

Hyperacute Liver Failure with Multi-organ Dysfunction Syndrome (MODS) by Leptospirosis: A Case Report

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Abstract

Introduction: Leptospirosis may have multi-organ involvement in its severe form with potentially life-threatening consequences. However, acute fulminant hepatic failure is very uncommonly reported. A case study is presented here with fulminant hepatic failure and a diagnostic dilemma for etiology.

Case history: A 40-year-old man with no significant medical history presented with fever, muscle pain, weakness, and pain in the upper abdomen. On clinical work, he has developed multi-organ hepatic, respiratory, and renal failure. A timely workup was done, but due to the rapid progression of the disease, the patient succumbed to the disease in the intensive care unit by the time his report for positive leptospirosis test arrived.

Conclusion: Leptospirosis must be considered as an important differential diagnosis of acute liver failure patients. An early suspicion for leptospirosis in patients with fulminant hepatic failure and multi-organ failure in India particularly in the rainy season is warranted owing to its high mortality rate.

Keywords: leptospirosis, Acute fulminant hepatic failure, Multi organ dysfunction syndrome.

INTRODUCTION

Leptospirosis is a priority zoonotic disease under one health program with worldwide distribution.^[1-3] Previously thought to be a disease of rural populations and sewage workers, it is re-emerging as a potentially life-threatening disease in urban populations. Although it is endemic in southern and western parts of India,^[4-6] leptospirosis has also been recently reported from eastern and northern India, where it was earlier thought to be non-existent.^[7-14] Despite being common, its diagnosis is often ignored or delayed because of a low index of suspicion and protean presentation. However, detailed data on leptospirosis's frequency, degree, and type of hepatic dysfunction are limited. The present study highlights a patient who presented with clinical problems confusing in the clinical setting and could be easily managed once suspected and found positive on an investigation. By shedding light on the complexities of hyperacute liver failure with

MODS in leptospirosis, this study aims to contribute to the existing body of knowledge, guide clinical decision-making, and ultimately improve the prognosis for patients affected by this critical condition, such diagnosis often gets missed despite efforts by the one health program for prevention and control of Zoonotic diseases through sentinel surveillance sites for capacity building of epidemiologists, clinicians, and microbiological laboratories.

Case History

This is a case history of a 40-year-old man who was admitted to our hospital with chief complaints of severe pain in the upper abdomen for 4 days, fever with chills for 3 days, severe

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weakness for 3 days, and yellowish discoloration of urine for 3 days. Apparently, a remarkably short history narrated by the patient that he was asymptomatic 5 days back when the patient felt sudden onset sharp upper abdominal pain which was acute in onset, gradually progressive, dull aching, non-radiating with no aggravating factors but was relieved only on IV tramadol injection. He was admitted to a local hospital as a case of acute abdomen. Urgent ultrasound was done, which showed altered echotexture of bilateral kidneys with normal size suggesting medical renal disease and also showed heterogenous hepatic echotexture but the pancreas appeared to be normal. The patient was referred to us as he might need admission to the intensive care unit.

The following day, the patient developed a high-grade fever that was acute in onset and was followed by yellowish discoloration of urine and altered sensorium during the hospital stay. His Glasgow Coma Scale (GCS) rapidly deteriorated to 5. The patient developed respiratory failure with tachypnoea (respiratory rate 28 bpm and arterial blood saturation 80%). He was immediately intubated and put on mechanical ventilation; subsequently, his biochemical and

hematological investigations report showed the following results: Table 1. It showed moderate anemia (Hb-8.2gm/dl), leucocytosis, prolonged prothrombin time more than twice of control, mild jaundice with significantly high SGOT (3290 U/l), and SGPT (3450 U/l) levels suggesting acute hepatic failure. The patient had acute renal failure too with raised serum creatinine 4.19 mg/dl). Arterial blood gas analysis showed severe metabolic acidosis pH-7.01, PaCO₂-30 mmHg, PaO₂-156 at FiO₂-0.4, and HCO₃⁻-18.6.

We also found that the patient reported negative results for malaria antigen, typhoid DOT, dengue, hepatitis B antigen, HCV, and HIV antibody tests. Hepatitis A viral screening also yielded negative results. We also sent a test for leptospirosis Ig M with Elisa, which was positive but sadly, the report was received post-death of the patient. His presumptive diagnosis is based on Faine’s criteria (Part A and B score- 28) (table 2). The diagnosis was further confirmed as leptospirosis by positive Elisa IgM by the next day.

