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Leptospirosis Presenting with Rapidly Progressing Acute Renal Failure and Conjugated Hyperbilirubinemia: A Case Report

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Statistical Analysis C
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Manuscript Preparation E
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Patient: Male, 53
Final Diagnosis: Leptospirosis
Symptoms: —
Medication: —
Clinical Procedure: None
Specialty: Infectious Diseases

Objective: Rare disease

Background: Unexplained renal insufficiency combined with hepatic failure is a common problem encountered by clinicians. As with many disease processes involving multi-organ systems, reversible causes are usually not readily identifiable, and for many patients their health deteriorates rapidly.
We present a rare cause of acute renal failure and hyperbilirubinemia occurring simultaneously, with leptospirosis presenting as Weil's disease.

Case Report: A 53-year-old male presented to our clinic with complaints of anuria over the past two days. His symptoms started with dark urine, severe cramps in the thighs, and chills. The patient was a visitor to the United States from Guyana. Positive physical examination findings included mild tachycardia and hypotension, scleral icterus, and tenderness over abdomen, costovertebral angles, and thighs. The patient had a high white blood cell count, thrombocytopenia, renal/hepatic insufficiency, and an urinary tract infection (UTI). The patient was initially treated under the suspicion of acute kidney injury secondary to rhabdomyolysis and pyelonephritis. The patient continued to deteriorate with decreasing platelet counts, worsening renal function, hyperbilirubinemia, and respiratory distress, with no improvement with hemodialysis. Broad-spectrum antibiotics were administered, including doxycycline, due to a high suspicion of leptospirosis. The patient's condition drastically improved after initiation of doxycycline. On subsequent days, the patient's *Leptospira* antibody results were available, showing titers of more than 1:3200. Hemodialysis was discontinued as the patient started producing urine with improved kidney function.

Conclusions: As world travel becomes more economically feasible, we will continue to encounter foreign endemic diseases. Leptospirosis presenting as Weil's disease is a common cause of renal and hyperbilirubinemia in endemic areas. Often, as was the case for our patient where the time from presentation to acute respiratory distress syndrome (ARDS) was 72 hours, the diagnosis evolves over the course of several days. Antibody testing often takes time and delays in treatment can cause rapid clinical deterioration. In such cases, we recommend beginning empiric treatment before confirmation of laboratory tests.

MeSH Keywords: Acute Kidney Injury • Endemic Diseases • Hyperbilirubinemia • Leptospirosis

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/897741

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Background

Renal insufficiency combined with hepatic failure is a problem commonly encountered by clinicians. The reversible causes of multi-organ failure are often not readily identified; therefore, many patients experience rapid deterioration of their health.

We present a case of a severe form of leptospirosis presenting as Weil's disease, which is a rare endemic disease causing acute renal failure and hyperbilirubinemia simultaneously.

Case Report

A 53-year-old man with no significant past medical history presented with complaints of anuria over the previous two days. The patient was a visitor to the United States from Guyana. He reported that his symptoms started within a week of arrival to the United States, and included severe cramps in his thighs and chills. In the next few days, he noticed his urine had turned dark, which then progressed to anuria. The patient denied any fever, cough, shortness of breath, chest pain, diarrhea, or sick contacts. He was a former smoker and former alcoholic, but had quit both smoking and consuming alcohol six months earlier.

On examination, the patient was mildly tachycardic with a blood pressure of 98/64 mm Hg. Positive physical examination findings included icteric sclera, jaundice, and tenderness over abdomen, costovertebral angles, and thighs. His lab test results included white blood count of 6.6 K/mcL with bands of 18%, and platelets of 53 K/mcL, CK of 2104 units/L, BUN of 84 mg/dL, creatinine of 9.07 mg/dL, and a deranged hepatic function panel, as shown in Table 1. Urinalysis (done with a very small quantity of urine) was positive for leukocyte esterase, moderate amounts of blood, and protein. With the limited laboratory data available, the patient was initially treated for the suspicion of acute kidney injury secondary to rhabdomyolysis and pyelonephritis. Intravenous ceftriaxone 1 g daily was started while results from a viral hepatitis and autoimmune workup was pending. The patient's condition continued to deteriorate with decreasing platelet counts, worsening renal failure, and hyperbilirubinemia. Hemodialysis was then initiated as per nephrology consultation; however, this did not make any difference in the patient's clinical condition. Over a course of 72 hours from the initial presentation, the patient had developed severe respiratory distress. Chest x-ray revealed diffuse relatively symmetric interstitial infiltrates and ground glass opacities suggesting pulmonary edema or diffuse pneumonitis. Systemic Inflammatory Response Syndrome was suspected and broad-spectrum antibiotics (vancomycin and Zosyn, both given in renal doses) were administered. Intravenous doxycycline 100 mg every 12 hours was also started empirically for high suspicion of leptospirosis from the patient's travel history as well as his rapid clinical deterioration.

