ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 01 | January - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

LEPTOSPIRA AND SALMONELLA CO-INFECTION IN AN ADOLESCENT MALE PRESENTING TO A TERTIARY CARE HOSPITAL – A CASE REPORT.

Clinical Microbiology

Dr. Rani Kumaravel MBBS I year Post Graduate, MD Microbiology, Chettinad Hospital And Research Institute Chettinad Academy of Research And Education

Dr. Alice Peace Selvabai R M Sc PhD Associate Professor, Department of Microbiology, Chettinad Hospital And Research Institute Chettinad Academy of Research And Education

Dr Priyadarshini Shanmugam* MD,PhD Professor And Head Department of Microbiology, Chettinad Hospital And Research Institute Chettinad Academy of Research And Education. *Corresponding Author

ABSTRACT

Coinfections in patients with both Salmonella and Leptospira is a rare occurence, even in endemic regions where these pathogens are common. It is hard to differentiate between these two infections based on the clinical symptoms as they are overlapping and nonspecific.[1] Though many cases of co-infections like dengue and typhoid, leptospirosis and dengue, scrub typhus and leptospirosis, dengue and scrub typhus have been reported yet very rarely co-infection with Leptospira and Salmonella has been reported. [2]

We present a 14-year-old male patient who was admitted to our hospital with the complaints of fever, malaise, vomiting, loose stools and abdomen pain that resolved after two weeks. Patient was treated with antibiotics, analgesics for a week prior admission to our hospital. Blood and radiological investigations were done. Blood culture and sensitivity yielded *Salmonella Typhi*. Widal tube agglutination was positive for both O and H. Patient was also positive for Leptospira IgM antibodies by ELISA method. CT abdomen reported hepatosplenomegaly. Antibiotics were started based on the drug susceptibility report. Patient improved symptomatically and was discharged two weeks later in a stable condition. This case study is submitted to stress the need for clinical suspicion of co-infections, early laboratory testing and treatment with appropriate antibiotics based on the susceptibility pattern, which reduces the hospital stay of the patient, morbidity and prevents antibiotic resistance.

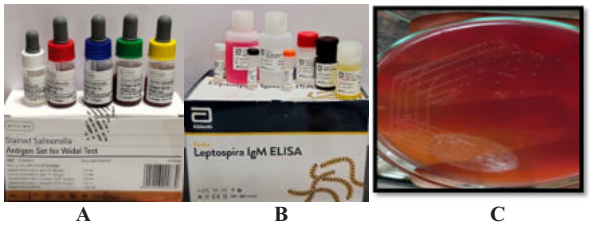
KEYWORDS

Co-infection, Acute febrile illness, Leptospirosis, pyrexia, typhoid

CASE REPORT:

A14-year-old male was brought to our tertiary care, medical college hospital with complaints of fever, cough, vomiting, abdominal pain with loose stools, giddiness and malaise of ten days duration. He gave no history of dysuria. Symptoms began a few days after intake of food from a hotel. Patient was initially treated at a local clinic with antibiotics and other supportive medications. Symptoms did not subside and hence reported to our hospital. On examination, the patient was febrile, tachycardic- 84/minute, Blood Pressure (BP) was 100/60 mmHg. There was no pallor, clubbing, cyanosis, and lymphadenopathy. No meningeal signs and eschar were noted. Fever was intermittent, high-grade ranging from 100^0C– 103^0C, associated with chills and rigors. There was tenderness over the right hypochondrium and the periumbilical region. There was mild hepatomegaly on palpation (2 cm below the costal margin). Patient was admitted to the paediatric ward. Based on the clinical signs and symptoms, differential diagnosis of scrub typhus, leptospirosis, enteric fever, malaria, hepatitis A and hepatitis E were considered. Blood and radiological investigations were done. Patient was kept on intravenous fluid maintenance and antibiotics ceftriaxone and doxycycline were started empirically.

