**Case Report**

**Extra Pulmonary Legionellosis — A Case of Legionnaires’ Disease Associated Severe Tubulointerstitial Nephritis**

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**Abstract**

Legionnaires’ disease is a severe form of pneumonia caused by a bacterium known as legionella. It is a nationally notifiable disease which is over treated but frequently underdiagnosed. Extra pulmonary legionellosis is rare and patients often have a dramatic presentation without typical pulmonary manifestations. In these circumstances, the index of suspicion for this infection is low and can be overlooked. We report a unique case of a patient presenting with acute renal failure who subsequently tested positive for urine legionella antigen. Following the initiation of appropriate antibiotic therapy and temporary hemodialysis, the patient had complete recovery of renal function without the need for corticosteroids.

**ABBREVIATIONS**

LD: Legionnaires Disease

**INTRODUCTION**

Legionnaires’ disease (LD) was first recognized during an outbreak of pneumonia among attendees of an American Legion convention in Philadelphia in 1976. It has been associated with two distinct clinical syndromes: Pontiac fever, which is a self-limited, acute, febrile illness; and legionaries’ disease, which is pneumonia caused by legionella species [1]. LD is recognized as a multi-system illness [2,3]. Patients may have pulmonary, gastrointestinal tract and central nervous system complications. Even if microscopic hematuria is frequently encountered [4], acute renal failure is an uncommon finding in LD. The pathogenesis of renal involvement remains unknown and several mechanisms have been proposed including toxemia, drug toxicity, hypotension, direct nephrotoxicity of the microorganism, and immune-mediated nephrotoxicity [5,6]. Our case illustrates a nonspecific presentation of LD and it highlights the significance of recognizing the extra pulmonary manifestations of LD.

**CASE PRESENTATION**

A 36 year old African American man with no medical history and not on any medications who presented with complaints of generalized malaise and feeling unwell for one week. He also reported decreased oral intake and urine output. He denied having sick contacts, using over the counter medications or illicit drug abuse. On examination, patient was lethargic. His blood pressure was 119/84 mm Hg, afebrile, tachypneic at 26 breaths per minute and tachycardic at 105 beats per minute. He had normal capillary refill and good skin turgor. Laboratory tests showed hemoglobin of 12.8 g/dL, white count of 18.1 K/mcL, BUN of 157 mg/dL, creatinine of 24.99 mg/dL, sodium of 128 mmol/L and potassium of 5.6 mmol/L. Patient had a metabolic acidosis with an anion gap of 45 mEq/L but a normal osmolar gap. Serological workup including antinuclear antibody, C3, C4, anti-proteinase antibody, anti-myeloperoxidase antibody was negative. HIV, Hepatitis B and C panel was negative (Figure 1,2). Urinalysis showed no red blood cell casts and trace protein. Chest radiography revealed bilateral lower lobe atelectasis. Renal ultrasound was unremarkable. In view of acute renal failure, hemodialysis was initiated. Due to new onset of productive cough and fever spikes, antibiotics were broadened to include azithromycin once urine legionella antigen was negative. HIV, Hepatitis B and C panel was negative (Figure 1,2). Urinalysis showed no red blood cell casts and trace protein. Chest radiography revealed bilateral lower lobe atelectasis. Renal ultrasound was unremarkable. In view of acute renal failure, hemodialysis was initiated. Due to new onset of productive cough and fever spikes, antibiotics were broadened to include azithromycin once urine legionella antigen was negative. Renal biopsy reported severe tubulointerstitial nephritis along with some evidence of acute tubular injury—likely LD associated in view of negative serological work up, no predisposing factors for renal disease, and noted improvement in renal function after initiation of appropriate antibiotic regimen (Figure 3). Patient was continued on hemodialysis and received three weeks of azithromycin with resolution of renal failure. Patient was followed in the outpatient nephrology clinic one month later and in the primary care clinic 4 months later with notable improvement in renal function to a creatinine of 1.3 mg/dL and 1.1 mg/dL respectively.

**DISCUSSION**

LD most commonly presents with pulmonary symptoms and can vary in severity from a mild pneumonia to respiratory...
failure. However, *Legionella* can also present atypically without signs or symptoms of cough, shortness of breath and sputum production. These patients in particular can have extra pulmonary manifestations involving the gastrointestinal tract, integumentary, renal, cardiovascular and central nervous systems. There are few known reported cases of LD associated renal involvement with each patient presenting in a different way.

Our patient had unusual presentation with renal failure and delayed pulmonary manifestations, hence *legionella* was not on the differential initially, therefore appropriate work up and antibiotics were not introduced until later in the hospital course. Patient had no evidence of intravascular volume depletion, hypotension or hypertension, no prior medication use, illicit drug abuse or any other factors which could contribute to acute renal failure, therefore diagnosis of tubulointerstitial nephritis was likely due to LD. Corticosteroids are usually administered for acute interstitial nephritis, but due to the delay in the diagnosis of interstitial nephritis and gradual improvement of renal failure with temporary hemodialysis, steroid therapy was not initiated.

This case demonstrates the importance of renal biopsy aiding in early diagnosis and appropriating the management of *Legionnaires’ disease* which can in turn lead to a full recovery.

**REFERENCES**