Case Report

Fulminant leptospirosis masquerading as acute gastroenteritis leading to refractory shock and acute respiratory distress syndrome

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ABSTRACT

Leptospirosis is a classical zoonotic infection characterised by a wide spectrum of clinical manifestations ranging from mild febrile illness to severe multiorgan involvement with fatal outcomes. Diagnosis has always been a challenge for physicians due to its non-specific presentation and its early clinical overlap with other common infections, such as viral febrile illness or acute gastroenteritis. We report a case of a 25-year-old, previously healthy female, who presented with fever, vomiting, and diarrhea and was initially managed as acute gastroenteritis with hypovolemic shock, and was subsequently confirmed to have leptospirosis. Despite aggressive and comprehensive resuscitation, the patient developed multiorgan dysfunction, acute respiratory distress syndrome (ARDS), and refractory shock and ultimately succumbed to the illness. This case is unique due to its deceptive onset as isolated acute gastroenteritis with hypovolemic shock, rapidly evolving into fulminant leptospirosis with ARDS and refractory shock despite the absence of classical exposure risk. This case highlights the importance of early consideration of leptospirosis as a differential for any acute febrile illness, even in urban setups, for prompt diagnosis and treatment to avoid potentially fatal outcomes.

Key words: Acute respiratory distress syndrome, Gastroenteritis, Leptospirosis, Multiple organ dysfunction syndrome

Leptospirosis is a globally prevalent and well-recognised zoonotic disease caused by pathogenic *Leptospira* species [1-3]. Human beings, the dead-end host, acquire infection through direct or indirect contact with the urine of infected animals, most commonly rodents [1,2]. The disease is endemic to tropical regions, with peak incidence during the monsoon season [3,4]. The disease is significantly linked with climatic conditions such as rainfall, flooding, and waterlogging, as well as poor sanitation measures and occupational exposures, particularly among sewage and agricultural laborers [3,5]. Leptospirosis has protean clinical manifestations and includes fever, myalgia, jaundice, gastrointestinal symptoms, rash, bleeding manifestations, and altered sensorium attributed to secondary multi-organ dysfunction [1,2,6,7]. Severe leptospirosis, also known as Weil's disease, is frequently associated with high mortality rates, especially when accompanied by acute respiratory distress syndrome (ARDS) and septicemic shock [5,8]. Due to its non-specific early manifestations, diagnosis is challenging and frequently delayed, resulting in poor outcomes [1,6,7].

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CASE REPORT

A previously healthy, 25-year-old female, resident of an urban area of Agra, presented to the emergency department with a history of high-grade fever for 3 days, multiple episodes of loose stools and vomiting for 2 days, which were associated with abdominal and lower back pain. There was no initial history of jaundice, any form of bleeding manifestation, rash, altered sensorium, or significant exposure.

The patient was afebrile on presentation, drowsy, with signs of severe dehydration in the form of dry mucous membranes, anuria, tachycardia, and hypotension. Oxygen saturation was maintained on room air. The patient had a tender abdomen with no palpable organomegaly. Respiratory and cardiovascular examinations were unremarkable.

A provisional diagnosis of acute gastroenteritis with hypovolemic shock was considered, and the patient was aggressively resuscitated with intravenous crystalloids, following which there was drastic improvement, blood pressure normalized, and urine output gradually improved to normal.

Despite initial stabilisation, over the next 24 h following admission, the patient developed new-onset shortness of breath and hypoxemia with deterioration

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of blood pressure. Chest X-ray revealed bilateral diffuse infiltrates suggestive of ARDS, supported by worsening PaO_2/FiO_2 on blood-gas analysis. Empirical antibiotic therapy, piperacillin–tazobactam, was initiated within 24 h of admission owing to suspicion of sepsis, and the patient was put on non-invasive ventilation and intravenous noradrenaline support to maintain adequate mean arterial pressure (MAP).

Laboratory investigations came out to reveal significantly raised total leukocyte count (12,400 cells/mm^3), serum creatinine of 1.76 mg/dL, mildly raised transaminases (alanine aminotransferase/aspartate aminotransferase: 69.05/65.86 IU/L) with markedly raised total bilirubin of 5.2 mg/dL with a cholestatic picture (serum bilirubin direct/indirect: 3.9/1.3 mg/dL), which was non-appreciable initially and missed on clinical examination. In view of the clinical picture of fever, jaundice, leukocytosis, renal dysfunction with features of ARDS, a zoonotic infection was suspected, serological tests were sent, and antibiotic coverage was extended by adding doxycycline on day 2.

