

Case Report

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A Young Farmer with Multi-Organ Failure: A Case Report on Weil's Disease in Bangladesh

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Abstract:

Weil's disease is a zoonotic infection caused by organism of *Leptospira icterohaemorrhagiae*, having a very high mortality. This article reports a case of a young male farmer who presented to a tertiary-level hospital in north-eastern Bangladesh with severe fatigue, fever, abdominal pain and yellow discoloration of the whole body. Meticulous history taking revealed that he worked bare-footed in an animal farm and had a cut injury in his right foot 15 days back. On the basis of this piece of information, serological tests for leptospirosis were done that showed positive results. There was significant clinical and biochemical improvement after treatment. This case report revealed that a patient with fever, hepatitis and, pancreatitis with a background history of suggestive exposure, leptospirosis should be considered.

Key words: Weil's disease, Leptospirosis, Jaundice, Pancreatitis, Hepatitis, Multi-organ-failure

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Introduction:

Leptospirosis is a zoonotic infection with protean clinical manifestations caused by pathogenic spirochetes that come from the genus *Leptospira*.¹ A systematic review and modeling exercise estimated that more than a million human cases occur worldwide yearly, including approximately 60,000 deaths.² It is also known as Weil's disease, Weil-Vasiliev disease, rice-field fever, cane-cutter fever, swamp fever, Swineherd's disease, mud fever, Fort Bragg fever, Stuttgart disease, waterborne fever, nanukayami fever, Mgunda fever, and Canicola fever.

Leptospira are aerobic spirochetes that are spiral-shaped and, highly motile and include 18 or more coils per cell.³ It is the most common disease in tropical regions but may occur in temperate areas also. The most prevalent areas are South and Southeast Asia including Bangladesh, parts of Latin America, the Caribbean, parts of sub-Saharan Africa and Oceania. Mammals are the primary reservoir. The environment with contamination can also serve as a reservoir. *Leptospira* lives in the kidney tubules of infected mammals and is eventually shed in the urine. Organisms can survive for a period of days to months in contaminated soil and water.^{4,5} On exposure to a contaminated environment, humans become infected by being an accidental host. Transmission occurs through portals like cuts in skin or abrasion, mucous membranes, or conjunctivae.⁶ Clinical manifestations range from non-specific febrile illness to multi-organ failure which may lead to death. Severe leptospirosis may present as jaundice, pulmonary hemorrhage, acute renal injury and neurological complications such as encephalitis, aseptic meningitis etc.^{2,3,4} This article draws attention to the severe and atypical presentation of Weil's disease in the index patient and thus emphasizes the importance of history, especially the occupational history, to exclude exposure to contaminated soil and/or water as a risk factor.

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Case Summary

A 35-year-old farmer presented with generalized weakness and extreme fatigue of 10-day duration. He also complained of fever, abdominal pain, anorexia, yellow discoloration of eyes and urine with vomiting several times in the last 5-days. Further asking revealed a cut injury in his right foot while working in the field. His fever was high-grade for the first few days of illness, and abdominal pain was mostly in the epigastrium, non-radiating and dull aching. He denied photophobia, headache, vomiting, and change in bowel habits, respiratory or other urinary symptoms. He had no significant past medical, surgical or family history. He was a non-smoker and had no known allergies.

On admission, the patient was toxic-looking, deeply icteric (Figure 1), moderately dehydrated and conscious. His pulse rate was 92 bpm, blood pressure was 80/50 mmHg, respiratory rate was 16 breaths/min, SaO₂ was 98% in room air, and temperature was 99°F. He was not anemic. On abdominal palpation, the epigastrium was tender without rigidity. No organomegaly was noted. Bowel sound was audible and normal. Bilateral mild crepitation was found over both lung bases. His other systemic examinations were unremarkable.

On investigation, the patient's complete blood counts showed total white blood cells 15600/cumm (neutrophils: 83%, lymphocytes 12%, eosinophil 2%, monocytes 3 %, platelet count 50000, hemoglobin 13.2 g/dl, hematocrit 36 %, random blood sugar 6.5 mmol/L, CRP 92.2 mg/l, troponin-I 0.68 ng/ml, D-dimer 2.48 µg FEU/ml, serum bilirubin 34 mg/dl, SGPT 52 U/L, alkaline phosphatase 98 U/L, blood urea 152 mg/dl, creatinine 3.38 mg/dl, serum lipase 1410 U/L, serum HBsAg negative and, Anti-HCV negative. His *Leptospira* IgG antibody was raised and, blood culture did not yield any growth. Abdominal ultrasound showed features suggestive of acute hepatitis and, a few sludge in the gall bladder. CT scan of the abdomen revealed normal liver, biliary system and, pancreas (Figure 2). The chest radiograph showed mild bilateral inflammatory shadows but cardiac evaluation found normal features in

ECG and ECHO-2D with ejection fraction 62%. On the 4th day of admission, serum bilirubin came down to 14.29 mg/dl and creatinine to 0.95 mg/dl.

