

# Quiz for Module 1: CRRT Overview (Rev. 1)

## Lesson 1: Renal Anatomy and Physiology

Name: \_\_\_\_\_  
Date: \_\_\_\_\_

Score: \_\_\_\_\_  
Instructor: \_\_\_\_\_  
Location: \_\_\_\_\_

Please circle the correct answers:

1. What percentage of cardiac output goes to the kidney?
  - A. 15%
  - B. 25%
  - C. 20%
  - D. 10%
2. Which of the following are NOT components of the kidney?
  - A. Cortex, medulla, renal pelvis
  - B. Nephrons and glomerulus
  - C. Collecting system and tubules
  - D. Bladder and urethra
3. Which of the following can be described as the functional unit of the kidney?
  - A. Renal artery
  - B. Efferent arteriole
  - C. Nephron
  - D. Glomerulus
4. Approximately, how much filtrate is produced by the kidney each day?
  - A. 100 liters
  - B. 180 liters
  - C. 200 liters
  - D. 50 liters
5. Which kidney structure can best be defined as a semi-permeable membrane?
  - A. Nephron
  - B. Medulla
  - C. Afferent and efferent arterioles
  - D. Glomerulus

- 6. Which of the following pressures force fluid across the glomerular membrane?
  - A. Oncotic pressure
  - B. Hydrostatic pressure
  - C. Osmotic pressure
  - D. Non of the above
  
- 7. Which blood vessel carries blood INTO the glomerulus?
  - A. Afferent arteriole
  - B. Efferent arteriole
  - C. Renal vein
  - D. Renal artery
  
- 8. What is the normal ratio of calcium to phosphorus in the blood?
  - A. 3:1
  - B. 1:2
  - C. 2:1
  - D. 1:3
  
- 9. Normal kidney function is measured in terms of glomerular filtration rate (GFR).  
What is the normal GFR?
  - A. 100 mL/min
  - B. 150 mL/min
  - C. 125 mL/min
  - D. 75 mL/min

10. List seven functions of the kidney
- 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
  - 3. \_\_\_\_\_
  - 4. \_\_\_\_\_
  - 5. \_\_\_\_\_
  - 6. \_\_\_\_\_
  - 7. \_\_\_\_\_

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Switzerland  
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# Quiz for Module 1: CRRT Overview (Rev. 1)

## Lesson 2: Acute Renal Failure

Name: \_\_\_\_\_  
Date: \_\_\_\_\_

Score: \_\_\_\_\_  
Instructor: \_\_\_\_\_  
Location: \_\_\_\_\_

Please circle the correct answers:

1. Select the statement(s) that represent acute renal failure:
  - A. may be accompanied by metabolic disturbances
  - B. may require immediate treatment
  - C. Is defined as an abrupt decline in glomerular filtration rate
  - D. All of the above
2. Select the answer that best describes "Pre-renal" acute renal failure:
  - A. Direct injury to the kidney
  - B. Decreased blood flow to the kidney
  - C. Increased blood flow to the kidney
  - D. An obstruction below the kidney
3. Some examples of "Post-renal" acute renal failure may include:
  - A. Thrombi
  - B. Urinary tract obstruction
  - C. Tumors
  - D. All of the above
4. Select the answer that BEST describes the phase(s) of acute renal failure:
  - A. Diuretic phase
  - B. Recovery phase
  - C. Oliguric phase
  - D. All of the above
5. Which of the following statements is NOT true when referring to the oliguric phase of acute renal failure?
  - A. May last from five to 21 days
  - B. Protein may be present in the urine
  - C. Urine output less than 600 mL/24 hours
  - D. There may be electrolytes and acid-base imbalances

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# Quiz for Module 1: CRRT Overview (Rev. 1)

## Lesson 3: What is CRRT?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_

Instructor: \_\_\_\_\_

Location: \_\_\_\_\_

Please circle the correct answers:

1. Select the answer that BEST defines Continuous renal replacement therapy (CRRT)
  - A. A fluid removal therapy
  - B. A kind of dialysis
  - C. A therapy indicated for continuous solute and/or fluid removal in critically ill patients
  - D. A therapy indicated for intermittent solute and/or fluid removal in critically ill patients
2. Acute renal failure combined with hemodynamic instability is often used as an indication to begin continuous renal replacement therapy (CRRT). Which of the conditions listed below might also be used as a non-renal indication to start therapy?
  - A. Severe fluid overload
  - B. Rhabdomyolysis
  - C. Systemic inflammatory response syndrome (SIRS) and sepsis
  - D. All of the above
3. Diffusion is the movement of solutes through a semi-permeable membrane from an area of higher concentration to an area of lower concentration. Select the answer that is NOT true of diffusion in continuous renal replacement therapy (CRRT):
  - A. Blood flows on one side of the membrane and dialysate flows counter current on the other side
  - B. Dialysate does not mix with blood
  - C. Occurs during hemofiltration
  - D. Efficient for removing small molecules
4. Convection is the one-way movement of solutes through a semi-permeable membrane with a water flow. Select the answer that is true of convection in continuous renal replacement therapy (CRRT):
  - A. Substitution fluids should be clean
  - B. Molecular size of solutes do not affect clearance
  - C. Occurs during hemofiltration
  - D. Only efficient for removing large molecules

