

A rare case of septic arthritis of the knee joint by Salmonella enterica subspecies enterica serovar Para typhi B with sickle cell anemia: A case report and review

¹Thorat Devika, Junior Resident 3, Department of Microbiology, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

²Sawant Sandhya, Associate Professor, Department of Microbiology, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

³Madavi Vaishnavi, Assistant Professor, Department of Microbiology, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

⁴Rajadhyaksha Girish, Professor and Unit Head, Department of Medicine, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

⁵Karande Shilpa, Associate Professor, Department of Medicine, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

⁶Set Reena, Professor and Head of Department, Department of Microbiology, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

Corresponding Author: Thorat Devika, Junior resident 3, Department of Microbiology, TNMC & BYL Nair Hospital, Mumbai, Maharashtra, India.

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Abstract

Salmonella enterica subspecies enterica infection may result in infections like enteric fever, gastroenteritis and septicemia with or without local suppurative lesions and carrier state. Arthritis in an adult is rare manifestation of salmonella infection. Here we report a case of septic arthritis of the knee joint in a patient with sickle cell anemia caused by Salmonella enterica subspecies

enterica serotype Para typhi B. The incidence of septic arthritis due to Salmonella Para typhi B with pre-existing fever is rare and patients with sickle cell anemia are more prone to have invasive infection compared to normal individual and one of the main pathogen of concern is salmonella, hence salmonella species should always be kept in mind for differential diagnosis of septic arthritis in relevant cases with predisposing

factors.

Keywords: Knee joint, sickle cell anemia, Salmonella enterica subspecies enterica serotype Para typhi B

Introduction

Septic arthritis by Salmonella is a rare complication which occurs in 0.27% to 2.4% of cases of salmonella infection. (1,2) Achard and Bensaude were the first to describe septic arthritis, in the year 1896. They had isolated Salmonella paratyphoid bacilli in a 7-month-old female from the right sternoclavicular joint. (3) The infective bacterial process may result into arthritis due to salmonella. Mostly monoarticular joints are involved, which mainly affects the knee and shoulder joint. Various other studies have also reported cases of sterile or reactive arthritis. (4,5) Infection of the localized site usually occurs following salmonella bacteremia, but sometimes it may result after enteric fever or gastroenteritis. Though dissemination of infection can occur, but septic arthritis of the knee joint due to salmonella Para typhi is a rare entity.(6,7) The invasive forms of the disease typically affect patients with preexisting conditions like hemoglobinopathy, particularly in children with sickle cell disease, prior joint disease (rheumatoid arthritis), hematologic neoplasm, SLE, administration of corticosteroid or other immunosuppressant treatment, idiopathic thrombocytopenia, alcoholic liver disease, AIDS, and conditions that cause increased hemolysis.(8,9) Septic arthritis due to salmonella Para typhi B is one of the rare and serious infection in patients with sickle cell anemias and remains an important cause of morbidity and mortality in this group of patients.(10) We describe a case of an adult, who presented with septic arthritis caused by Salmonella enterica subspecies enterica serovar Para typhi B with sickle cell anemia.

Case Presentation

A 21-year-old male, was admitted in medical intensive care unit, with complaints of fever with chills, pain and swelling at the right knee joint, since 5-6 days. The patient's medical history revealed he was a known case of sickle cell anemia since 3-4 years with hepatic encephalopathy which was resolved. He was also a known case of hepatitis along with pancytopenia. He gave history of blood transfusion in last 3 years.

Clinical findings and Diagnostic assessment:

On examination the patient's general condition was moderate. The axillary temperature was 39°C, Blood pressure was 110/70 mmhg and the pulse rate was 92 beats/minutes. There was evidence of hepatosplenomegaly. Local examination of the right knee showed red, swollen joint, with raised local temperature and tenderness on palpation and painful movements. There was restriction of movements of the right knee. There was no history of trauma, prior surgery or any similar history in the family. Abdominal pain, vomiting and diarrhea were not present. The patient did not give any history of ingestion of street food during the 2 weeks before the onset of symptoms. X-ray knee joint did not reveal anything. USG of right knee joint revealed moderate joint effusion. USG guided knee fluid tapping was done, using aseptic precautions and no post procedure complications were noted. On gross examination the knee joint aspirate was about 5cc, reddish in color, thick and mucoid. Mucin clot test was positive, i.e., good. Routine microscopy of the synovial fluid suggested few degenerated cells seen on the background of proteinaceous material; 450 cells/cumm. Laboratory investigation of the patient showed: knee joint fluid proteins:3.02 gm%, cholesterol 16mg%, sugar

12 mg%, uric acid 3.6mg%, raised ESR 40mm/hr, raised C-reactive protein 160mg/L (normal up to 5mg/L). Patient was negative for HIV antibody. His hemoglobin (Hb) was 3.5gm/dl on admission and after receiving 3 packed cell volume (PCV) transfusion his Hb was raised to 6.9-8gm/dl.