The patient was treated at the beginning with meropenem and metronidazole thinking of acute pancreatitis with impending multi-organ failure. On the availability of a serology report, doxycycline was started. Then the patient was observed for well-being. He was discharged on the 6th day of admission with advice to follow up in 2 weeks. Regarding the risk factors, counseling was done to minimize environmental contamination.

The follow-up at 2 weeks revealed clinical improvement in his jaundice (Figure 1b) and serum bilirubin came down to 6.09 mg/dl. Other markers- serum lipase (290 U/L), and CRP (1.8 mg/L) were also lower than baseline levels. His symptoms resolved gradually following the 2 weeks course of doxycycline.

Figure 1: a. Deep jaundice at presentation b. improvement after treatment

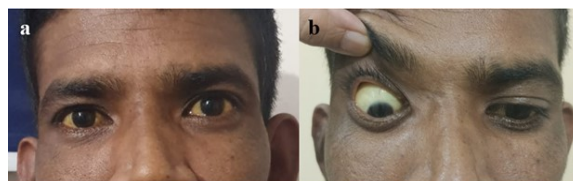
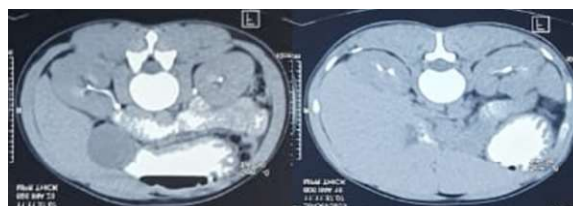


Figure 2: CT scan of abdomen



Discussion

Leptospirosis is common in tropical regions of the world and prevalence in Bangladesh is 2-44% of patients, who get treatment outdoors with febrile illness.⁶ Common risk factors for leptospirosis infection are occupational exposure such as people working with contaminated soil or water, recreational activities like swimming in contaminated water, household exposure with pets, low socio-economic conditions with poor sanitation for developing countries, and

traveling to endemic areas for people of developed countries.^{5,7} The reported patient in this article came from a very remote area of Bangladesh and worked bare-footed on a farm with poor sanitary conditions. He had an accidental cut injury in his right foot while working on the paddy field.

The clinical presentation of leptospirosis varies from case to case.^{7,8,9,10} Sometimes, presentation is not very typical and leads to delayed diagnosis. Based on the progression, the disease can be fatal in case of delay to start treatment especially due to multi-organ failure.¹¹ Common systemic involvements are aseptic meningitis, acute hepatic injury, hemorrhagic or necrotizing pancreatitis, pulmonary hemorrhage, carditis, acute kidney injury, and even death.^{4,5} Acute pancreatitis may develop due to ischemic effects on the pancreas due to decreased removal of toxins and increased stasis of injurious products.^{1,3} Therefore, a physician might seek assistance with serological tests for earlier clinical decision-making. Initially, the index case directed investigators toward the clinical diagnosis of acute pancreatitis or hepatitis. On admission, they found suggestive serum levels of pancreatic enzyme and very high serum bilirubin without raised liver enzymes, which led them to ask for *Leptospira* serology. The diagnosis can also be confirmed by the positive Polymerase Chain Reaction (PCR) of blood or urine if possible. PCR is not sensitive within the first week of clinical presentation.^{12,13}

Careful monitoring of the patient is very crucial in case of multi-organ failure besides empirical antibiotic treatment.^{11,14} Supportive treatment such as hemodialysis, blood products, and ventilator support may also be needed for some cases of organ dysfunction. For mild disease in the case of outpatients, we may choose oral antibiotics such as doxycycline or azithromycin. In the case of pregnant women, either azithromycin or amoxicillin is preferred. In severe disease, for hospitalized patients, intravenous penicillin, doxycycline, ceftriaxone, or cefotaxime are chosen.^{4,5,12} Patients should be advised to stay away from possible contaminated water or soil, rats and mice, and keep food and drink away from animals.

Conclusion

Weil's disease is a common *Leptospira* infection in the tropics including Bangladesh. But the presentation is variable and, sometimes it presents with acute pancreatitis or acute hepatitis or multi-organ failure. The morbidity and mortality rise significantly in such patients. An early serology or PCR can be a helpful tool to make a prompt diagnosis, especially in patients with significant risk factors. Early antibiotic treatment in these patients can reduce fatal outcomes.

Disclaimer: Authors declare no conflict of interest

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