Case Report

Leptospirosis presenting as acute meningoencephalitis

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Abstract

Leptospirosis in humans is a common zoonotic disease. It is often under-diagnosed, especially when associated with neurological features, resulting in significant morbidity and mortality. This subgroup of patients with neurological manifestations is often empirically treated for cerebral malaria, dengue fever, tuberculous meningitis, hepatic encephalopathy, viral encephalitis, etc. Hence it is important to be aware of uncommon manifestations of this disease. We report one such patient, which highlights the importance of considering leptospirosis as the diagnostic possibility with hepato-renal, pulmonary and nervous system involvement, particularly where diagnostic supports and resources are limited.

Key words: leptospirosis; viral encephalitis; Weil's disease; hemorrhagic alveolar pneumonitis; hepato-renal; zoonotic disease

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Introduction

Leptospirosis in humans is a common zoonotic disease found worldwide, especially in tropical and temperate climates. The causative organism belong to species Leptospira interrogans, which is a finely coiled motile spirochete with bent or hooked ends, generally transmitted through the urine of infected rats. Clinical spectrum can range from an asymptomatic, sub clinical infection to a fatal hepatorenal syndrome (Weil's disease), severe pulmonary form, including pulmonary hemorrhage and acute respiratory distress syndrome [1-3]. Because of protean clinical manifestations and a paucity of investigations, it is often under-diagnosed, especially when associated with neurological features, resulting in significant morbidity and mortality [4-6]. Based on seasonal prevalence, endemicity of the infective agent and clinical bias, this subgroup of patients are empirically treated for cerebral malaria, dengue fever, tuberculous meningitis, hepatic encephalopathy, viral encephalitis, *etc*. [7]. They are subsequently referred to higher centres following a poor therapeutic response. Hence it is important to be aware of uncommon manifestations of this disease. We report one such patient, which highlights the importance of considering leptospirosis as the diagnostic possibility with hepato-renal, pulmonary and nervous system involvement, particularly where diagnostic supports and resources are limited.

Case report

A 23-year-old male farmer from a village of Eastern Uttar Pradesh (India) presented with complaints of fever for 15 days, which was continuous, moderate to high grade, and associated with chills and rigors**.** He also had headache with repeated episodes of vomiting. There was generalized body ache, not responding to analgesics. A week prior to presentation, he had increasing drowsiness which progressed to altered sensorium. There was no focal deficit. There was a history of decreased urine output and cough with blood-tinged sputum for three days. There was no history of bleeding from nose, teeth or gums, hematuria or melena, rashes, bone pains, recent blood transfusion, or any high-risk behaviour for human immunodeficiency virus (HIV) infection. He was being managed at the district hospital of his locality for acute viral encephalitis and also for cerebral malaria. There was no therapeutic response, following which he was referred to our hospital (a tertiary care centre in northern India). An episode of generalized tonic clonic seizures was witnessed in emergency.

His blood pressure was 100/70 mm of Hg and there was tachycardia (134/min) with tachypnoea (34/min). He was febrile (103 ^{o}F). There was a

conjunctival suffusion with icterus without any lymphadenopathy. Hepatosplenomegaly was present and chest examination on auscultation revealed decreased air entry in the right hemithorax with coarse crepitations, during both the expiratory as well as inspiratory phase of respiration, in the right infraclavicular and axillary regions. The patient was delirious (Glasgow scale = 12). Neck rigidity and positive Kernig's Sign was present. Cranial nerves were intact and no motor deficit was present. Deep tendon jerks were brisk with bilateral extensor plantar response.

Initial investigations revealed deranged hepatic functions (bilirubin - 2.21 mg/dl, aspartate aminotransferase (AST) - 290 IU/L, Alanine Aminotransferase (ALT) - 600 IU/L, serum alkaline phosphatase -813 IU/L and serum albumin - 2.3 gm %) and deranged renal function (creatinine - 2.7 mg/dL and BUN - 46 mg/dL). Hemogram revealed thrombocytopenia (platelets – 27,000/$mm^{3)}$ and total leukocyte count - 16,500/mm^3 with 88% polymorphs. Coagulation profile was normal. Peripheral smear examination did not reveal malarial parasite. The urine and blood culture were negative for bacterial growth. Cerebrospinal fluid (CSF) was abnormal (total protein of 176 mg/dL, the ratio of CSF/Serum glucose was 0.51 and 70 cells/mm^3 with 90% lymphocytes). Microbiological examination, including Polymerase chain reaction for Japanese encephalitis, was negative. Serology for HIV, dengue, salmonella, malarial parasite and hepatotrophic viruses were negative. Cranial imaging was normal. The chest X ray revealed diffused, ill-defined ground glass density in the left lower zone (Figure 1a). The patient was initially not responding to the conservative management of acute viral encephalitis. His diagnosis was reviewed and in view of the deranged hepatorenal functions and seasonal prevalence (recent floods in the area where the patient resided), leptospirosis was clinically suspected, which was further confirmed by the positive serum IgM-ELISA.

