

Total Hip Arthroplasty for Acetabular Protrusion in a Patient with Active Tuberculosis Infection: A Case Report

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Abstract

Background: After the spine, the hip is the most common site that can be infected with extrapulmonary tuberculosis (TB). In the early stages, patients present with complaints of pain around the hip, and after a while, they might experience deformities, shortening, and limited movements. Because hip TB mimics the symptoms of other hip diseases like rheumatoid arthritis (RA) and osteoarthritis, diagnosis is difficult. Here, we aimed to report a rare case of hip TB secondary to pulmonary TB and the result of the total hip arthroplasty (THA).

Case Report: A 41-year-old man presented to the orthopedic clinic with a complaint of progressive pain in the right hip. After laboratory tests, imaging, and sputum culture, active TB infection and advanced arthritis of the hip joint were detected. A subluxation/ dislocation stage of arthritis and an acetabular protrusion were present, leading to the restriction of movements. After receiving medical therapy, we performed THA for the patient.

Conclusion: The patient's right hip reached a normal range of motion (ROM) without pain in the 18-month follow-up. Since TB can mimic the symptoms of many common diseases, considering hip TB along with other diagnoses can aid in reducing possible complications and improving patients' lives.

Keywords: Total Hip Replacement; Extrapulmonary Tuberculosis; Osteoarticular Tuberculosis; Tuberculosis

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Background

According to the Global Tuberculosis (TB) Report of the World Health Organization (WHO), about 10.6 million people are infected with TB worldwide (1). Mycobacterium TB can cause TB, which is more common in men (2) in the second and third decades of life (3). TB has two types of pulmonary and extrapulmonary manifestations (2). After the spine, TB of the hip is the most frequent site affected by extrapulmonary TB (3), consisting of two forms: synovial and osseous. If the synovium is infected first, the synovial membrane becomes swollen and congested (4). Necrosis of the subchondral bone occurs because of the expansion of granulation tissue from the synovium onto the bone (5). The pathogen can also infect the metaphysis or epiphysis of the bone; in this situation, the head or neck of the femur, greater trochanter, or acetabulum are some regions that can be destroyed (4). Synovial TB has a slow onset with mild symptoms (6). Synovial TB in double or multiple joints and extraosseous TB are much rare (7). Wrist TB tenosynovitis and synovial TB of knee joint are the most common cases mentioned in studies (8, 9).

The osseous form can present either in an intraarticular or extraarticular fashion (3). Intraarticular TB can stimulate the symptoms, signs, and imaging findings of other diseases like transient synovitis, rheumatoid arthritis (RA), osteoarthritis, and osteonecrosis (10). Destroying the acetabular, head, and neck of the femur, and finally, joint dislocation and deformity are other consequences of TB (11). In the active

phase of the disease, the patients experience limping and pain that prompts nocturnal awakenings (3). Overall, most patients are referred with pain in the hip, limping, and limitations in their movements (4).

Depending upon the clinical features of hip TB, four stages have been defined by Babhulkar and Pande: synovitis, early arthritis, arthritis, and advanced arthritis (3). In 2010, Saraf and Tuli modified the classification to include synovitis, early arthritis, advanced arthritis, and advanced arthritis concomitant with subluxation/dislocation. Clinical features, imaging (especially plain X-ray), biopsy from the infected site, and culture can be helpful for the diagnosis (4). According to Saraf and Tuli, both nonsurgical and surgical interventions are treatment options. Excision arthroplasty, joint arthrodesis, and hip arthroplasty are the surgical options (11).

Here, we aim to report a case of acetabular protrusion due to an active TB infection. After receiving a complete period of anti-TB medications, the patient underwent total hip arthroplasty (THA). He had a normal range of motion (ROM) without any pain after 24 months of follow-up.

Case Report

A 41-year-old man presented to the orthopedic clinic with a complaint of progressive pain in the right hip since last year. The pain became severe in the last two months and caused an inability to bear weight. A history of weight loss, anorexia, occasional fevers, excessive sweating, especially at night, and fatigue was mentioned. On



physical examination, his right hip had a limited ROM in flexion, adduction, and internal rotation. Moreover, he felt pain in all movements. Due to his systemic symptoms, like weight loss and fever, the patient was admitted for further examinations. Necessary examinations including an X-ray and computed tomography (CT) scan of the chest, pelvis, and pelvic magnetic resonance imaging (MRI) were requested.

