

IV: Acute Renal Failure

Dan Henry, MD

Medicine Clerkship Director

University of Connecticut School of Medicine

Specific Learning Objectives:

Knowledge

Subinterns should be able to describe and define:

1. The differential diagnosis of acute renal failure, including pre-renal, renal, and post renal causes
2. The utility of the urinalysis in the diagnosis of acute renal failure, including the significance of the following:
 - a. Proteinuria
 - b. Red or white cells casts
3. The utility of the urine sodium and fractional excretion of sodium in the differential diagnosis of acute renal failure
4. The utility of imaging modalities used in the evaluation of acute renal failure, including:
 - a. Ultrasonography
 - b. Renal scans

Skills

Subinterns should demonstrate the ability to:

1. Conduct a history eliciting and interpreting symptoms that could indicate uremia and fluid overload.
2. Conduct a physical examination detecting and interpreting signs of volume overload and bladder outlet obstruction
3. Develop a management plan for a patient with acute renal failure
 - a. Create a differential diagnosis
 - b. Perform and interpret a urinalysis
 - c. Calculate a fractional excretion of sodium
 - d. Use information from serum and urine laboratory studies and imaging studies to arrive at a specific cause

- e. Communicate the expected course of acute renal failure and the procedure of hemodialysis to patients and families
- f. Order appropriate fluid and electrolyte management, medication adjustment for decreased glomerular filtration rate, and supportive care

Attitudes and professional behaviors:

Subinterns should demonstrate:

1. Sensitivity to patients and families concerns and questions when confronted with a serious diagnosis such as acute renal failure
2. Commitment towards understanding patients' preferences regarding life-sustaining treatments such as dialysis

CASE: Acute Renal Failure

1) **SCENARIO:** A 71-year-old male with a history of hypertension presents to the Emergency Department with fever, chills, and dysuria. Two days ago he noticed dysuria and frequency of small amounts of urine. One day ago he experienced an onset of fever and a temperature of 102°, chills, vomiting (3-4 times/day), and flank pain (7/10). He started taking sodium naproxen for his flank pain with some relief (3/10) This morning the symptoms persisted and he had dizziness on standing, relieved by lying down. In the last year he had noticed hesitancy and nocturia times 2. He has a history of hypertension treated with Lisinopril 20 mg/day. His blood pressure has been under good control. His creatinine 2 months ago was 1.0 mg/dL. He has no other medical problems. In the Emergency Department his Blood Pressure was 80/50 mm Hg, Pulse was 100/min. Orthostatics were not done. He had no jugular venous distention supine. His lungs were clear. His heart had no murmurs or gallops. His abdomen had mild generalized tenderness and left flank was tender to percussion. He had no edema. His prostate was enlarged with no nodules.

2) **ADDITIONAL DATA:**

Labs revealed

Na 140 mEq/L K 6.2 mEq/L C1 102 mg/dL HCO₃ 16 mEq/L

BUN 60 mg/dL Creatinine 2.4 mg/dL

pH 7.32 on room air pO₂ 90 mm Hg pCO₂ 32 mm Hg HCO₃ 16 mEq/L

Urinary Na 14 mEq/L

Urinary Cr 280 mg/dL

Urinalysis specific gravity 1.030 1+ protein microscopic 30-50 WBCs

1. Question: What is the differential diagnosis for his renal failure?

2. What radiological studies would you order?

3. What are the reasons for increased potassium?

4. Question: What is acid base abnormality and mechanism of decreased bicarbonate?

5. Question: How would you treat the hypotension and the pyelonephritis?

General Overviews:

ATN

Esson ML, Schrier RW. Diagnosis and treatment of acute renal failure. *Ann Intern Med.* 2002;137:744.

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