DOI: 10.7860/JCDR/2018/32611.11272

Case Report

Microbiology Section

Coinfection by *Salmonella* and *Leptospira* Presenting as Subacute Intestinal Obstruction with Colitis: A Diagnostic Dilemma

ARTI NEGI[1], NIDHI TEJAN[2], CHINMOY SAHU[3], TAPANKUMAR NIRODCHAND DHOLE[4]

ABSTRACT

Coinfection with *Salmonella* and *Leptospira* is a rare entity even in regions where both pathogens are endemic. As clinical features are nonspecific and overlapping, it is very difficult to differentiate between these two infections. However, many cases of coinfections of leptospirosis and scrub typhus; dengue and Leptospirosis, typhoid and dengue have been reported but coinfections by *Salmonella* and *Leptospira* have been reported rarely. Clinically they should be suspected in endemic areas and here we are presenting such a case. A 30-year-old female presented with chief complaints of loose stools for 10 days, high grade fever and jaundice for three days. CT enterography showed mildly enlarged liver and features of small bowel obstruction. Blood culture was sterile. No improvement was seen with empirical antibiotics. Widal titers were very high and IgM antibodies for *Leptospira* was positive by Enzyme-Linked Immune Sorbent Assay (ELISA) test in third week of illness. She was started on ceftriaxone 1 gm Intravenous (IV) twice a day as both the infections respond excellently to ceftriaxone. Over next couple of days her conditions improved and she was discharged in stable condition. This case highlights the need for optimal use of microbiological laboratory services and timely intervention to reach a final diagnosis.

Keywords: Differential diagnosis, Jaundice, Widal test

CASE REPORT

A 30-year-old female, known case of hypothyroidism for 13 years (on tab thyroxine 150 mg OD) presented to gastromedicine department with chief complaints of loose stools for 10 days, fever and jaundice for three days. Fever was high grade ranging from 102°F-104°F with chills. She was managed symptomatically but her condition deteriorated. She started complaining of diffuse abdominal distension and pain, vomiting and constipation. On examination, patient's pulse was 88/minute, Blood Pressure (BP) was 100/70 mmHg. Icterus and pedal oedema were present. There was no pallor, clubbing, cyanosis and lymphadenopathy. Abdomen was distended with sluggish bowel sounds and tympanic note was present. There was diffuse tenderness over whole abdomen. There was mild ascites and enlarged liver on palpation (5 cm below the costal margin). Chest X-ray revealed mild right-sided pleural effusion. She was admitted to gastromedicine ward and kept on fluid maintenance and empiric antibiotics of vancomycin and amikacin. Based on history and clinical examination, differential diagnosis of Hepatitis A and E, leptospirosis, enteric fever and tuberculosis were considered.

Patient's liver enzymes were deranged. Serum Alanine Aminotransaminase (ALT) was 75 µ/L, Aspartate Aminotransferase (AST) was 88 µ/L. Serum bilirubin (total) and serum bilirubin (conjugated) was 9.6 mg/dL and 7.3 mg/dL respectively. Serum alkaline phosphatase was 2438 µ/L and blood urea was 1 mg/dL and serum creatinine was 0.4 mg/dL, Serum albumin was 2.1 gm/dL. Platelet count was decreased to 86,000/µL. Anti-Hepatitis A Virus (HAV) IgM and anti-Hepatitis E Virus (HEV) IgM were negative. Patient was managed conservatively and further evaluated.

X-ray abdomen was suggestive of dilated small bowel loops with multiple air fluid levels. CT enterography showed mildly enlarged liver and minimal ascites; entire colon wall, starting from caecum upto rectum was thickened, lumen was obliterated and dilatation of proximal small bowel loops was seen. Small mesenteric and right iliac fossa lymph nodes were enlarged.

Colonoscopy revealed severe colitis with multiple superficial and deep ulcers which were present throughout the colon along with ileal ulcers. Biopsy was taken and sent to histopathology department for further evaluation. On histopathology by Haematoxylin and Eosin (H&E) staining, ulcerated columnar epithelium covered by necrotic debris was observed. There were multiple crypt abscesses and lymphoplasmacytic infiltrates. No granuloma was seen.

Pleural fluid examination revealed a Total Leucocyte Count (TLC) of 3,400 cells/µL, differential count was showing lymphocyte predominance (neutrophil 40%, lymphocyte 60%), total protein was 2.6 gm/L, albumin 1.5 gm/dL, Adenosine Deaminase (ADA) 162 IU/L and raised levels of Lactate Dehydrogenase (LDH) 205 U/L, suggestive of exudative pleural effusion. Aerobic BACTEC™ bacterial culture of pleural fluid was sterile. It was negative for Acid Fast Bacilli (AFB).

Her fever did not subside even after two days of empiric treatment of vancomycin in a dose of 15 mg/kg IV 12 hourly and amikacin 7.5 mg/kg intravenously 12 hourly. Bacterial cultures of blood and urine were sterile. So, blood sample was sent to serology laboratory for widal tube agglutination test and anti IgM Leptospira ELISA. Widal titers were very high, titre against O antigen was ≥1:160 and H antigen was ≥1:640 [1]. Interestingly IgM antibodies for leptospirosis (DRG International, Inc. USA) came out to be positive with OD 1.788 with cut off 0.15. These tests were done in third week of illness. Repeat tests after one week were also positive.

Based on widal and IgM *Leptospira* positivity, she was started on ceftriaxone 1 gm IV twice a day.

Over next couple of days her abdominal distension subsided and pain decreased. Bowel movements returned to normal and nasogastric (Ryles) tube was removed. Her liver function tests showed decreasing trend of enzymes. She was discharged in stable condition after 10 days of treatment and oral cefixime 400 mg once daily was suggested. Repeat colonoscopy and biopsy were performed after two weeks, which showed healing colitis with no ulcers and mild erythematous mucosa.

