypertension. The nurse knows the physiologic principle causing hypertension is believed to be increased production of
- renin.
 - antidiuretic hormone (ADH).
 - atrial natriuretic hormone (ANP).
 - glucocorticoids.
10. During his hospital stay, Mr. Day is started on captopril (Capoten) 12.5 mg 3 times a day. What class of antihypertensive medication is this drug?
- Angiotensin-converting enzyme (ACE) inhibitor.
 - Calcium channel blocker.
 - Primary vasodilating agent.
 - Beta adrenergic blocker.

Mr. Day is discharged from the hospital and started on Lopressor (metoprolol tartrate) 50 mg PO bid.

11. Discharge teaching for a patient on Lopressor would include discussion of which of the following side effects?
- Fatigue.
 - Slow heartbeat.
 - Cold hands and feet.
 - All of the above.
12. After educating Mr. Day regarding his medication, he states, "Because I take blood pressure pills, do I need to learn how to take my blood pressure?"

The nurse's response is based on the knowledge that

- learning ability increases with age.
- information is processed in discrete bits.
- emphasizing concepts enhances learning.
- immediate feedback fosters learning.

Jim Murray, a 44-year-old male, is admitted to the Medical ICU with a diagnosis of malignant hypertension and kidney failure. He weighs 80 kg and is being treated with a sodium nitroprusside (Nipride) drip of 50 mg/250 mL D5W. The drip is being titrated to maintain his systolic blood pressure at 120 mmHg. A dual lumen catheter is placed for hemodialysis.

Serum blood values include blood urea nitrogen (BUN) 200 mg/dL, creatinine 22.4 mg/dL, potassium 6.5 mEq/L, and carbon dioxide (CO₂) 12 mEq/L.

13. With a BUN of 200 mg/dL, the nurse would expect Mr. Murray's neural examination to show
- hyperreflexia of muscles.
 - tetany of upper limbs.
 - dilated and slowly reactive pupils.
 - lethargy and forgetfulness.
14. Since Mr. Murray has hyperkalemia, the nurse will monitor closely for potential
- cardiac arrhythmias.
 - nonspecific seizures.
 - aspiration emesis.
 - respiratory suppression.
15. Noting Mr. Murray's laboratory values and diagnosis, the nurse will provide patient teaching
- on all treatment modalities before starting hemodialysis.
 - during dialysis since the process of dialysis can be demonstrated.
 - when Mr. Murray starts to ask questions indicating that he is ready to learn.
 - using a standardized teaching format and presentation.
16. For Mr. Murray's initial hemodialysis, the nurse might be asked to decrease the blood flow rate, use a dialyzer with a lower coefficient, or decrease dialysate flow. What is the best rationale for this process?
- It will minimize complications associated with a Nipride drip.
 - It will minimize complications associated with malignant hypertension.
 - It will reduce trauma at the dual lumen catheter insertion site.
 - It will decrease diffusion of urea across the blood-brain barrier, reducing the possibility of cerebral edema.

Answers, Rationales, and References

A. Acute Care

- C. 13-18%.** AKI develops in 13–18% of all hospitalized patients. One in 5 adults and 1 in 3 children experience AKI during a hospitalization.
Fallone, S., & Cotton, A.B. (2015). Acute kidney injury. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 22). Pitman, NJ: American Nephrology Nurses Association.
- D. RIFLE.** Risk, Injury, Failure, Loss, and End-stage kidney failure. Patients are classified based on estimated GFR ranges and/or urine output. May be helpful in deciding when to initiate KRT.
Fallone, S., & Cotton, A.B. (2015). Acute kidney injury. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 23). Pitman, NJ: American Nephrology Nurses Association.
- B. oliguria and inability to concentrate urine.** Is usually associated with oliguria because of the extensive nephron injury.
Fallone, S., & Cotton, A.B. (2015). Acute kidney injury. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 31). Pitman, NJ: American Nephrology Nurses Association.
- D. Perform all of the above.** A to C are all part of CDC guidelines for preventing the transmission of infections among chronic hemodialysis patients.
Peacock, E.J., Counts, C.S., German, S., Holloway, K., Howard, L., & Wiseman, K. (2015). Foundations in infection prevention, control, and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 345). Pitman, NJ: American Nephrology Nurses Association.
- B. wearing gloves when caring for the patient OR touching the patient's equipment.** Wearing gloves is an important part of the CDC guidelines. The nurse should also remember to sanitize hands after removing gloves and before moving to the next patient.
Peacock, E.J., Counts, C.S. German, S., Holloway, K., Howard, L., & Wiseman, K. (2015). Foundations in infection prevention, control, and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 387). Pitman, NJ: American Nephrology Nurses Association.