The processing of the synovial fluid was done following Standard microbiological methods. Direct gram stained smear showed plenty pus cells and gram-negative bacilli. The aspirate was inoculated on macconkey agar, 5% sheep blood sugar and incubated overnight at 37°C. The isolate from the synovial fluid grown showed non-lactose fermenting, oxidase negative colonies, which on secondary gram stain were gram-negative bacilli. The isolate on the culture plate was motile, on hanging drop. It showed the following biochemical reactions: TSI: K/A with H₂S, Citrate: positive, Urease: positive, PPA: negative, Indole: negative. The isolate showed agglutination with salmonella polyvalent O and Factor O₄/ H antisera phase b and was thus identified as *Salmonella enterica* subspecies *enterica* serovar *Paratyphi B*. The antimicrobial susceptibility testing was done using Clinical and Laboratories Standards Institute guidelines (CLSI). All the antibiotics used for the susceptibility testing showed excellent activity against the isolate. The isolate was susceptible to Ceftriaxone, Cotrimoxazole, Nalidixic acid, Ciprofloxacin, Chloramphenicol and Ampicillin.



Fig.1: NLF (non-lactose fermenting) colonies



Fig.2: AST pattern

The report was informed to the clinician and was asked for stool, blood, urine sample for culture and antibiotic susceptibility testing and blood for widely test, in order to find out the source of infection. The patient was treated with fluid and electrolyte therapy, paracetamol, ceftriaxone, vitamin B and K and metronidazole. The urine culture, stool culture and blood culture report and widely test report did not grow salmonella. After the treatment improvement in patients' condition was noted as the fever declined and pain and swelling at the right knee joint also reduced.

Discussion

The genus salmonella consists of a large group of gram negative bacilli. It is classified as typhoid salmonella (causative agent of enteric fever, includes salmonella enterica serovar typhi and salmonella enterica serovar Para typhi A, B, C) and non-typhoid salmonella (NTS, which includes rest of the strains) Human Salmonellosis has been linked to a variety of joint symptoms, including osteomyelitis and septic arthritis along with the migrating sterile arthritis. Extraintestinal infections are less common and usually occur after salmonella bacteremia.

In our case Salmonella enterica subspecies enterica serovar Para typhi B was isolated from a young adult. Many case reports have been published stating that osteoarticular infections are common in immunocompromised patients, yet the patient in our case was immunocompetent. (13) The patient gave history of sickle cell anemia, which is one of the risks factor in our case. Joint involvement is uncommon in sickle cell patients, but if it occurs, salmonellae are usually to blame. (14) Capillary occlusion caused by intravascular sickling may devitalize and infarct the stomach, allowing Salmonella to invade. Hepatosplenomegaly was noted in our patient which may be due to reduced liver and spleen function, combined with interference with reticuloendothelial system activity caused by erythrophagocytosis, decreases clearance of these organisms from the bloodstream. Atypical opsonizing and complement function are also likely to be involved. (10) Barrett-Connor reported 250 infections in sickle cell patients but only discovered two incidences of septic arthritis (both caused by Salmonella). (15) Swaak et al reported 6 patients with arthritis caused due to salmonella. He stated that arthritis associated with

salmonella infection cannot be excluded on the negative results of widely test. (12) In our patient to find out the source of infection or carrier state we did widely test, stool, urine and blood culture which was found to be negative. So, we could not identify the source of infection. Ebong et al. Examined the presenting symptoms, modality of therapy, and consequences of septic arthritis in 31 sickle cell disease patients (50 joints) over a 66-month period, with salmonella (53%) being the commonest organism. (16) Staphylococcus aureus, Haemophilus influenzae type B, and Streptococci are frequent pathogens associated with septic arthritis. Salmonella arthritis is uncommon, accounting for only 1% of all cases. (13) Hence their identification and antibiotic susceptibility of bacteria detected in culture is an essential component of definitive therapy for septic arthritis. Most enteric Gram-negative infections can be treated in 2-4 weeks with intravenous second or third generation cephalosporins or fluoroquinolones. Our patient was treated with ceftriaxone for 14 days. The patient's condition improved gradually with antibiotic treatment and temperature subsided after 5 days. The pain and swelling of the joint subsided on day 14 of follow up. After that patient went discharge against medical advice so further follow-up could not be done.

Conclusion

Septic arthritis caused by Salmonella species is a rare occurrence, especially in adults. It should be considered in patients with haemoglobinopathies like sickle cell anaemia. Septic arthritis carries a poorer prognosis and often requires aggressive treatment, therefore isolation and correct identification of the etiological agent of arthritis is important for the treatment.

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