The patient's condition continued to deteriorate with worsening of respiratory distress and shock, requiring escalation of vasopressor support along with intravenous hydrocortisone. Bedside ultrasonography and two-dimensional echocardiography (2D echo) were unremarkable. Still considering the possibility of septicemic cardiomyopathy in view of rising serum lactate trends with adequate MAP of 65 mmHg and urine output of >0.5 mL/kg/hr, the patient was started on an intravenous inotrope, dobutamine.

Blood and stool cultures returned to be negative, but the serology for *Leptospira* was positive, confirming the diagnosis of leptospirosis with refractory septic shock, septicemic multiple organ dysfunction syndrome with ARDS. The patient was electively intubated 48 h after admission and mechanically ventilated on synchronized intermittent mandatory ventilation mode in view of worsening respiratory distress and inability to tolerate non-invasive ventilation. Despite maximal supportive care and aggressive management in the critical care unit, the patient remained in refractory shock and succumbed to the illness eventually within 72 h of admission.

DISCUSSION

The present case is clinically unique due to its deceptive gastrointestinal onset, absence of classical exposure risk, and rapid transition from apparent hypovolemic shock to fulminant septic shock with multi-organ dysfunction.

Leptospirosis is an important but often under-recognised zoonotic infection in India, presenting frequently as an acute febrile illness, especially during the monsoon season [3,4]. The disease is endemic to several regions of India and is significantly influenced by climate factors such as rainfall, flooding, waterlogging, and poor sanitation measures [4,5]. Recent Indian studies have found leptospirosis to be associated with a pooled inpatient mortality of around 11%, underscoring the potential severity of the disease, particularly when presenting with multi-organ dysfunction, ARDS, and shock [5,8]. Several hospital-based serological surveys have demonstrated considerable seroprevalence variation in the setting of acute undifferentiated pyrexia across the country, ranging from 24.5% in Jharkhand to as low as 6.5% in urban centers like New Delhi [1,3,4]. This variation cannot be attributed solely to regional differences but may also represent variability in diagnostic practices across the country [1,4].

The clinical spectrum of leptospirosis is wide, ranging from mild febrile illness to a severe and often fatal course when associated with multi-organ involvement and refractory shock, as seen in the present case [1,2,6]. Early symptoms may mimic a wide spectrum of diseases such as acute viral hepatitis, acute gastrointestinal infections, and dengue, leading to misdiagnosis and delayed recognition [1,6,7]. The non-specific nature of presentation and absence of pathognomonic features make leptospirosis a diagnostic challenge for the attending physician [1,2,6]. In the present case, the initial presentation was consistent with acute gastroenteritis and hypovolemic shock, and the rapid evolution to multi-organ dysfunction, ARDS, and refractory shock in the absence of positive cultures illustrates the aggressive and unpredictable course of severe leptospirosis [1,5,8].

Marked hyperbilirubinemia with a cholestatic pattern and mildly elevated transaminases are consistent with hepatic involvement described in the literature [1,2,6]. Renal dysfunction and rapidly progressive respiratory distress with refractory shock further indicate the severity of the systemic illness [1,6]. Given the non-specific laboratory profile and frequent negative culture results, serological assays, including IgM ELISA, remain the cornerstone of diagnosis of leptospirosis [1,6].

This case highlights the importance of early consideration of leptospirosis as a differential diagnosis for febrile illness, even in urban centers of India [3,4]. Early suspicion, timely serological testing, and prompt initiation of appropriate antibiotics may help reduce morbidity and mortality associated with severe leptospirosis [5,8]. However, as illustrated in the present case, despite prompt and comprehensive supportive care, severe leptospirosis can rapidly progress to complications such as ARDS, multi-organ dysfunction, and refractory shock, resulting in fatal outcomes [2,5,8].

CONCLUSION

This case is unique in its presentation as acute gastroenteritis with apparent hypovolemic shock, rapidly evolving into fulminant leptospirosis with ARDS and refractory septic shock in an urban patient without any classical exposure history. This case highlights the potentially fulminant and deceptive nature of leptospirosis. The rapid progression of apparent hypovolemic shock to severe, refractory septic shock

with multi-organ dysfunction and ARDS underscores the aggressive course leptospirosis may take despite comprehensive critical care. Leptospirosis may be far more prevalent in the Indian set-up than currently reported, owing to variability in diagnostic practices and a low degree of suspicion. A high index of suspicion for leptospirosis in any acute febrile illness, across all seasons, even in urban settings of tropical countries like India, especially when complicated by shock and multi-organ dysfunction, is essential to avoid delayed diagnosis and catastrophic outcomes.

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