DISCUSSION

Typhoid fever is endemic in India with incidence ranging from 102 to 2,219 per 100,000 of the population [2]. It is caused by *Salmonella* typhi, a gram-negative bacterium. Its protean manifestations ranging from high fever, toxaemia, abdominal distension and tenderness, haepatomegaly, splenomegaly and sepsis make this disease a true diagnostic dilemma [3]. Leptospirosis occurs worldwide but is most common in tropical and subtropical areas. It is endemic in South East Asia [4]. It is caused by the pathogenic spirochaete of genus *Leptospira,* known to cause multiorgan dysfunction including acute renal failure, rhabdomyolysis, hepatic dysfunction, pulmonary haemorrhages and myocarditis, aptly known as "The Great Mimicker" [5].

This patient was diagnosed as a case of coinfection with typhoid and leptospirosis. The initial symptoms of fever, diarrhoea followed by decrease in platelet count, pleural effusion, ascites jaundice and deranged liver functions point towards multiorgan involvement. A positive IgM serology for leptospirosis explains all these symptoms. Although, microscopic agglutination test is the gold standard in diagnosing leptospirosis, our microbiology laboratory performs *Leptospira* IgM ELISA test, which is 100% sensitive and 93% specific [6]. Further, in this patient, presence of colonic ulcers and a positive widal test in high titres suggests enteric fever. The blood and urine cultures were sterile probably due to prior antibiotic administration. A study conducted in India suggested that higher prevalence of *Salmonella* played an important role in aetiopathogenesis of ulcerative colitis [7].

Coinfection with *Salmonella* and *Leptospira* is a rare entity even in regions where both pathogens are endemic. As clinical features are nonspecific and overlapping, it is very difficult to differentiate between these two infections [8,9]. In developing countries like India, leptospirosis and typhoid present as acute undifferentiated fever. In a seroprevalence study from South India, out of 100 samples, only two were positive for both typhoid and leptospirosis [8]. In a study conducted to determine the prevalence of dual infections from 100 cases of fever, only one case of triple infection with malaria, leptospirosis and typhoid was reported [9]. Most of the case reports available in literature are about dual infection caused by dengue virus and *Salmonella*; leptospirosis and *Salmonella* infection, malaria and leptospirosis, hepatitis virus and *Salmonella.* To the best of our knowledge this is the first case report of dual infection of leptospirosis and typhoid fever in Northern India.

Coinfections with common endemic pathogens presenting as acute febrile illness like leptospirosis and typhoid can prove to be a diagnostic dilemma especially if symptoms are overlapping [10]. So, where available, diagnostic tests for both the infections should be done.

However, both pathogens are usually sensitive to third generation cephalosporins. The mixed infections can be treated successfully by a single agent.

CONCLUSION

To the best of our knowledge this is the first case report of dual infection of leptospirosis and typhoid fever in North India which presented with intestinal obstruction. This case highlights the need for optimal use of microbiological laboratory services and timely intervention to reach a final diagnosis for such coinfections. Early diagnosis and treatment by cephalosporins is advised in such cases.

REFERENCES

[1] Mishra N, Tripathi SM, Jain M, Mishra R. Prevalence of typhoid fever in healthy people: a descriptive study. Int J Sci Stud. 2016;4(2):154-56.
[2] Chowta MN, Chowta NK. Study of clinical profile and antibiotic response in typhoid fever. Indian J Med Microbiol. 2005;23(2):125-27.
[3] Zaki SA, Karande S. Multidrug-resistant typhoid fever: a review. J Infect Dev Ctries. 2011;5(5):324-37.
[4] Vinetz JM. Leptospirosis. Curr Opin Infect Dis. 2001;14(5):527-38.
[5] Jawanjal M, Patil S, Pendse M, Bhate A, Hooda S. An unusual presentation of leptospirosis: a case report. Open J Clin Diagn. 2014;4(2):112-16.
[6] Kaur IR, Sachdeva R, Arora V, Talwar V. Preliminary survey of leptospirosis amongst febrile patients from urban slums of East Delhi. J Assoc Physicians India. 2003;51:249-51.
[7] Tripathi MK, Pratap CB, Dixit VK, Singh TB, Shukla SK, Jain AK, et al. Ulcerative colitis and its association with *Salmonella* species. Interdiscip Perspect Infect Dis. 2016;2016:5854285.
[8] Sushi KM, Sivasangeetha K, Kumar AS, Shastri P, Ganesan A, Anitha D, et al. Seroprevalence of leptospirosis, enteric fever and dengue in patients with acute febrile illness in Tamil Nadu, India. Ind J Basic and App Med Res. 2014;3(2):615-23.
[9] Parker TM, Murray CK, Richards AL, Samir A, Ismail T, Fadeel MA, et al. Concurrent infections in acute febrile illness patients in Egypt. Am J Trop Med Hyg. 2007;77(2):390-92.
[10] Bhat D, Dhooria GS, Bains HS. Co-infection of hepatitis A and E with *Salmonella* infection; a case report. Iran J Pediatr. 2009;19(1):79-81.

PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Microbiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
2. Senior Resident, Department of Microbiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
3. Assistant Professor, Department of Microbiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
4. Professor and Head, Department of Microbiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Chinmoy Sahu,
Assistant Professor, Department of Microbiology, Sanjay Gandhi Postgraduate Institute of Medical Sciences,
Lucknow-226014, Uttar Pradesh, India.
E-mail: sahu.chinmoy@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Sep 19, 2017**
Date of Peer Review: **Nov 14, 2017**
Date of Acceptance: **Feb 01, 2018**
Date of Publishing: **Mar 01, 2018**