CASE REPORT

Salmonella Typhimurium causing chronic osteomyelitis with septic arthritis

Anitha Madhavan, Vasudhevapanicker Jayalakshmi, Balakrishnan Sobha

Department of Microbiology, Government TD Medical College, Alappuzha, Kerala, India

ABSTRACT

Although acute gastroenteritis is the most common manifestation of *Salmonella* infections, the illness can present with focal lesions in almost any organs with or without septicaemia. We describe here a case of chronic osteomyelitis right trochanter with septic arthritis hip caused by *Salmonella* typhimurium which was treated with surgical debridement and Ciprofloxacin.

Key words: Chronic osteomyelitis, Ciprofloxacin, *Salmonella* typhimurium

INTRODUCTION

The genus Salmonella comprises a large group of Gram-negative bacteria that parasitise the intestine of a large number of vertebrates. As a group, they are enteroinvasive and enteropathogenic organisms. Human infections occur solely by ingestion of contaminated food or drink although rarely transmission has occurred by direct contact or inhalation.[1]

Even though Salmonella infections are universally prevalent, the infection rate is considerably higher in early childhood than later in life. Salmonella infections can present in multiple ways, the most common being gastroenteritis. It can also cause bacteraemia with or without focal metastasis like osteomyelitis and abscess. However the majority of such infections occur in patients with pre-existing diseases such as sickle cell haemoglobinopathy, rheumatoid arthritis, systemic lupus erythematosus, osteoarthritis, gout, previous trauma, diabetes, immunosuppressive therapy, and AIDS.[2]

CASE REPORT

An otherwise healthy 42-year-old male presented with pain and swelling of right hip since 1-year and history of recurrent discharging sinus from the back of hip for 4 months. The patient complained of minimal weight loss and low grade fever. He also had a history of trauma right leg following a fall 20 years back for which he was treated for a year. There was no past history of any surgical interventions.

His routine laboratory parameters were as follows:

- Total count – 12300 per cubic mm.
- Differential count – N80 L19 M7 E1.
- erythrocyte sedimentation rate – 105/1st h.
- Hb – 15.1 g/100ml.
- Blood urea – 15 mg/100ml.
- Serum creatinine – 0.9 mg/100ml.
- Random blood sugar – 215 mg/100ml.
- Culture – pus swab from discharging sinus sent to the microbiology lab yielded *Staphylococcus aureus* and accordingly patient was put on Cloxacillin.

His X-ray showed evidence of chronic osteomyelitis in right trochanter.

After preoperative evaluation, the sinus tract was explored and found to be communicating with the cavity of the hip joint. This was filled with Gentamicin bone cement. The postoperative period was uneventful except for the varying blood sugar levels for which he was treated with insulin. He was continued on Cloxacillin postoperatively. The pus sample obtained during the procedure was sent for culture and inoculated on blood agar (BA) and MacConkeys agar (MA). After 24 h of incubation, MacConkey agar grew non-lactose fermenting colonies. It was found to be motile Gram-negative bacilli which was oxidase negative. The isolate fermented glucose and mannitol with H_2S production in triple sugar iron

Access this article online

Quick Response Code:

Website: www.jacmjournal.org

DOI: 10.4103/0972-1282.158812

Address for correspondence: Dr. Anitha Madhavan, E-mail: anitha_anoop@yahoo.co.in

medium. The isolate utilised Simmons citrate and was found to be indole and urease negative and nitrate reducing. His blood and stool culture was also done which yielded negative results.

The isolate was confirmed to be *Salmonella* Typhimurium which gave positive agglutination with Salmonella polyvalent O, 4 O, and i H antiserum. The antibiotic susceptibility testing showed sensitivity to Ciprofloxacin, Chloramphenicol, Ceftriaxone, and resistance to Ampicillin and Nalidixic acid. The minimum inhibitory concentration value for Ciprofloxacin was 0.5 (intermediate) by VITEK 2 Technology for invitro diagnostic use, Biomerieux INC.100, Rodolphe street, Durham, NC 27712, USA.

Even though the isolate was resistant to Nalidixic acid, the patient was given Ciprofloxacin 500 mg twice daily orally for 1½ month and tapered to once daily dosing for another 1½ month. During the follow-up period, the patient remained well with no evidence of recurrence.

DISCUSSION

Salmonellosis is a global health problem that has a devastating impact on resource-poor countries. Areas without water supplies and adequate waste disposal have a high incidence of Salmonellosis.