The patient's condition started to improve drastically after initiation of doxycycline. Other antibiotics were discontinued. On subsequent days, the patient's *Leptospira* antibody results were available and showed titers of more than 1:3200. Blood cultures, which were sent without any special media, remained negative throughout hospitalization. Workup for viral and autoimmune hepatitis was also negative. Hemodialysis was discontinued when the patient started producing urine with improved kidney function.

Discussion

Leptospirosis is a zoonosis caused by pathogenic spirochetes of the genus *Leptospira*. The incidence in the tropics is approximately 10 times higher than in temperate regions [1]. Human infection usually results from exposure to environmental sources, such as animal urine, contaminated water or soil, or infected animal tissue. Portals of entry include cuts or abraded skin, mucous membranes, or conjunctivae. In the tropics, endemic

Table 1. Hepatic function panel.

Day of presentation	Aphos	AST	GGT	ALT	LDH	ALB	TBil	Bili. Conj
1	99	196	41	146	408	2.3	17.30	11.85
3	92	102	35	96	606	1.7	26.28	17.94
5 Doxycycline initiated	103	74	35	89	1021	1.8	30.92	20.76
6	86	67	28	65	1213	1.7	31.14	20.21
7	90	43	27	54	982	1.6	28.64	19.47
9	102	36	27	41	634	1.6	24.32	14.58
10	92	32	25	29	541	1.8	11.78	6.81
14	81	37	25	39	231	2.3	5.94	3.12

leptospirosis is mainly a disease of poverty [2]. It is acquired through occupational exposure (subsistence farming) and living in rodent-infested, flood-prone urban slums [3]. The illness generally presents with the abrupt onset of fever, rigors, myalgia, and headache in 75% to 100% of patients, following an incubation period of 2 to 26 days (average 10 days). Severe, potentially fatal illness characterized by jaundice and renal failure ("Weil's disease") occurs in a minority of patients. Pulmonary hemorrhage is a potential complication [4]. The fatality rate in hospitalized patients with leptospirosis ranges from 4% to 52% [5–9]. Leptospirosis may be complicated by renal failure, uveitis, pulmonary hemorrhage, acute respiratory distress syndrome (ARDS), myocarditis, and rhabdomyolysis [5,10–12].

White blood cell (WBC) counts are generally less than 10,000/microL but may range from 3,000 to 26,000/microL; a left shift occurs in about two-thirds of patients, as seen in our patient. Thrombocytopenia can also occur. Hyponatremia is common in severe leptospirosis. Serological tests are used most frequently for diagnosis of leptospirosis [13]. Assays include the microscopic agglutination test, macroscopic agglutination test, indirect hemagglutination, and enzyme-linked immunosorbent assay (ELISA) [14,15]. Blood and CSF specimens are generally positive during the first 10 days of the illness. Treatment includes administration of antimicrobials like oral doxycycline or oral azithromycin. Amoxicillin is an alternative therapy. For severe leptospirosis, parenteral penicillin, doxycycline, and third-generation cephalosporin are all acceptable options.

On further interviewing, our patient admitted to previous work on a farm and that he was often exposed to rodents. This exposure occurred just before coming to the United States. His symptoms started with myalgia and rhabdomyolysis. His disease then progressed to hemolysis causing hyperbilirubinemia, and rhabdomyolysis causing acute renal failure. Not surprisingly, laboratory findings included anemia, thrombocytopenia, hyponatremia, high creatinine kinase, elevated bilirubin, and elevated BUN and creatinine. Chest x-ray showed findings consistent with pulmonary edema, which was likely pulmonary hemorrhage or ARDS. All these findings were consistent with severe complicated leptospirosis. We suggest, based on our case report, that clinicians should have a high index of suspicion when encountering patients with recent travels to the tropics who present with rapidly progressing kidney failure and hyperbilirubinemia.

Conclusions

As world travel becomes more economically feasible, we will continue to encounter foreign endemic diseases. Leptospirosis presenting as Weil's disease is a common cause of renal failure and hyperbilirubinemia in endemic areas. Confirmatory testing often takes time, and delay in the treatment can cause rapid clinical deterioration. In such cases, we recommend beginning empiric treatment.

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