5. Ultrafiltration is the movement of fluid through a semi-permeable membrane along a pressure gradient.  
Select the answer(s) below that also represent ultrafiltration in continuous renal replacement therapy (CRRT):
- A. Positive and negative pressures affect ultrafiltration
  - B. Positive pressure is generally on the blood side of the membrane
  - C. Negligible convective solute clearance happens
  - D. All of the above
6. Adsorption is the adherence of solutes and biological matter to the surface of a membrane.  
Select the answer below that is true of adsorption in continuous renal replacement therapy (CRRT):
- A. High levels of adsorption may cause hemofilters to clog and become less efficient
  - B. The type of membrane does not affect adsorption
  - C. Adsorption happens only in convective therapies
  - D. Adsorption has no impact on treatment
7. Select the correct answer(s). In Slow continuous ultrafiltration (SCUF):
- A. The principle used is ultrafiltration
  - B. Substitution and dialysate fluids are used
  - C. Primary indication is fluid overload without electrolyte disturbances
  - D. All of the above
8. Select the correct answer(s) regarding Continuous veno-venous hemofiltration (CVVH):
- A. Requires use of a substitution fluid
  - B. Effective at removing small and large molecules
  - C. The principle used is convection
  - D. All of the above
9. Select the statement that is NOT true regarding Continuous veno-venous hemodialysis (CVVHD):
- A. The principle used is diffusion
  - B. Uses a combination of substitution and dialysate fluids
  - C. Effective at removing small and large molecules
  - D. Primary therapeutic goals are solute and fluid management
10. Select the statement that BEST describes Continuous veno-venous hemodiafiltration (CVVHDF):
- A. The principle used is convection
  - B. The principle used is diffusion
  - C. Requires only a dialysate fluid
  - D. Uses the principles of diffusion and convection

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# Quiz for Module 1: CRRT Overview (Rev. 1)

## Lesson 4: Delivery of CRRT

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_

Instructor: \_\_\_\_\_

Location: \_\_\_\_\_

Please circle the correct answers:

- Select the statement(s) that correctly identifies the importance of vascular access in continuous renal replacement therapy (CRRT)
  - Central venous catheters provide rapid and easy access permitting immediate use in critically ill patients
  - Vascular access is a basic prerequisite to any form of extracorporeal therapy
  - To have a good CRRT treatment it is essential to have a good access
  - All of the above
- Under certain conditions administering continuous anticoagulants may pose a risk to patients. Select the answer(s) that include some of these conditions:
  - Active bleeding
  - Increased aPTT and INR
  - Liver failure and low platelet count
  - All of the above
- List five components of a continuous renal replacement therapy (CRRT) system needed to deliver a CRRT treatment:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Hemofilters are often referred to as artificial kidneys. In reference to a hollow fiber hemofilter, which one of these statements is correct?
  - Dialysate flows on the inside of the hollow fibers
  - Membranes are semi-permeable and usually cellulosic
  - Blood flows on the inside of the hollow fibers
  - The type of membrane will not affect solute clearance
- The goals of fluid management in continuous renal replacement therapy (CRRT) are typically to achieve two important functions. What are these functions?  
\_\_\_\_\_  
\_\_\_\_\_

6. When calculating patient fluid removal during continuous renal replacement therapy (CRRT)
  - A. Substitution and dialysate fluids
  - B. Programmed patient fluid loss
  - C. Non-CRRT intakes and outputs
  - D. All of the above
  
7. What is the primary function of substitution fluid?
  - A. Diffusive clearance
  - B. Volume replacement
  - C. Convective clearance
  - D. Electrolyte replacement
  
8. What is the primary function of dialysate fluid?
  - A. Diffusive clearance
  - B. Volume replacement
  - C. Convective clearance
  - D. Electrolyte replacement
  
9. Filtrate is a combination of substitution fluid, dialysate fluid and fluid removed from the patient. Which of the following components would you expect the filtrate to contain?
  - A. Water and electrolytes
  - B. Drugs, vitamins and amino acids
  - C. Waste products and immune mediators
  - D. All of the above
  
10. Some studies suggest that recovery from renal failure is better when the patient is treated with continuous renal replacement therapy (CRRT) instead of intermittent hemodialysis (IHD). Select the answer that BEST describes a long-term advantage of renal recovery for the patient:
  - A. Less time in the ICU
  - B. Better quality of life because of freedom from need for chronic hemodialysis
  - C. No need for vascular access
  - D. Less costly for the health care system

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# Quiz for Module 1: CRRT Overview (Rev. 1)

## Lesson 5: CRRT Considerations

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_

Instructor: \_\_\_\_\_

Location: \_\_\_\_\_

Please circle the correct answers:

1. Select the answer(s) that may be considered advantages of continuous renal replacement therapy (CRRT):
  - A. Slow, gentle, continuous delivery provides improved hemodynamic stability
  - B. Avoids rapid fluid and electrolyte shifts
  - C. Can be adapted to the needs of the critically ill patient
  - D. All of the above
2. Select the answer(s) that may be considered limitations of continuous renal replacement therapy (CRRT):
  - A. Requires a large-bore central venous access
  - B. Typically requires anticoagulation
  - C. Limits mobility of the patient
  - D. All of the above
3. Patients receiving continuous renal replacement therapy (CRRT) may be at risk of bleeding.  
Select that answer that BEST describes how you would monitor the patient for signs of bleeding:
  - A. Monitor access site closely
  - B. Check patient's clotting parameters
  - C. All of the above
  - D. None of the above
4. Drug removal in continuous renal replacement therapy (CRRT) is dependent on many factors.  
Select the answer that is LEAST likely to impact the removal of drugs in CRRT:
  - A. Molecular weight of the drug
  - B. Type of anticoagulation used
  - C. Sieving coefficient and degree of protein binding
  - D. Adsorption to the membrane

5. Which of the following statements regarding hypothermia in continuous renal replacement therapy (CRRT) is NOT correct?
- A. Has no impact on circuit clotting
  - B. May affect nutritional requirements
  - C. May affect immune function
  - D. May improve cardiovascular stability

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