Infection with non-typhoidal Salmonella most commonly manifests as intestinal illness. Salmonella osteomyelitis is a rare entity constituting 0.8% of all Salmonella infections and is the causative organism in 0.45% of osteomyelitis.[3] Most common isolates in Salmonella osteomyelitis are from subtypes Typhimurium, Typhi, and Enteritidis.[4]

Although any skeletal site can be infected, the most commonly affected sites are metaphysis of long bones like humerus, femur. and the vertebral bodies. Skeletal infections are particularly common at sites of injury, trauma or abnormality. Less common sites include ulna, radius, cranium, sternum, and ribs.[5]

Salmonella infections are more common in the immunocompromised. Most of the reported cases of Salmonella osteomyelitis are in patients with haemoglobinopathies like sickle cell disease or thalassaemia. Very few cases of Salmonella osteomyelitis have been reported in otherwise healthy adults. Skull osteomyelitis caused by *S. Typhimurium* was reported by Kamarulzaman et al. Another case of Salmonella osteomyelitis was reported in an otherwise healthy adult who was treated with antibiotics alone by Arora and Singh.

Diabetes mellitus has been found to be associated with 28% of focal Salmonella infections.[6] Our patient was diagnosed to have diabetes at the time of investigation, thus making him susceptible to this rare infection. However, we found no literature documenting Salmonella osteomyelitis as the presenting sign of new-onset diabetes mellitus.

The blood culture positivity in Salmonella osteomyelitis cases is found to be 25-30%.[3] Blood and stool cultures of our patient did not yield the pathogen. Blood cultures are not reliable in focal infections with Salmonella, and hence bone obtained at surgery is the best specimen. The tissue has to be properly ground before processing.

The choice of antibiotic therapy in treatment of Salmonella osteomyelitis has been complicated by the emergence of resistant strains. There are no standardised antibiotic therapy regimens or surgical procedures. Quinolones are effective in treating chronic osteomyelitis because of their ability to achieve adequate levels in bone.[7] *Salmonella* isolates showing resistance to Nalidixic acid must be treated with higher dose of Ciprofloxacin. In our case, the isolate was resistant to Nalidixic acid, but the patient was given Ciprofloxacin 500 mg twice daily. Decreasing susceptibility to Ciprofloxacin possess a new challenge for the clinician resulting in treatment failure and poor outcome.

Third generation cephalosporins have now emerged as alternative antibiotics in the treatment of systemic salmonellosis.

In chronic cases, therapy should be given for a minimum of 3 months. Surgery must be considered when the patient's complaints continue or when they become unresponsive to antibiotic therapy. Our patient did well with surgical debridement and Ciprofloxacin therapy and continues to be asymptomatic.

CONCLUSION

Most common causative agent of osteomyelitis is *S. aureus*. This case is being reported to highlight *Salmonella Typhimurium* as a rare causative agent of osteomyelitis especially in endemic areas. Specimens obtained for microbiological studies should be representative of the disease process. If poor quality specimens are sent to the lab, useless results are obtained. Thus, we would like to emphasise the importance of adequate and proper sampling which in this case led to the correct diagnosis and treatment of the patient.

REFERENCES

1. Ulug M, Celen MK, Geyik MF, Hosoglu S, Ayaz C. Sacroiliitis caused by *Salmonella typhi*. J Infect Dev Ctries 2009; 3:564-8.

2. Agnihotri N, Dhingra MS, Gautam V, Gupta V, Kaushal R, Mehta D. *Salmonella typhi* septic arthritis of hip — A case report. Jpn J Infect Dis 2005;58:29-30.
3. Kapoor S, Mehtani A, Batra S. Fever with pain in bilateral shoulder joints. Postgrad Med J 2001;77:E5.
4. Arora A, Singh S, Aggarwal A, Aggarwal PK. *Salmonella* osteomyelitis in an otherwise healthy adult male-successful management with conservative treatment: A case report. J Orthop Surg (Hong Kong) 2003;11:217-20.
5. Mathuram A, Rijn RV, Varghese GM. *Salmonella typhi* rib osteomyelitis with abscess mimicking a 'cold abscess'. J Glob Infect Dis 2013;5:80-1.
6. Ispahani P, Slack RC. Enteric fever and other extraintestinal salmonellosis in University Hospital, Nottingham, UK, between 1980 and 1997. Eur J Clin Microbiol Infect Dis 2000;19:679-87.
7. Kamarulzaman A, Briggs RJ, Fabinyi G, Richards MJ. Skull osteomyelitis due to *Salmonella* species: Two case reports and review. Clin Infect Dis 1996;22:638-41.

How to cite this article: Madhavan A, Jayalakshmi V, Sobha B. Salmonella Typhimurium causing chronic osteomyelitis with septic arthritis. J Acad Clin Microbiol 2015;17:55-7.

Source of Support: Nil. **Conflict of Interest:** None declared.