

Case Report

Bilateral septic arthritis of the hip caused by nontyphoidal salmonella: A case report

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Nontyphoidal salmonella (NTS) infection can lead to gastroenteritis, enteric fever, and bacteremia. However, osteoarticular infections caused by NTS are rarely encountered. We report the case of a 53-year-old male patient with bilateral hip infection caused by NTS. We performed a two-stage reconstruction comprising debridement of both hip joints followed by prosthetic replacement with antibiotic-loaded acrylic cement because the patient's diagnosis was delayed for approximately three months and the hip joints were already damaged. At two-year follow-up, the clinical, radiologic, and laboratory findings were within the normal limits, and there was no sign of infection. This case is presented because reports of bilateral hip joint infection due to NTS are rare. Early detection and proper treatment are essential for the eradication of the infection. The use of a prosthesis made of antibiotic-loaded acrylic cement and prolonged antimicrobial therapy can be considered in the management of bilateral hip joint destruction due to delayed diagnosis of NTS infection.

Salmonella is the leading cause of foodborne bacterial diseases, constituting at least one-third of all outbreaks in the United States. Nontyphoidal salmonella (NTS) causes an estimated 1.4 million infections per year in the United States (1, 2). In addition, this infection occurs more frequently in patients with underlying diseases (3-9). NTS infection is found in cases with gastroenteritis, enteric fever, and bacteremia with or without endovascular infection. However, osteoarticular infections caused by NTS are rarely encountered and are frequently asymmetric (10, 11).

We describe a case of delayed diagnosis of bilateral septic arthritis of the hip due to NTS infection in a patient with no underlying diseases. The patient was successfully treated using a two-stage reconstruction of the hip joint and prolonged antimicrobial therapy.

Each author certifies that his institution's review board has approved the reporting of this case report. The patient was informed that data from the case would be submitted for publication, and he provided his consent.

Case Presentation

A 53-year-old male construction laborer with complaints of fever and pain in both hips was

admitted to the rheumatology department of our hospital. He had no history of other immunocompromizing diseases, such as diabetes mellitus, sickle cell anemia, or human immunodeficiency virus. He had watery diarrhea and a febrile episode that lasted for a month. Laboratory evaluation at the first clinic visit revealed a C-reactive protein (CRP) level of 12.3 mg/dL (normal range, 0–0.3 mg/dL), an erythrocyte sedimentation rate (ESR) of 120 mm/h (normal range, 0–20 mm/h), and a serum white blood cell (WBC) count of $9.9 \times 10^3/\text{mm}^3$ (normal range, 4.8×10^3 – $10.8 \times 10^3/\text{mm}^3$). Initial radiography of both hips indicated global joint space narrowing (Figure 1). Antibiotic treatment was immediately initiated with the administration of intravenous ceftriaxone (2 g/d), which was changed three days later to intravenous azithromycin and oral metronidazole administration for three days to treat fever of unknown origin. Oral metronidazole was continued for five days for Clostridium difficile toxin-associated diarrhea. Magnetic resonance imaging of the sacroiliac joint at one month after onset (Figure 2) revealed an edematous change in the focal subchondral bone marrow in the right sacroiliac joint and inflammatory arthritis of both hips. Oral sulfasalazine and prednisolone were therefore added for the treatment of right sacroiliitis

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and inflammatory arthritis of both hips. Despite treatment, the patient complained of pain in both hips, and his biological inflammatory marker levels were increased. Radiography of both hips (Figure 3) demonstrated severe joint space narrowing, and the patient was referred to the orthopedic department at three months after the onset of symptoms. Laboratory testing revealed a CRP level of 2.96 mg/dL, an ESR of 78 mm/h, and a serum WBC count of $9.1 \times 10^3/\text{mm}^3$. Aspiration of both hip joints yielded cloudy yellow synovial fluid with a WBC count of $46,728/\text{mm}^3$ (93% polymorphonuclear neutrophil leukocytes). *Salmonella* serogroup D (nontyphoid) were grown in culture from aspirated synovial fluid.

Because of the hip joint destruction due to prolonged exposure to NTS, we decided to perform a two-stage revision surgery using a posterolateral approach on both hips simultaneously. After resection of the femur neck, all acetabular inflammatory tissues were debrided and trimmed. Femoral prostheses made of antibiotic-loaded cement were implanted. The acetabular cavity was created from antibiotic-loaded cement and molded in the shape of a cup (Figure 4). The antibiotics used for the cement were a combination of 2 g of vancomycin and antibiotic Simplex cement impregnated with 500 mg of erythromycin per 40 g pouch (Stryker, Allendale, NJ, USA). We used our institution's routine protocol to devise the cement spacer for joint infection.