On the anteroposterior (AP) X-ray radiography of the pelvis, acetabular protrusion was seen (Figure 1).



Figure 1. Anteroposterior (AP) X-ray radiography of the pelvis showing acetabular protrusion

The pelvic CT scan revealed an inner wall fracture of the right acetabulum with displacement and protruding of the head of the femur into the pelvic cavity (Figure 2).

Bone marrow edema in the right femoral head, neck, and acetabulum and mild joint effusion on the medial side of the right hip joint were reported in his pelvic MRI report.

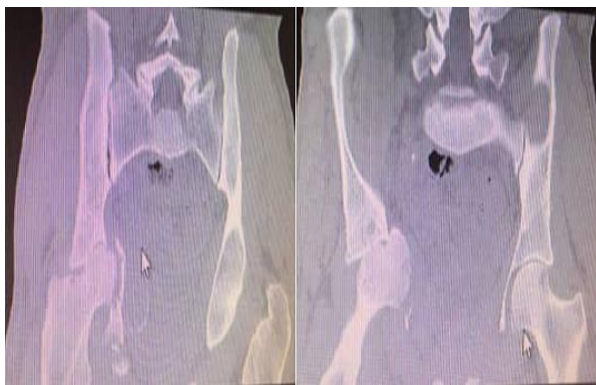


Figure 2. Fracture of the medial wall of the right acetabulum, associated with medial displacement of the femoral head protruding into the pelvic cavity

On the chest X-ray, reticulonodular opacity and areas of consolidation in the mid and upper zones of the lung were seen (Figure 3). Patchy consolidation and ground-glass opacity with peripheral and peribronchovascular distribution associated with centrilobular nodules and bronchial dilation were reported in the CT scan of the chest.

Laboratory tests on admission revealed hypochromic microcytic anemia [with a hemoglobin (Hb) level of 6.5 g/dl], with high inflammatory markers. Serologic tests for human immunodeficiency virus (HIV) and hepatitis B and C viral infections were negative.

According to the results of the chest X-ray and laboratory tests, with suspicion of TB, the consultation of an

infectious disease specialist was requested. A sputum sample from the patient underwent acid-fast bacilli (AFB) staining and mycobacteria culture, revealing the presence of *Mycobacterium TB*.

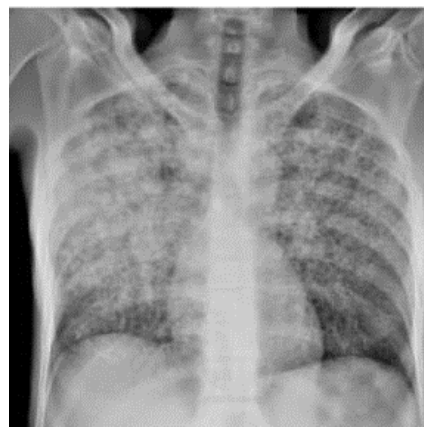


Figure 3. The chest X-ray, reticulonodular opacity and areas of consolidation in the mid and upper zones of the lung

Medical treatment started with daily administration of rifampicin, isoniazid, pyrazinamide, and ethambutol for the first two months, followed by a continued regimen of rifampicin, isoniazid, and ethambutol for a further ten months. After six months of follow-up, his pain had decreased and his weight had increased, while hip movements were still limited. Therefore, the decision was made to proceed with a THA. Preoperative evaluations, such as laboratory tests and ultrasonography, were performed. The laboratory tests did not show any anemia, and the erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were within the normal ranges. In addition, ultrasonography detected no joint abscess.

After almost a year, the patient underwent surgery. Due to the protruding head of the femur into the pelvic cavity, it was impossible to dislocate it. By cutting the neck of the femur and using a curette screw, the femoral head was removed. For acetabulum preparation, we started with removing the peripheral cartilage and soft tissue with a curette. In the macroscopic view, the synovium was hyperemic and hypertrophic, indicative of an inflammatory process. Due to the adhesion and tightness of the muscles, we had to release the sub-tissue. Upon opening the capsule, we noticed an amber-yellow fluid without any evidence of pus or contamination. The fluid sample was sent for culture and polymerase chain reaction (PCR), and a synovium biopsy was submitted for pathology. Without reaming the medial wall, we began reaming with a suitable reamer that fits comfortably in the acetabulum cavity. We used the patient's femoral head as a cancellous bone graft for filling the medial acetabular defects (impaction grafting). After all, a conventional cementless acetabular component was fitted into the construct. Preparation of the femoral medullary canal and appropriate stem fitting were done thereafter.

