

Case Report

Role of steroids in a case of leptospirosis and dengue coinfection with acute respiratory distress syndrome

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ABSTRACT

Coinfection with leptospirosis and dengue complicated by acute respiratory distress syndrome (ARDS) is rare and potentially fatal. While steroids are generally contraindicated in dengue and their role in leptospirosis remains uncertain, management becomes challenging. This case highlights a situation where steroid therapy was beneficial. We describe a case of a 17-year-old male presenting with fever with chills, joint pain, abdominal pain and vomiting, hemoptysis and subsequent respiratory distress, diagnosed with concurrent leptospirosis and dengue. Despite the uncertain role of steroids in such a case of co-infections, methylprednisolone (MPS) was administered due to severe ARDS, yielding positive outcomes. This case underscores the complexity of managing coinfections and prompts reconsideration of treatment protocols. Literature review reveals conflicting evidence on steroid use in complicated cases as this one. The positive outcomes of administering steroids in this case highlight the need for further research to refine therapeutic approaches in managing complex coinfections. This case urges robust randomized controlled trials assessing corticosteroid efficacy in severe dengue shock syndrome and leptospirosis, given their potential to significantly improve patient outcomes.

Keywords: Leptospirosis, Dengue, Coinfection, ARDS, Steroids

INTRODUCTION

Leptospirosis and dengue coinfection with acute respiratory distress syndrome (ARDS) is a rare and potentially life-threatening condition. Leptospirosis is a bacterial infection caused by the spirochete leptospira, which causes a wide array of symptoms involving multiple organ systems, giving the disease the name of 'the great mimicker'.¹ While dengue is a viral infection transmitted by the aedes mosquito, which causes symptoms ranging from fever, headache, muscle and joint pains, rash to even thrombocytopenia and shock. When these infections occur together, they can lead to a severe and potentially life-threatening illness, with ARDS being one of the complications. The role of steroids in such cases can be ambiguous. As per CDC, steroids are contraindicated in dengue.² While studies are ongoing to determine its role in leptospirosis, making it a tricky call to decide whether or

not to give steroids in cases of coinfections with complications.³ Our case highlights one such example wherein the use of steroids was instrumental.

CASE REPORT

A 17-year-old male from Mumbai, India, presented to the outpatient department with a 5-day history of fever with chills, joint pain, redness of eyes, cough, abdominal pain and vomiting.

2 days later the patient presented to the emergency department at 3:00 am with palpitations, difficulty in breathing, 8 episodes of hemoptysis and difficulty in walking. On admission he was febrile (102°F), conscious and non-icteric, hypotensive, tachycardiac, tachypneic, and hypoxic. Bilateral crepitations were heard on examination. Laboratory investigations showed anemia,

leukopenia, thrombocytopenia and raised total bilirubin, SGOT and CRP. IgG dengue antibody test was positive owing to a past history of dengue infection a month back, while dengue NS1 antigen came negative. Serological tests for leptospirosis (IgM test) and other infectious causes (malaria, typhoid, chikungunya, influenza, COVID 19, hepatitis B and C) were negative. Chest x-ray revealed bilateral diffuse reticulonodular opacities with fluffy nature suggestive of ARDS and diffuse alveolar haemorrhage (DAH). Computed tomography (CT) findings are shown in Figure 1.

Given the extensive nature of the disease on the scans and the endemicity of tuberculosis, miliary tuberculosis was one of the differentials. The Glasgow coma scale (GCS) score deteriorated and the patient was shifted to intensive care and ventilatory assistance was started. The patient management included stabilization and symptomatic treatment, along with methylprednisolone and doxycycline.

On rerunning the microbiology on day 3 of admission-dengue IgM, dengue IgG and leptospira PCR tested positive. Doxycycline and methylprednisolone were continued.

The patient improved clinically on the 5th day of admission and was transferred to inpatient care with clearer lung fields. The initial tachycardia due to the distress progressed to bradycardia due to the infections, and finally came back within the normal range once the patient recovered. Table 1 shows the trends in the patient's vitals and blood counts.