It was almost two weeks from the onset of symptoms when the patient was admitted and blood investigations were performed. Patient tested negative for scrub typhus IgM antibodies, dengue NS1Ag and malaria. Anti-Hepatitis E virus - IgM and anti-Hepatitis A virus - IgM were also negative. Liver enzymes were elevated. Serum Alanine Amino transaminase (ALT) was 122 µ/L, Aspartate Aminotransferase (AST) was 152 µ/L. Serum bilirubin (total) and serum bilirubin (conjugated) was 0.3 mg/dL and 0.1 mg/dL respectively. Blood urea was 11 mg/dL and serum creatinine was 0.4 mg/dL, Serum albumin was 3.6 gm/ dL. Peripheral smear was within normal limits. USG (abdomen) revealed mild hepato-splenomegaly. CT abdomen showed mildly enlarged liver and spleen with mesenteric lymph node enlargement. Patient's fever did not subside even after 3 days of empirical treatment with ceftriaxone at a dose of 75 mg/kg/day IV 12^{th} hourly and doxycycline 100mg 12^{th} hourly. Blood culture yielded *Salmonella Typhi* and the isolate was confirmed by Samonella H antiserum'd'. Widal tube agglutination was positive with a titre of ≥1:160 for O antigen and ≥1:320 for H antigen. IgM antibodies for leptospirosis were also positive by ELISA method (Panbio Kit) with the titre of 32.94 Panbio units. Vomiting subsided but abdominal tenderness and fever spikes persisted. Based on Blood culture and leptospira IgM positivity, and the susceptibility report for *Salmonella Typhi*, the patient was started on Azithromycin 20mg/kg/day orally in addition to doxycycline. Ceftriaxone was stopped. The liver function tests showed decreasing trend of enzymes. Repeat blood culture and urine culture yielded no growth. The patient improved symptomaticallyand was discharged in stable condition.



A B C

A. Antigen kit for Salmonella (ARKRAY KIT) is based on the principle of agglutination reaction. A rising titre of antibodies is indicative of enteric fever.
B. Panbio Leptospira IgM ELISA kit has the leptospira Ag coated on the wells. Serum containing the leptospira antibodies if present ,combines with the antigens in the well.This is indicated by the color development in the wells.
C. Mac Conkey Agar shows Non lactose fermenting colonies, circular, low convex, smooth, transluscent colonies.

DISCUSSION

The Gram-negative bacterium, *Salmonella enterica serotype Typhi* causes typhoid fever and humans serves as the only reservoir host. Typhoid fever remains as a burden in developing nations and is very common among children and especially young adults. It is prevalent in areas with poor hygiene, sanitation and low income. [3] *Salmonella enterica serotype Typhi* infection is contracted due to the ingestion of contaminated water and food. The infectious dose 10^3 and 10^6 organisms are required to cause infections in healthy people but also depend on the host immune mechanism [4]. Incubation period ranges from 10-14 days. Fever, relative bradycardia, abdominal pain, hepatomegaly and splenomegaly are the common symptoms seen. Appearance of rose spots may be noted on the chest and abdomen of infected individuals. About 40% to 80% of the infected individuals show blood culture positivity and 30% to 40% of the individuals show positivity in stool cultures[5].

Several pathogenic species of the genus *Leptospira* cause leptospirosis. Leptospirosis is a bacterial zoonotic infection affecting

humans. It can spread from animals to humans through abrasions in the skin or intact mucosa which has come in contact with soil or water contaminated with the infected animal's urine [6]. It is endemic to south East Asia and in India it is prevalent in all the states. There is no direct person to person spread. The World Health Organization estimates that each year it affects 10 or more people in every 100,000 individuals. However in an epidemic more than 100 people gets affected in every 100,000 individuals. But in areas with temperate climate, it probably affects 0.1 to 1 per 100,000 individuals [7]. It can either cause a mild asymptomatic illness / low grade pyrexia/ high grade fever with chills rigor and conjunctival injection or may progress to a more severe Weil's disease, which can be fatal, if untreated [8]. Symptoms of Weil's disease include acute renal failure, rhabdomyolysis, hepatic dysfunction, pulmonary haemorrhages and myocarditis, appropriately known as "The Great Mimicker".