When the final implants were in situ and the hip was reduced, we verified the implant positioning with fluoroscopy. Two weeks after the surgery, the results of the fluid culture and PCR were negative. Postoperatively, we allowed limited weight-bearing for three months. After six months of follow-up, a plain X-ray showed no sign of TB reactivation (Figure 4). After 18 months of follow-up, the patient's right hip had reached a normal ROM without pain.

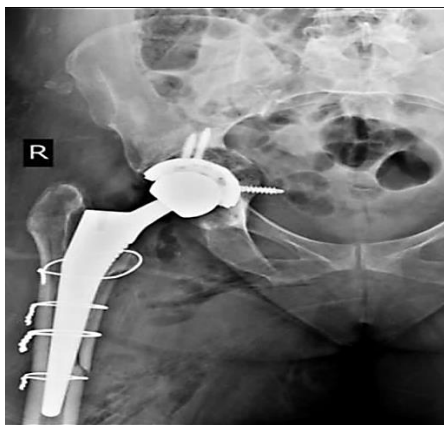


Figure 4. Anteroposterior (AP) X-ray radiography of the pelvis after six-month follow-up

Discussion

Herein, we reported a case of active TB infection with hip joint involvement in the stage of advanced arthritis concomitant with subluxation/dislocation. At this stage, with further advancement of the destruction of the acetabulum, head of the femur, and capsule, the femur may dislocate (12). Movements in this stage are grossly limited (12). Severe deformities and shortening are the two expected manifestations in this stage (4). In addition, protrusion of the acetabulum happens in this stage (12), as seen in our case.

The treatment plan at this stage with active TB infection is controversial (13). On the other hand, THA is the ideal choice to restore the hip completely (11). Although there are some worries about the recurrence of TB and surgical failure, the admissibility of the THA has gradually increased worldwide (11). Babhulkar and Pande recommend at least ten years between active infection and performing THA (3). On the other side, Sidhu et al. performed cemented THA in patients with active TB arthritis of the hip (14). Overall, THA is an acceptable treatment for patients recovering from TB (4).

Acetabulum reconstruction is crucial to prevent THA failure (11). Central hip dislocation and femoral acetabular impingement after THA are some of the consequences of acetabulum destruction (11). Eskola et al. reported the results of cementless total joint replacement in 18 patients with long-standing (mean 34 years after onset of infection) TB arthritis of the hip in 1988. Seven patients received anti-TB medications, while none had disease reactivation (15). Kim et al. reported about 60 cases of long-term hip TB treated with THA. Some patients did not receive TB chemotherapy, and TB recurrence occurred in five hips that were in the group receiving TB chemotherapy. However, authors confirmed that anti-TB chemotherapy was crucial in total reconstruction hip arthroplasty for TB coxarthrosis (16).

In 2009, Vogelpoel et al. reported a 33-year-old Caucasian woman with an acetabular bone defect caused by TB arthritis of the left hip joint. In this case, they preferred to initially ankylose the hip joint in order to fill up the acetabular defect with the patient's own femoral head instead of performing a resection arthroplasty followed by a THA in a second stage (17). Schreurs et al. investigated whether bone impaction grafting could provide long-term survival of the prosthesis in irregular acetabulum morphologies. Acetabulum reconstructions

were performed on 48 patients under 50 years. They found low complications and reoperation rates. Finally, they concluded that acetabular reconstruction using impaction grafting was a reliable and durable technique associated with good long-term results in young patients with acetabular bone defects (18, 19). In the case we presented, we encountered acetabular protrusion secondary to active TB. We restored the acetabulum with the bone impaction grafting technique. Fortunately, there was no TB reactivation or prosthesis dislocation in the follow-up.

Conclusion

Although TB is not endemic in our region and the chances of orthopedic specialists encountering such presentations of TB are low, there is still a possibility of missing these patients. The existence of similar studies in this field can be a guide for other colleagues facing these patients. Considering that this disease can mimic the symptoms of many common diseases, paying attention to hip TB, along with other diagnoses, can reduce its possible complications and improve patients' lives.

Conflict of Interest

The authors declare no conflict of interest in this study.

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