On the second day of the ICU stay, urine output started deteriorating and the nephrologist advised dialysis. Still, it could not be started as the patient developed hypotension and gastric bleeding with petechial hemorrhagic spots all over the body. The patient’s condition deteriorated rapidly and they went into cardiac arrest probably because of severe metabolic acidosis. He was revived by cardiopulmonary resuscitation but with a second arrest on the subsequent day the patient could not be revived again and died after 3 days of admission.

Table 1: Showing first-day blood reports with very high leucocyte count, creatinine and liver enzymes

Name of test	Report	Normal reference
Haemoglobin	8.2 gm/dl	11-15 gm/dl
Total Leucocyte count	13800	5000-10000
Platelet count	1.2 lac/ml	1.5-4.5 lac/ml
Prothrombin time ratio (INR)	4.6	0.8-1.1
S creatinine	4.19 mg/dl	0.6-1.2 mg/dl
S Bilirubin	2.6 mg/dl	0.2-1.2 mg/dl
SGOT	3290 U/l	5-40 U/l
SGPT	3450 U/l	7-56 U/l
S Amylase	48 U/l	23-85 U/l
S Lipase	69 U/l	0-160 U/l

DISCUSSION

The present report describes a case of hyperacute liver failure due to leptospirosis infection, the less common cause of liver failure. The confirmative diagnosis of leptospirosis was made based on the criteria according to modified Faine’s criteria score of more than 26 from Part A, and Part C. Unfortunately, the patient could not be saved due to rapidly deteriorating condition of acute exacerbation of acute renal

Table 2: Showing diagnostic criteria for leptospirosis. Presumptive diagnosis of leptospirosis is made if: Part A or Part A and Part B score: 26 or more; Parts A, B, C (Total): 25 or more. A score between 20 and 25 suggests leptospirosis as a possible diagnosis

Clinical Data (Part A)	Epidemiological factors (Part B)	Bacteriological & Laboratory Findings (Part C)
Headache 2	Rainfall	5 Isolation of Leptospira in culture-Diagnosis Certain PCR 25
Fever 2	Contract with contaminated environment	4 Positive Serology
Conjunctival Suffusion 4	Animal Contact	1 Elisa IgM positive 15
Meningism 4		SAT Positive 15
Conjunctival Suffusion +Meningism +Myalgia 10		Other Rapid Test 15
Jaundice 1		MAT Single Positive High Titer 25
Albuminuria/Nitrogen retention 2		MAT-Rising Titer/Seroconversion (Paired sera) 25
Hemoptysis/Dyspnea 2		Any one of test only should be scored latex agglutination test/ Lepto Dipstick/ Lepto Tek Lateral flow/Lepto Tek DriDot test

failure with respiratory failure but amply emphasized to consider leptospirosis too.

According to the above-mentioned criteria, the total score of our patient according to Part A and Part B was 28 which means the presumptive diagnosis was made. The patient was having jaundice along with frank liver failure and showed typical renal involvement, headache, and myalgia.

The patient coagulopathy was taken care of but the course of the disease was so fulminant that even prompt treatment and intravenous doxycycline could not save the patient. As the center was not having any liver transplantation facilities and the aggressive nature of the disease patient could not be shifted to the higher center and ultimately succumbed to severe metabolic acidosis and renal failure.

We required a liver biopsy for the definitive diagnosis, but it could not be performed because of severe derangement of the coagulation profile. He developed disseminated intravascular coagulopathy too.

Leptospira infection often has minimal clinical manifestations, with about 40% of the infected patients seroconverting asymptotically. Of the remaining 60%, approximately 90% suffer the milder anicteric form and 10% the more severe icteric form.^[2-4] The severe form is associated with multi-organ involvement, especially hepato-renal, and a fatality rate of up to 40%.^[5] Hepatic involvement in Leptospira infection is not uncommon and can vary from an asymptomatic rise in transaminases to severe icteric hepatitis.

CONCLUSION

Leptospirosis must be considered an important differential diagnosis of acute liver failure patients owing to its high mortality rate and growing incidence in India, particularly in rainy seasons and when the risk factors are present. Sensitization of epidemiologists, clinicians, and microbiological laboratories is required for the identification of such cases under one health program for the prevention and control of Zoonotic diseases through the strengthening of sentinel surveillance sites.

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