**Reynolds Geriatrics Series • USMLE Step 1 Prep**

### Recording Date
April 21, 2011

### USMLE Question Number: 85
A 75-year-old man has had increasing shortness of breath with exertion during the past 2 weeks. He has a 25-year history of hypertension well controlled with diuretics. Two months ago, serum urea nitrogen and creatinine concentrations were within the reference ranges. His pulse is 98/min, respirations are 19/min, and blood pressure is 180/11 mm Hg. The lungs are dull to percussion at the bases, and crackles are heard one third of the way up bilaterally. Cardiac examination shows increased jugular venous pressure, and S3 gallop, and no murmur. There is 3+ pitting edema of the lower extremities. Serum studies show:

- Na⁺ 126 mEq/L
- K⁺ 5.4 mEq/L
- Cl⁻ 108 mEq/L
- HCO₃⁻ 16 mEq/L
- Urea nitrogen 75 mg/dL
- Creatinine 3 mg/dL

This patient most likely has which of the following types of acid-base disturbance?

- (A) Metabolic acidosis
- (B) Metabolic alkalosis
- (C) Respiratory acidosis
- (D) Respiratory alkalosis
### Learning Objectives

**The listener should be able to:**

1. Describe basic physiologic mechanisms of prerenal azotemia.
2. List laboratory analytes affected in prerenal azotemia.
3. Describe the clinical presentation of prerenal azotemia.
4. Explore potential causes of decreased renal perfusion.

### Key Teaching Points

- Decreased renal perfusion and subsequent renal damage are often due to a sudden drop in blood pressure (i.e. congestive heart failure), hypovolemia (i.e. hemorrhage), or occlusive pathology (i.e. Renal artery occlusion).
- In prerenal azotemia, decreased renal results in elevations of serum creatinine and urea, as well as a decreased ability to reabsorb bicarbonate (metabolic acidosis).
- Decreased renal perfusion leads to activation of the rennin-angiotensin-aldosterone pathway, resulting in retention of salt and water. This often presents as hypertension and edema.

### USMLE Test source:


### Keywords

Geriatrics, USMLE step exam, acid-base disturbance, metabolic acidosis, respiratory acidosis, serum bicarbonate, serum PCO2, shortness of breath, congestive heart failure, prerenal azotemia

### References