- D. Infections due to beta-lactam-resistant gram-positive microorganisms.** Incorrect use and overuse of antibiotics play a large role in the development of antibiotic-resistant bacteria. Other antibiotics such as Ancef (cefazolin) are reasonable substitutes in many situations. This reduces the use of vancomycin and the risk for VRE.
Peacock, E.J., Counts, C.S., German, S., Holloway, K., Howard, L., & Wiseman, K. (2015). Foundations in infection prevention, control, and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 341). Pitman, NJ: American Nephrology Nurses Association.
- A. dialysis treatment set up in a separate room or area.** Per CDC guidelines, separating Ms. Howe from the other patients as much as possible will help prevent the transmission of infection.
Peacock, E.J., Counts, C.S. German, S., Holloway, K., Howard, L., & Wiseman, K. (2015). Foundations in infection prevention, control, and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 343). Pitman, NJ: American Nephrology Nurses Association.
- B. liver congestion.** Pulmonary edema increases pressure in the right atrium. The pressure can then back up into the liver causing congestion and swelling.
Greco, K., & Mahon, S.M. (2015). The kidney in health and disease: Genetics and genomics. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 98). Pitman, NJ: American Nephrology Nurses Association.
Axley, B. (2015). Hemodialysis in the acute setting: Prehemodialysis patient assessment. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 65, Table 1.11). Pitman, NJ: American Nephrology Nurses Association.
- A. renin.** Renin activates the angiotensin-aldosterone system. This in turn causes peripheral vasoconstriction, which increases blood pressure.
Greco, K., & Mahon, S.M. (2015). The kidney in health and disease: Genetics and genomics. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., pp. 43, 98, 127-128). Pitman, NJ: American Nephrology Nurses Association.

- 10. A. Angiotensin-converting enzyme (ACE) inhibitor.** Knowing that captopril is an ACE inhibitor prescribed for his hypertension, the nurse will assess the patient's blood pressure to monitor its efficacy.

Wilpula, E., & Salinitri, F.D. (2015). Foundations in pharmacology and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 307). Pitman, NJ: American Nephrology Nurses Association.

- 11. D. All of the above.** Knowing that Lopressor is a beta blocker, the nurse will educate patients to monitor their pulse rate as well as BP and to avoid getting up too fast from a lying or sitting position to avoid the risk of falling.

Wilpula, E., & Salinitri, F.D. (2015). Foundations in pharmacology and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 305). Pitman, NJ: American Nephrology Nurses Association.

- 12. D. immediate feedback fosters learning.** Providing selective reinforcement immediately after an appropriate response from the patient can enhance their retention of learning.

Cahill, M., & Groenhoff, C. (2015). Individualizing the care for those with kidney disease: Patient and family education. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 214). Pitman, NJ: American Nephrology Nurses Association.

- 13. D. lethargy and forgetfulness.** Uremic toxins can cause changes in mentation and cognition. The patient may experience CNS effects such as headaches, sluggishness, apathy, drowsiness, and insomnia.

Candela, L., & Parker K. (2006). End stage renal disease: Uremic syndrome. In A. Molzahn & E. Butera (Eds.), *Contemporary nephrology nursing: Principles and practice* (2nd ed., pp. 316-317). Pitman, NJ: American Nephrology Nurses Association.

- 14. A. cardiac arrhythmias.** Hyperkalemia can cause progressive electrocardiographic abnormalities such as peaked T waves, flattening or absence of P waves, or widening QRS complexes.

Hain, D.J., & Harras, M.S. (2015). Chronic kidney disease: Management of complications associated with CKD. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 173). Pitman, NJ: American Nephrology Nurses Association.

Fallone, S., & Cotton, A.B. (2015). Acute kidney injury. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 35). Pitman, NJ: American Nephrology Nurses Association.

- 15. C. when Mr. Murray starts to ask questions indicating that he is ready to learn.** Assessing the patient's learning needs requires listening carefully to the patient's responses and questions.

Cahill, M., & Groenhoff, C. (2015). Individualizing the care for those with kidney disease: Patient and family education. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 215). Pitman, NJ: American Nephrology Nurses Association.

- 16. D. It will decrease diffusion of urea across the blood brain barrier, reducing the possibility of cerebral edema.** Rapid changes in plasma solute levels can cause CNS symptoms. A slow blood flow rate helps prevent dialysis disequilibrium syndrome (DDS) by slowly lowering the solute level.

Axley, B. (2015). Hemodialysis in the acute setting: Prehemodialysis patient assessment. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., pp. 76-77). Pitman, NJ: American Nephrology Nurses Association.

- 17. B. dialyzability of Nipride.** In general, if a medication is primarily excreted by the kidney, it is usually also removed by hemodialysis. Nipride is metabolized to cyanide and then to thiocyanate which is, in turn, excreted by the kidney. For this patient, the level of the medication in his blood is diminishing as his dialysis session continues; the result is a rise in blood pressure.

Williams, H.F. (2015). Continuous renal replacement therapies. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed. p. 169). Pitman, NJ: American Nephrology Nurses Association.

Wilpula, E., & Salinitri, F.D. (2015). Foundations in pharmacology and clinical applications in nephrology nursing. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 2. Physiologic and psychosocial basis for nephrology nursing practice* (6th ed., p. 323). Pitman, NJ: American Nephrology Nurses Association.

- 18. A. with a dry gauze or transparent dressing at each dialysis.** NKF KDOQI guidelines state that dressings should be changed with each dialysis session using transparent dressing or gauze and tape. Some units use the BIOPATCH dressings. The BIOPATCH instructions state the chlorhexidine disk is good for 7 days so the dressing is changed once a week as long as it is dry and intact.

Williams, H.F. (2015). Continuous renal replacement therapies. In C.S. Counts (Ed.), *Core curriculum for nephrology nursing: Module 4. Acute kidney injury* (6th ed., p. 177). Pitman, NJ: American Nephrology Nurses Association.