Salmonella infections lead to hip joint damage in a patient with systemic lupus erythematosus: a case report

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Abstract: There is rare literature elaborating the diagnosis, treatment and outcome of a systemic lupus erythematosus (SLE) patient who had bilateral femoral head necrosis, and complicated with salmonella typhimurium infection that caused a rapid destruction of the right hip joint, eventually leading to total hip arthroplasty. We have summarized the whole process and reviewed the literature, thus providing a reference for the diagnosis and treatment of joint infection in SLE patients.

Keywords: Systemic lupus erythematosus, salmonella typhimurium, supplicative arthritis, hip joint, total hip arthroplasty

Introduction

Systemic lupus erythematosus (SLE) patients have the high risk of infections, infections account for 4.7% of death [1]. Salmonella is rare but a huge threat among various types of infection. We reported a case about the diagnosis process, treatment and outcome of a SLE patient who had septic arthritis of the hip joint caused by Salmonella typhimurium.

Case report

A 42-year-old man diagnosed with SLE and Lupus Nephritis in November 2013, was on steroid therapy, started with 60 mg/d prednisone, and then gradually reduced the doses until now. On May 1, 2014, he suffered fever and right hip pain, and was treated 2 weeks at local clinic without improvement. He was first admitted to our hospital on May 15, 2014. He complained of pain and limited joint motion (LJM) in the right hip, with the pain increased with passive movement, as well as pitting edema in right lower limb. The initial X-ray pelvis showed narrowing of the right joint spaces with low bone mineral density of femoral head and intertrochanteric (Figure 1). MRI revealed an early osteonecrosis of the bilateral femoral head without any cortical collapse and with an soft tissue swelling around the right joint (Figure 2). The following were the lab tests at the time of admission to the hospital: WBC 14.35×10⁹/L, NEU% 84.4%, ESR 97 mm/h, CRP 12.0 mg/L, PCT 0.05 ng/ml, PLT 416×10⁹/L, CREA 190 umol/L, HGB 101 g/L, ALB 23.4 g/L, urine leucocyte number 34/ul. The highest body temperature was 39.1°C. The blood, urine and stool cultures were negative. On May 20, 2014, hip centesis was performed, synovial fluid was aspirated and sent for culture and sensitive test. Salmonella typhimurium was isolated and antibiotic-resistant to penicillin, some of cephalosporin, aminoglycoside and quinolone (levofloxacin for mediation), sensitive to tert-cephalosporins. Treatment contained electrolyte replacement and rehydration, albumin supplementation, and anti-infection with combination of ceftriaxone sodium (1 g, VD, BID) and levofloxacin (300 mg, PO, QD) for two weeks. The patient was discharged on oral levofloxacin (300 mg, PO, QD) for 6 weeks.
On December 25, 2014, the patient was admitted for the second time, with right hip pain and more obvious LJM than previous report. The patient was still taking prednisone at 10 mg/d. X-rays pelvis showed the right femoral head fracture, cortical collapse, and progression of bone absorption of femoral head and intertrochanteric (Figure 3). MRI revealed progression of bilateral femoral head necrosis, a collapse of right femoral head, and surrounding soft tissue swelling, an abscess near the lesser trochanter.

During this admission, the patient’s body temperature was normal. The lab tests were as follows: WBC $9.77 \times 10^9/L$, NEU% 82.8%, ESR 78 mm/h, CRP 9.99 mg/L, PCT <0.05 ng/ml, PLT 292×10^9/L, CREA 85 umol/L, HGB 117 g/L, ALB 35.6 g/L. On January 1st, 2015, hip arthrocentesis was performed again. Synovial fluid was aspirated and sent for culture, and the result showed no isolated bacteria. On January 14, 2015, the right hip joint debridement was performed under epidural anesthesia. During the operation, collapse of the femoral head and separation of cartilage from bone were observed. Dark brown and white turbid liquid filled the articular cavity. A cystic hyperplasia mass was seen in front of the lesser trochanter. Biopsy showed neutrophils 12/HPF. After the resection of compromised tissue, the wound was cleaned repeatedly by hydrogen peroxide solution, iodine volts and saline. Pathological report showed “chronic suppurative synovial inflammation”. Ceftriaxone sodium (1 g, VD, BID) was used for 3 days for prevention of post-surgery infection. The patient was discharged on oral cefaclor capsule (0.25 g, PO, TID) and levofloxacin tablet (300 mg, PO, QD) for six weeks. The post-debridement X-ray was shown in Figure 5.