Ceftriaxone was initiated at a dose of 2 g intravenously daily. The patient was administered intravenous antibiotics for three weeks, after which he was switched to 200 mg of oral cefixime per day. After five weeks of antibiotic treatment, his CRP level declined to 0.29 mg/dL, ESR was 19 mm/h, and the serum WBC count was $6.8 \times 10^3/\text{mm}^3$. One month after discontinuing the antibiotic treatment, the patient underwent simultaneous bilateral conversion to total hip arthroplasty. A cementless femoral component and a cementless acetabular component were used. In the second stage of the reimplantation procedure, samples were obtained for microbiological and histopathological studies. No evidence of infection was noted. At two-year follow-up, the patient's CRP level was 0.09 mg/dL, ESR was 18 mm/h, and the serum WBC count was $5.2 \times 10^3/\text{mm}^3$. The Harris hip score and Western Ontario and McMaster Universities Osteoarthritis Index score were 95 points and 31 points, respectively. In addition, no osteolytic lesion was observed around the stem or cup (Figure 5) (12-15).

Discussion

Septic arthritis of the hip is relatively rare in adults, and its incidence ranges from 2 to 10 per 100,000 person-years (16). Nevertheless, it is a potentially disturbing disease. Septic arthritis may directly damage the cartilage by bacterial enterotoxins and indirectly due to the host's immune response to bacteria (17). Delayed treatment of joint infection can cause joint degeneration, osteonecrosis, and joint instability (18, 19).

Septic arthritis due to salmonella typhoid is rare and constitutes only 1% of all cases (20). Among the extraintestinal complications, the incidence of septic arthritis due to salmonella (typhoid and nontyphoid combined) is estimated to be less than 0.1%–0.2% (21). Among all salmonella cases in the United States, the incidence of bone and joint infection due to NTS is 0.06% (11). In addition, septic arthritis occurs more frequently in patients with



Figure 1. Anteroposterior radiograph of the hip revealed joint space narrowing. Image taken two weeks after the onset of fever



Figure 2. Magnetic resonance imaging of the sacroiliac joint indicated joint effusion and periarticular bone marrow signal change of the bilateral hip joints. Image taken one month after the onset of fever



Figure 3. Anteroposterior radiograph of the hip revealed severe joint space narrowing and disappearance of the acetabular sourcil. Image taken three months after the onset of fever



Figure 4. Anteroposterior radiograph of the hip taken after first-stage surgery

underlying diseases such as sickle cell disease, systemic lupus erythematosus, immunosuppressive state, and diabetes mellitus (3-9).

The English literature has mentioned only one case report of bilateral salmonella septic arthritis of the hip. In this report, a 27-year-old man with a 10-year history of Crohn disease was diagnosed with bilateral septic arthritis. He underwent bilateral arthroscopic debridement and subsequent two-stage reconstruction for both hips, as performed in our case (9).

The prognosis of septic arthritis after salmonella infection has not been well defined. Although most patients demonstrate resolution of the arthritis within four months of onset, chronic symptoms can persist for up to five years. Our case did not

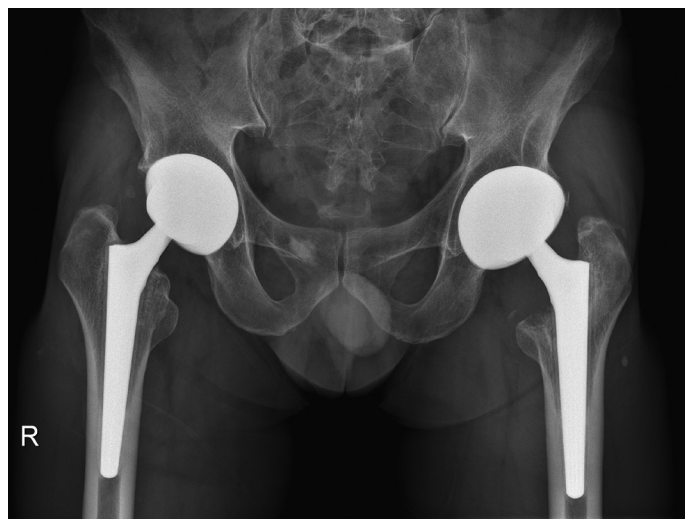


Figure 5. Anteroposterior radiograph of the hip taken two years after surgery, indicating good bone ingrowth without osteolysis

have any underlying medical conditions, but delayed diagnosis and inadequate treatment of fever and hip pain may have resulted in prolonged exposure to the organism. This infection led to complete joint space loss within months of fever onset. Due to gross articular destruction of the hip joint with periarticular osteomyelitis, it was difficult to achieve complete debridement. Moreover, even after the eradication of the infection, severe pain will be sustained as a result of the destroyed joint. Therefore, we performed staged reconstruction for bilateral septic hip arthritis using local antibiotic therapy (22, 23).

A third-generation cephalosporin is the drug of choice for salmonella infection, but there are some reports of antimicrobial resistance in NTS serotypes (24, 25). In our patient, we conducted antibiotic susceptibility testing, which aided the selection of appropriate antibiotics for successful eradication of the NTS infection.

Conclusion

We present a rare case of bilateral septic arthritis of the hip due to NTS infection in a patient without any underlying medical conditions. Early detection and proper treatment are crucial for the eradication of the infection. However, the patient presented diagnostic and therapeutic difficulties. A two-stage revision hip arthroplasty with the use of a prosthesis made of antibiotic-loaded acrylic cement and prolonged antimicrobial therapy can be considered in the management of bilateral hip joint destruction due to delayed diagnosis of NTS infection.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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