The patient was initiated on intravenous crystalline penicillin 10 lac IU, 6 hourly. He showed a significant recovery over a week when he was administered doxycycline 100 mg twice daily. The chest X ray was repeated after a week and showed complete resolution of the pneumonic infiltrates (Figure 1b). Icterus slowly disappeared. After 20 days of hospital stay he had recovered clinically with normal hematological and biochemical parameters. The IgM-ELISA for leptospirosis continued to be positive after a month.

Discussion

This patient presented with leptospirosis in its severe form, *i.e.* icteric-hemorrhagic illness with multiorgan dysfunction (Weil's disease). Considering that there are not enough published data about neurological features, the interesting aspect in this patient was a predominant nervous system involvement in the form of headache, vomiting, altered sensorium and seizures. These neurological manifestations are rare, and have been described in only 15% of patients, the seizures and altered sensorium being the commonest among them [3,8]. Other pointers to leptospirosis in the present patient were derangement in hepatic and renal functions along with pulmonary manifestation in the form of dry cough and hemoptysis, which was probably overshadowed by the involvement of other organs and therefore escaped notice of the referring family physician. Outbreak and sporadic patients of leptospirosis after floods have been described previously, which was another important clue in the present patient [9,10].

Our patient had pulmonary involvement in the form of cough and hemoptysis along with the radiological evidence of diffuse, ill-defined ground glass density in the left lower zone, which has been described in leptospirosis [11]. This radiologic abnormality was suggestive of alveolar hemorrhage because of faster resolution (within a week), in comparison to other forms of bacterial pneumonia which resolve slowly. Radiological manifestations of hemorrhagic alveolar pneumonitis in leptospirosis are most common in the lower lobes and the peripheral lung fields. Complete radiologic resolution usually occurs between the 6^{th} and 10^{th} days of illness, which was also evident in our patient.

We wish to emphasize the importance of considering neuroleptospirosis as an important differential diagnosis of dengue, Japanese encephalitis, pyogenic meningitis and cerebral malaria, especially in endemic areas with seasonal prevalence. Several factors contribute to the underdiagnosis of neuroleptospirosis: (i) it can present as other diseases such as aseptic viral meningitis; (ii) non availability of appropriate diagnostic tools; (iii) the serological and immunological tests are rarely performed at the early stages of the disease; and finally, (iv) the indiscriminate use of antibiotics has decreased the

Figure 1(a). Chest X ray of the patient on day one showing hemorrhagic alveolar pneumonitis in the form of diffused, ill-defined ground glass density in left lower zone.

