AKI and Hypercalcemia in a Patient with Weakness and Fatigue

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Case Description
A 59-year-old, Black patient presented to the emergency department for fatigue and weakness lasting for several weeks. Past medical history was significant for hypertension and migraine headaches. Physical exam was nonfocal, with normal breath sounds, no peripheral lymphadenopathy, no rash, and no edema. Laboratory findings included BUN of 40 mg/dl (7–20 mg/dl), creatinine of 4.16 mg/dl (0.6–1.2 mg/dl), serum calcium of 12.4 mg/dl (8.5–10.5 mg/dl), eGFR of 15 ml/min per 1.73 m² (≥60 ml/min per 1.73 m²), parathyroid hormone <3 pg/ml (10–65 pg/ml), 1,25-dihydroxyvitamin D of 72 ng/ml (25–40 ng/ml), and angiotensin-converting enzyme of 112 U/L (8–53 U/L). Head computed tomography scan and chest x-ray were unremarkable. Serologic studies, including cerebrospinal fluid analysis, were negative for malignant. The elevated angiotensin-converting enzyme and 1,25-dihydroxyvitamin D levels made sarcoidosis a strong possibility. A kidney biopsy was performed to determine the cause of AKI.

The kidney biopsy specimen (Figure 1A) demonstrated granulomatous interstitial nephritis with widespread, coalescing, non-necrotizing granulomas, with occasional multinucleated giant cells in a background of lymphocytes, plasma cells, and eosinophils. No acid-fast or fungal organisms were identified on special stains. Some tubules showed prominent droplets within their cytoplasm, highlighted by lysozyme stain. Glomeruli and vessels were without morphologic abnormalities, and immunofluorescence studies were negative. Taken together with the clinical scenario, a diagnosis of sarcoid-related tubulointerstitial nephritis was made.

The patient was subsequently started on a 10-week corticosteroid regimen. Symptoms of weakness and fatigue resolved and, at 6-week follow-up, laboratory values were as follows: calcium of 9.9 mg/dl (8.5–10.5 mg/dl), BUN of 26 mg/dl (7–20 mg/dl), creatinine of 1.45 mg/dl (0.6–1.2 mg/dl), and eGFR of 50 ml/min per 1.73 m² (≥60 ml/min per 1.73 m²).

Sarcoidosis is a chronic disease that can affect any organ, although pulmonary involvement is involved in >90% of cases. Symptoms of weakness and fatigue, in addition to AKI and hypercalcemia, may be seen in patients with sarcoid-related tubulointerstitial nephritis.

In summary, we present a patient with renal-limited sarcoidosis presenting with fatigue and classic laboratory findings without pulmonary involvement. The kidney biopsy sample with lysozyme staining supported a diagnosis of sarcoid-related tubulointerstitial nephritis, and the patient had an excellent response to corticosteroids.

Teaching Points

- Sarcoidosis is a chronic disease that can affect any organ, although pulmonary involvement is involved in >90% of cases.
- Symptoms of weakness and fatigue, in addition to AKI and hypercalcemia, may be seen in patients with sarcoid-related tubulointerstitial nephritis.
- Lysozyme staining of proximal tubules may be a useful ancillary tool to distinguish sarcoid-related tubulointerstitial nephritis from other causes of tubulointerstitial nephritis.

Disclosures
M. Stroemel reports receiving personal fees from the Veterans Administration, during the conduct of the study. M. Stroemel also reports receiving a monthly stipend from Fresenius Medical Care of North America to serve as medical director at a local dialysis clinic to monitor quality, outcomes, and ensure regulatory compliance. All remaining authors have nothing to disclose.

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Informed consent was obtained from the patient.

Author Contributions

N. Andeen was responsible for methodology and visualization; N. Andeen, C. Rahimi, and M. Stroemel conceptualized the study, wrote the original draft, and reviewed and edited the manuscript; and N. Andeen and M. Stroemel were responsible for resources, supervision, and validation.

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