

**A RARE SEROTYPE *SALMONELLA WELTEVREDEN* CAUSING ENTERIC FEVER IN AN HIV-POSITIVE PATIENT IN MANGALORE**RADHAKRISHNA M<sup>1\*</sup>, KOTIGADDE S<sup>2</sup><sup>1</sup>Department of Microbiology, Kasturba Medical College, Mangalore, Manipal University, Karnataka, India. <sup>2</sup>Department of Microbiology, KVG Medical College, Sulia, Karnataka, India. Email: manipuraradhakrishna@yahoo.com

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**ABSTRACT**

Enteric fever is endemic in India. Usually caused by *Salmonella enterica* serotype Typhi and *S. enterica* serotype Paratyphi A. Enteric fever due to non-typhoidal *Salmonellae* is rare. We report an extremely rare case of enteric fever caused by *S. enterica* serotype Weltevreden in an HIV-positive 27-year-old male.

**Keywords:** Enteric fever, Non-typhoidal *Salmonella*, *Salmonella weltevreden*.

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**INTRODUCTION**

The global *Salmonella* survey has revealed that *Salmonella weltevreden* is a common cause of non-typhoidal salmonellosis in the South East Asian Region and Western Pacific Region [1]. It has been reported that more than 20% of *Salmonella* isolates of human origin in India belong to this serotype [2]. It is frequently isolated from seafood, meat poultry products, and water [3]. We report a case of enteric fever caused by *Salmonella enterica* serotype Weltevreden in an HIV-infected 27-year-old male.

**CASE REPORT**

A 27-year-old male was admitted to the Government Wenlock Hospital, Mangalore, with fever, anorexia, body pain, and abdominal pain since 15 days. On examination, he was thin built, poorly nourished with body mass index 16. He was a manual laborer by occupation, married for 3 years with a healthy wife and no issues. He lived on mixed diet and had normal sleep. Neither he nor the family had the history of jaundice. There was no history of blood transfusion and long-term drug intake. He did not reveal any premarital or extramarital sexual affair. Fever was intermittent, and there was no history of cough and breathlessness. Mild diarrhea was present in first few days. There was a history of yellowish discoloration of urine and sclera for past 15 days. He revealed paresthesia in the toes of both legs since a month and clumsiness in the hands for 10 days. Physical examination revealed a temperature of 40°C, pulse rate of 144 beats/minute, respiratory rate of 12/minutes, and blood pressure 120/s80 mm of Hg. There was no evidence of lymphadenopathy, edema, clubbing, and cyanosis. Buccal and palmar pigmentation was observed. Abdominal tenderness could be elicited in the right hypochondrium, epigastrium, and umbilical region. The liver was palpable and but not the spleen. Neurological examination was normal. A provisional diagnosis of acute hepatitis - viral or alcoholic was made, and there was a necessity to rule out Wilson's disease. In fact, enteric fever was not at all suspected and the patient had not received any antibiotics before admission.

Laboratory investigations revealed a hemoglobin level of 9.8 g % and total leukocyte count of 9600/mm<sup>3</sup>. Differential leukocyte count showed neutrophils, 70%; lymphocytes, 25%; eosinophils, 3%; monocytes 2%. ESR was 103 mm after 1 hr. Platelet count was 1.2×10<sup>5</sup>/mm<sup>3</sup>. Peripheral smear examination showed normocytic to

microcytic, hypochromic anemia. Liver function tests results were abnormal (serum bilirubin -14.4 mg/dL, direct - 9.8 mg/dL, serum glutamic-oxaloacetic transaminase - 660 IU/L serum glutamic-pyruvic transaminase - 360 IU/L, and alkaline phosphatase - 401 IU/L). Renal function tests and electrolytes were within normal limits. Ultrasonography of the abdomen revealed enlarged fatty liver and no other abnormalities. No malaria parasites were seen. Widal test was negative. HBs Ag test was negative. Serum was reactive for HIV 1 antibody which was confirmed by Western Blot test. The patient's blood and stool samples were collected for bacteriological culture and sensitivity on the day of admission. A second blood sample for culture was obtained on day 3 of admission. Blood samples were processed for both aerobic and anaerobic bacteria. Non-lactose fermenting colonies were grown on MacConkey agar from both blood samples. Stool sample was plated on MacConkey agar and deoxycholate citrate agar plate and incubated at 37°C for 24-48 hrs. No intestinal pathogens could be isolated from stool sample either from direct culture or after Selenite F broth enrichment. The blood culture isolate was identified with the help of colony morphology, Gram-stain, and biochemical reactions as per standard bacteriological methods [4]. Biochemically, this organism produced catalase, reduced nitrate, fermented glucose, mannitol and xylose with acid and gas, utilized citrate, produced abundant H<sub>2</sub>S. Triple Sugar Iron medium showed acid butt, alkaline slant, with abundant H<sub>2</sub>S production and gas suggestive of *Salmonella paratyphi* B or *Salmonella typhimurium*. The isolate agglutinated with group specific *Salmonella* Polyvalent 'O' (A-G) antiserum (Denka - Seiken Co. Ltd., Japan) but not with type specific Flagellar antisera of *Salmonella typhi*, *S. paratyphi* A, or *S. paratyphi* B and reported as non-typhoidal *Salmonella*. Antibiotic sensitivity test was performed with the help of Kirby-Bauer disc diffusion test as per CLSI guidelines using commercial antibiotics from HiMedia Pvt. Ltd., Mumbai [5]. It was found to be susceptible to ampicillin, cefotaxime, gentamicin, chloramphenicol, and ciprofloxacin and resistant to none. On admission to the hospital, the patient was treated with ciprofloxacin before the antibiotic report was available. As the isolate was found to be sensitive to this antibiotic the same drug was continued. The patient showed signs of recovery and was discharged after 10 days. The isolate was sent to the National *Salmonella* and Escherichia Centre, Research and Development Division at the Central Research Institute, Kasauli, India, where it was identified as *S. enterica* serotype Weltevreden with an antigenic formula 3,10:r: z6.