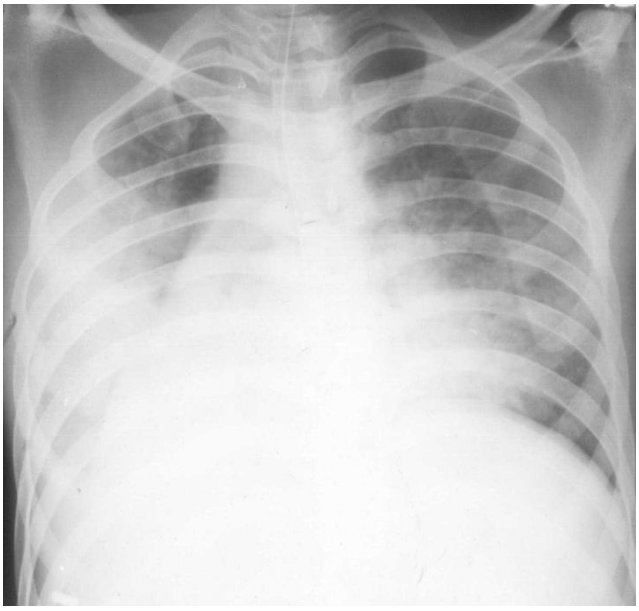
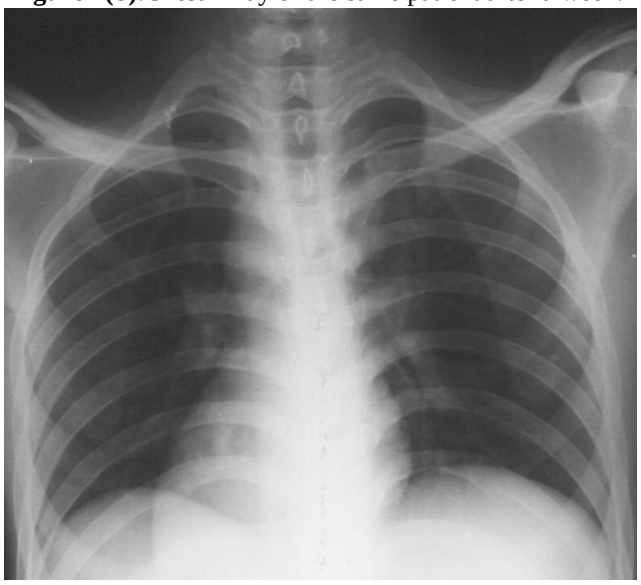


Figure 1(b).Chest X ray of the same patient after a week.



likelihood of obtaining an isolate. All these factors have significant consequences in the diagnosis and prompt treatment of the disease.

In all infections pertaining to the nervous system along with hepatorenal dysfunction, there should be a high index of suspicion and therapy should be initiated on the basis of clinical judgment, as laboratory confirmation can be delayed. Although the microscopic agglutination test (MAT) is a standard diagnostic test for leptospirosis, it unfortunately has limited accessibility. MAT could not use for diagnosis in this case due to its unavailability in our laboratory. In view of the clinical and epidemiological factors, there was strong clinical possibility of leptospirosis in our patient. The diagnosis was done using IgM ELSIA for leptospirosis. The chance that the positivity of the test was merely due to endemicity was therefore minimal.

Early diagnosis of neuroleptospirosis is mandatory, as effective and specific treatment is available and neurological sequelae are unusual, unlike Japanese encephalitis or Herpes simplex encephalitis, which leads to significant morbidity and mortality even with treatment.

References

1. Vieira SR, Brauner JS (2002) Leptospirosis as a cause of acute respiratory failure: clinical features and outcome in 35 critical care patients. Brazil J Infect Dis 6: 135-39.
2. Karande S, Satam N, Kulkarni M, Bharadwaj R, Pol S (2005) Leptospiral pneumonia. Indian J Pediatr 72: 86.
3. Speelman P and Rudy H. (2008) Leptospirosis In: Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Jameson JL, Loscalzo J, editors. *Harrison's principles of internal medicine*. 17th Ed. New York: Mcgraw-Hill Company: 1048-51.
4. Vinetz JM (2001) Leptospirosis. Curr Opin Infect Dis 14: 527-38.
5. Kamath SA, Joshi SR (2003) Re-emerging of infections in urban India - focus Leptospirosis. J Assoc Physicians India 51: 247.
6. Beeson PB, Hankey DD (1952) Leptospiral meningitis. Arch Intern Med 89: 575-84.
7. Turner LH (1973) Leptospirosis. BMJ 1: 537-40.
8. Mathew T, Satishchandra P, Mahadevan A, Nagarathna S, Yasha TC, Chandramukhi A, Subbakrishna DK, Shankar SK (2006) Neuroleptospirosis-revisited: experience from a tertiary care neurological centre from south India. Indian J Med Res 124: 155-62.
9. Karande S, Bhatt M, Kelkar A, Kulkarni M, De A, Varaiya A (2003) An observational study to detect leptospirosis in Mumbai, India, 2000. Arch Dis Child 88: 1070–75.
10. Gaynor K, Katz AR, Park SY, Nakata M, Clark TA, Effler PV (2007) Leptospirosis on Oahu: an outbreak associated with flooding of a university campus. Am J Trop Med Hyg 76: 882-85.
11. Pai ND and Adhikari PM (2001) Hemorrhagic pneumonitis: a rare presentation of leptospirosis. J Postgrad Med 47: 35-36.

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