Our patient was diagnosed as a case of coinfection with typhoid and leptospirosis. The initial symptoms of fever, vomiting, loose stools, abdominal pain and elevated liver enzymes invokes the clinical suspicion of Enteric fever but masks the diagnosis of Leptospirosis, which can be missed easily. Salmonella and Leptospira coinfection remain as a very rare occurrence even in endemic areas. It remains very difficult to differentiate these two infections as the clinical symptoms overlap and non-specific in nature. A high index of clinical suspicion aided by the appropriate laboratory diagnostic test is important in the diagnosis of Leptospirosis. Though the gold standard test for leptospirosis is MAT or Macroscopic Agglutination Test, the commonly used test in most of the laboratories is Leptospira IgM ELISA, which is 100% sensitive and 93% specific in the diagnosis of Leptospirosis. In developing countries like India, leptospirosis and typhoid present as acute undifferentiated fever. In a seroprevalence study from South India, out of 100 patients tested, only two were positive for coinfection with typhoid and leptospirosis [9]. In another study conducted to determine the prevalence of co-infections among febrile patients, out of 100 cases of fever, only one case of triple infection with malaria, leptospirosis and typhoid was reported [10]. Most of the case reports available in literature describe dual infections such as dengue and typhoid, leptospirosis and typhoid, malaria and leptospirosis, Hepatitis A virus and typhoid.

CONCLUSION:

This case study reiterates the importance of evaluating all the AFI patients using a panel of diagnostic tests for the common infections prevalent in that geographical location and also the need for a high index of clinical suspicion of co infection in patients, especially those not responding to treatment. It explains the necessity for early laboratory investigations including the antimicrobial susceptibility pattern for bacterial infections, for the management of patients with various antibiotics inorder to decrease the burden of antibiotic resistance which is an emerging killer for the growing generation.

REFERENCES

1. Negi A, Tejan N, Sahu C, Dhole TN. Coinfection by Salmonella and Leptospira Presenting as Subacute Intestinal Obstruction with Colitis: A Diagnostic Dilemma. Journal of Clinical & Diagnostic Research. 2018 Mar 1;12(3).
2. Bhatia M, Kumar P, Gupta P, Gupta PK, Dhar M, Kalita D. Serological evidence of human leptospirosis in patients with acute undifferentiated febrile illness from Uttarakhand, India: A pilot study. Journal of laboratory physicians. 2019 Jan; 11 (01): 011- 6.
3. Crump JA, Sjölund-Karlsson M, Gordon MA, Parry CM. Epidemiology, clinical presentation, laboratory diagnosis, antimicrobial resistance, and antimicrobial management of invasive Salmonella infections. Clinical microbiology reviews. 2015 Oct; 28(4):901-37.
4. Sanhueza Palma NC, Farías Molina S, CalzadillaRiveras J, Hermoso A. Typhoid fever: case report and literature review. Medwave. 2016 Jun 21;16(05).
5. Khanal B, Sharma SK, Bhattacharya SK, Bhattarai NR, Deb M, Kanungo R. Antimicrobial susceptibility patterns of Salmonella enterica serotype typhi in eastern Nepal. Journal of health, population, and nutrition. 2007 Mar;25(1):82.
6. Himani D, Suman MK, Mane BG. Epidemiology of leptospirosis: an Indian perspective. J Foodborne Zoonotic Dis. 2013 Jul;1(1):6-13.
7. Sethi S, Sharma N, Kakkar N, Taneja J, Chatterjee SS, Banga SS, Sharma M. Increasing trends of leptospirosis in northern India: a clinico-epidemiological study. PLoS neglected tropical diseases. 2010 Jan 12;4(1):e579.
8. Mørch K, Manoharan A, Chandy S, Chacko N, Alvarez-Uria G, Patil S, Henry A, Nesaraj J, Kuriakose C, Singh A, Kurian S. Acute undifferentiated fever in India: a multicentre study of aetiology and diagnostic accuracy. BMC infectious diseases. 2017 Dec;17(1):1-1.
9. Anupriya A, Meera J, Uma A. Dual edge sword-leptospirosis and typhoid coinfection with rare complications – A case report. Sch J Med Case Rep. 2016;4:363–5.
10. O'Doherty E, Sayers R, O'Grady L, Shalloo L. Effect of exposure to Neospora caninum, Salmonella, and Leptospira interrogans serovar Hardjo on the economic performance of Irish dairy herds. Journal of dairy science. 2015 Apr 1;98(4):2789-800.