On April 30, 2015, the patient was admitted for the third time. The right hip pain decreased but LJM had no change. There was still no clinical symptoms on the left hip. The patient was still on prednisone treatment at 10 mg/d. The X-rays showed no significant change (Figure 6),
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“chronic mild synovial inflammation, neutrophils <5/HPF”, vancomycin 0.5 g for local external use was used for preventing infection. Ceftriaxone sodium (1 g, VD, BID) was used for 2 days for prevention of post-surgery infection. The patient was discharged on oral levofloxacin tablet (300 mg, PO, QD) for six weeks. Regular follow-up was performed monthly for 3 months. THA postoperative X-ray was shown in Figure 8.

On November 9, 2015, six months after THA, the patient had no pain, and no symptoms indicating recurrent infection. X-rays showed good prosthesis position (Figure 9). Lab tests were normal.

Discussion

Suppurative arthritis is a medical emergency, which can cause rapid joint destruction, leading to the joint function loss. Delayed diagnosis and treatment will directly affect the disease’s prognosis. SLE patients are often in a condition of cellular and humoral immune deficiency, and simultaneously use hormone and immune inhibitor for the treatment, which significantly increased the risk in the infection of common and opportunistic pathogens [2]. Even if SLE patients have been diagnosed as chronic arthritis, they shall also pay attention to joint infection.

Salmonella is a kind of gram-negative bacillus which can be parasitic in human and animals. Salmonella typhimurium serotype is a type of closely associated with human [3]. 0.57% of SLE patients are infected by salmonella, and 92% of the infected patients are in the immunosuppressive state [4]. Salmonella suppurrative joints infection is mainly involved in young SLE patients’ single joint, most of which is hip joint [5].

Salmonella joints infection is mainly characterized by fever and suppurrative arthritis, with unusual symptom including soft tissue abscesses and meningitis, as well as sepsis syndrome to be one of the worst prognosis. Early diagnosis and aggressive treatment are important to get a good prognosis [4]. According to the symptoms and lab tests, it is not difficult to diagnosis SLE patients’ infection. CRP is an important reference index. Although CRP levels in SLE patients are raised during exacerbations, they are rarely over 50 mg/L. CRP >50 mg/L indi-
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cates highly-suspected infection [6]. It is very helpful to find pathogenic bacteria from the blood, sputum, urine or feces in order to early diagnosis the types of bacteria, but it is difficult to get a positive result. Joint puncture is an effective diagnostic method, which is crucial for the diagnosis when pathological tissues are collected and sent for bacterial culture and sensitive test.

Salmonella can be usually multiple-drug resistant, and sensitive to the third-generation cephalosporins, chloramphenicol and ciprofloxacin [7]. The most effective treatment is to use sensitive antibiotics according to sensitivity testing. For the suppurative joint infection patients, it is not effective enough to just use antibiotics. Joint arthroscopy or open debridement are often into consideration. It is more challenged to treat SLE patients with femoral head necrosis, because the bacteria attaches to the biofilm of necrotic bones or ischemic tissues, which makes it hard for antibiotics to penetrate into the biofilm [8]. Hence, eliminating the damaged tissue is the key of debridement.

The case reported in this paper is not common in clinic. The specialty is that the SLE patient with bilateral femoral head necrosis never stopped the corticosteroid treatment and was infected by salmonella in the right hip. 2 weeks prior to the first hospitalized to our hospital, the patient received treatment in the outer court because of fever and right hip pain. Because the MRI showed right femoral head necrosis which might be the cause of pain, infection was not paid attention to, which delayed the treatment. It was confirmed as infection after admission to hospital by biopsy. Even though it had been diagnosed as infection, there was still a challenge for treatment. Although the sensitive antibiotics were used, bacteria attached to pathological tissues biofilm, which made it difficult for antibiotics to be effective. So the necrotic bone became a “hotbed” for harbor bacteria, which directly lead to rapid destruction of hip joint. It took half a year from the diagnosis of avascular necrosis and salmonella typhimurium infection to the severe damage of hip joint. This was probably because of our lack of understanding of the disease and lack of further follow-up. For the second admission, we carried out complete debridement for hip joint. After the disease was stable and the infection was controlled, the total hip arthroplasty was performed for the third time admission. Half a year follow-up evaluation showed excellent progress with minimal pain and improved range of motion of the right hip joint. No signs and symptoms or lab tests indicated recurrent infection.

Conclusion

This paper reported a case of SLE patients with long-term corticosteroid usage which lead to bilateral femoral head necrosis, and at the same time complicated with salmonella typhimurium infection. This caused a rapid destruction of the right hip joint, eventually lead to total hip arthroplasty. This suggests that clinicians should take more attention to hip infection in SLE patients, especially when there is femoral head necrosis. Early diagnosis and treatment is the key to control infection. If there is irreversible joint damage caused by infection, then two-stage total hip arthroplasty is also a viable option after adequate debridement and infection control.

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Disclosure of conflict of interest

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