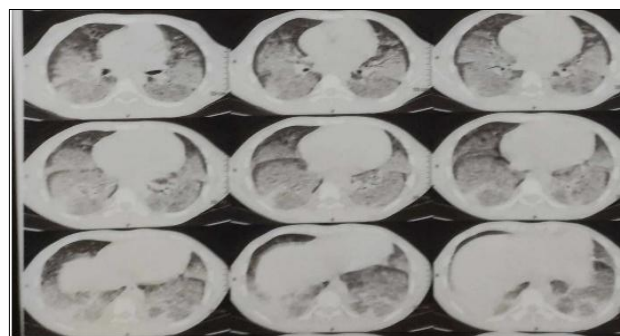


Figure 1: CT showing diffuse ground glass opacity density areas with smooth interlobular septal thickening and adjacent subsegmental consolidations are seen in both lung parenchymas predominantly in lower lobes. These are most likely suggestive of diffuse alveolar haemorrhage.

Table 1: Trends in patient's vitals and blood counts.

Parameters (unit)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Hemoglobin (g/dl)	8.5	8.5	9.1	10.2	11.5	11.5
White blood cell count (cells per mm³)	3300	4200	6200	12800	14500	19200
Platelet count (cells per mm³)	40000	40000	89000	54000	97000	183000
Pulse rate (beats per min)	135	106	50	45	48	100
Blood pressure (mm Hg)	100/70	Systolic-120, diastolic- scanty	110/70	110/70	120/80	120/80
Respiratory rate (breaths per min)	48	40	40	30	28	25
SpO₂	78% @4.5 litres O ₂ by nasal prongs	100% on BiPAP	94% @6 litres O ₂ by nasal prongs	98% @4 litres O ₂ by nasal prongs	98% on room air	99% on room air

DISCUSSION

The endemicity of such infectious diseases in the tropical regions makes it very important to keep a high degree of suspicion and think of the possibility of co-infections as well. As was seen in this case, where the patient was suspected of having military tuberculosis initially, which on further evaluation was found to be a leptospirosis and dengue coinfection.

This case report presents a rare instance of this dual infection not extensively documented, which was managed with steroids, a line of treatment that still remains unexplored. Remarkably, steroids are usually

contraindicated in dengue management and despite the absence of guidelines commenting on their use in leptospirosis, they were administered to address the severe ARDS in this case. They were provided based on the supportive evidence from a case series of 30 patients having pulmonary leptospirosis which showed beneficial effects of methylprednisolone.⁴ As well as from the positive results that were seen while treating ARDS in COVID-19 patients by the treating physicians in our case.

A systematic review found that the efficacy of corticosteroids in treating dengue relies on ensuring consistent and prolonged therapeutic concentrations of the medication in the bloodstream.⁵ In another non-

randomised case series of 22 children, 9 out of 11 children treated with MPS survived while others not given steroids died.⁶ Another recent retrospective analysis investigating the efficacy of single-dose MPS in adult patients experiencing dengue shock revealed a notable decrease in mortality rates compared to a cohort of similar patients who did not receive steroid treatment as outlined by the protocol.⁴

In 2006, the Cochrane database of systematic reviews determined that the available evidence was insufficient to support the utilization of corticosteroids in cases of dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), emphasising the necessity for extensive randomised controlled trials.⁷

This decision of using steroids raises questions about the conventional knowledge surrounding steroid use in dengue, as well as introducing uncertainty regarding its impact on leptospirosis. This patient's clinical course and outcomes provide valuable insights into the complexities of managing coinfections, urging a re-evaluation of treatment protocols and emphasising the need for further research to guide appropriate therapeutic strategies in such challenging scenarios. A properly powered and meticulously planned randomised controlled trial of high-dose corticosteroids is unquestionably warranted for treating patients with severe dengue shock syndrome and its efficacy in leptospirosis.

CONCLUSION

This case highlights the diagnostic and therapeutic challenges of dengue and leptospirosis coinfection complicated by severe ARDS. Although the role of corticosteroids remains uncertain, the favorable clinical response seen in this patient suggests that steroids may have a role in selected severe cases. Further studies are needed before their routine use can be recommended.

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