## DISCUSSION

Enteric fever is an acute systemic febrile illness caused by *S. enterica* serotypes Typhi, Paratyphi A, B, and C [6]. In India, the most common serovarieties of *Salmonella* causing human infections are *S. typhi* (73%) and *S. paratyphi A* (24%) among typhoidal serovars and *Salmonella* worthington (28.2%) and *S. typhimurium* (22.5%) among non-typhoidal serovars [7]. Overview of the literature reveals that several serovars of *S. enterica* such as Dublin, Bareilly, Sendai, Enteritidis, Typhimurium, Eastbourne, Saintpaul, Oranienburg, and Panama were occasionally incriminated as causative agents of enteric fever [8]. The recent addition to this list is *S. enterica* serotype Kapemba and Weltevreden, while the former one caused enteric fever in an adult male, and the later was responsible for enteric fever in 4-year-old child [9,10]. An earlier report revealed that more than 29% of *Salmonella* isolates of human origin in India belong to *S. weltevreden* serotype [2]. So far, two documented reports on human salmonellosis due to *S. weltevreden* are available from Karnataka. The first one being a report from Hubli, regarding two cases of neonatal sepsis [11] and another one is a cluster of food poisoning cases involving 34 female students of nursing from Mangalore [3]. To best of our knowledge, the present report is the first case of enteric fever due to *S. weltevreden* in an HIV-infected Male adult.

The disease enteric fever is generally characterized by stepladder fever, abdominal pain, relative bradycardia, rose spots, leukopenia with diarrhea or constipation. In severe cases, complications such as hemorrhagic intestinal perforation, disseminated intravascular coagulation, and cholecystitis psychoses may occur. However, in the present case, only fever and abdominal pain were observed. No complications were evident. *S. weltevreden* could be isolated only from repeat blood samples. Stool samples did not grow the organism in culture probably because the sensitivity of stool culture in the diagnosis of enteric fever is low (27%) in the adult population [3]. Widal test was negative because the antigenic formula of *S. weltevreden* is different from the common serotypes causing enteric fever. Prompt institution antibiotic therapy helped the patient recover fully without any complication. Plasmid-mediated drug resistance for 3 or 4 drugs has been documented for *S. weltevreden* isolated from buffaloes [12]. However, the isolate from the present case was susceptible to routinely used drugs such as ampicillin, cefotaxime, ciprofloxacin, chloramphenicol, and gentamicin. HIV/AIDS patients are prone to a variety of opportunistic infections and have 20-100 fold increased risk for salmonellosis when compared to general population [13]. *S. weltevreden* serotype has been frequently isolated from sea food, meat poultry, and water and hence the potential sources of human infection [3]. Since *S. weltevreden* biochemically resembles *S. paratyphi B* and *S. typhimurium*, it is essential to do serotyping to establish the serotype identity and do phage typing to find out the phage types prevalent in a particular geographical area. As the drug resistance is frequently observed in *S. weltevreden* serotype, antibiotic susceptibility testing of the isolate should be done.

## CONCLUSION

The 27-year-old HIV-infected male was admitted with signs and symptoms suggestive of hepatitis. Blood and stool cultures were undertaken. Weltevreden - a rare *Salmonella* serotype was isolated from the blood sample with an antigenic formula 3,10:r:z6. The isolate was sensitive to ampicillin, cefotaxime, gentamicin, chloramphenicol, and ciprofloxacin. Prompt institution antibiotic therapy helped the patient recover fully without any complication.

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