



Rapidly Progressive Tuberculous Arthritis of the Knee Following Excision of a Tubercular Cystic Mass Misdiagnosed as a Baker's Cyst: A Case Report

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Abstract

Extrapulmonary tuberculosis (TB) in the musculoskeletal system is most often reported in the spine and hip joints. The knee, however, is not a common site for extrapulmonary TB to occur. Primary TB arthritis of the knee rarely occurs in the presence of a cystic mass without a history of pulmonary TB. We report the case of a 48-year-old female who underwent total knee arthroplasty (TKA) due to rapidly progressive tuberculous arthritis. This occurred despite receiving anti-tuberculosis (anti-TB) treatment following the excision of a tubercular cystic mass, which had been misdiagnosed as a Baker's cyst.

Keywords: TB arthritis, Tubercular cyst, Baker's cyst, TKA

Introduction

Tuberculosis (TB) is no longer confined to undeveloped or developing nations. Today, one third of the global population suffers from TB. Extrapulmonary TB, found in the musculoskeletal system, is an uncommon infection caused by tuberculous bacilli, and constitutes 1-5% of all forms of TB. Approximately 30% of skeletal TB cases involve joints, with the knee being the third most affected joint, after the spine and the hip joints. TB of the knee commonly presents as synovitis or arthritis, and the presence of a cyst is a rather rare complication. Here, we report a case of TB arthritis in a native knee, initially presenting as a Baker's cyst, without systemic signs or symptoms.

Case Presentation

The patient is a 48-year-old female with no specific history, other than vitiligo treated with steroid medication for several months. The patient had an aspiration of cystic mass and received NSAID medication from a local clinic about 6 months, but aggravated pain of the left knee. So, she visited to our clinic. Upon physical examination, we could palpate a 7 cm × 15 cm soft mass on the medial side of the proximal tibia, for which the patient complained of tenderness. The patient's pain was aggravated during extension of the knee; however, there were no neurological symptoms, redness, or local heat, which would suggest an infection. On x-ray imaging of the knee, there were no significant findings, such as arthritic changes (Figure 1A and B). A chest X-ray was also interpreted as normal. In the hematologic examination, the erythrocyte sedimentation rate (ESR) was slightly elevated, and all other factors were within the normal ranges.

Magnetic resonance imaging (MRI; INGENIA 3.0T, Philips, Netherlands) was performed to confirm the characteristics of the mass. The musculoskeletal radiologist interpreted the images as showing diffuse and thick enhancing synovial proliferation involving the joint capsule, and an elongated, complex cystic mass with diffuse high T2 signal intensity between the semimembranosus and medial gastrocnemius muscles like as Baker's cyst. There were no signs of arthritis due to ligament or cartilage damage in the joint (Figure 2A and B).

Under the spinal anesthesia, we excised the mass in the supine position and a tourniquet applied at the proximal thigh. Intraoperative findings showed a cyst with unclear proximal and/or distal margins and adhesion to adjacent soft tissues due to inflammation, which presented differently than a Baker's cyst. There was friable soft tissue, and the mass was excised. Histological findings showed caseous necrosis and tuberculosis with granulomatous inflammation (Figure 3A-C).

Postoperatively, a final biopsy results confirmed TB via a polymerase chain reaction (PCR) TB test. Other examinations, including a chest x-ray, chest computed tomography (CT), and sputum

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Figure 1: (A) Preoperative findings showed a 7 x 15cm , soft mass on the medial side of the left calf. (B) The radiographic examination performed at the patient's first visit showed normal alignment and non-specific findings.

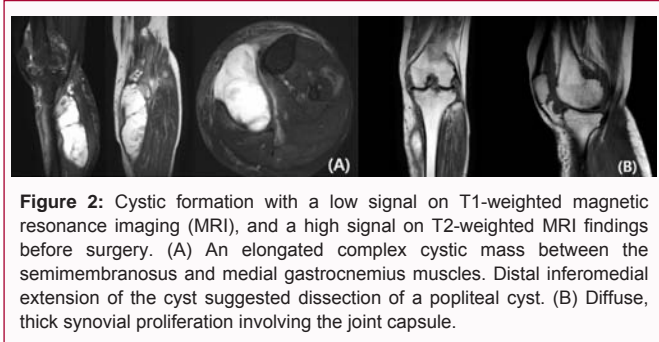


Figure 2: Cystic formation with a low signal on T1-weighted magnetic resonance imaging (MRI), and a high signal on T2-weighted MRI findings before surgery. (A) An elongated complex cystic mass between the semimembranosus and medial gastrocnemius muscles. Distal inferomedial extension of the cyst suggested dissection of a popliteal cyst. (B) Diffuse, thick synovial proliferation involving the joint capsule.



Figure 3: (A) Intraoperative findings showing adhesion with surrounding tissue and unclear margins. (B) After excision, the knee had granulation tissues with an irregular surface, and showed a different pattern from a Baker's cyst. (C) Microscopic examination(H&E staining, x200) showed caseous granuloma with scattered multinucleated giant cells (black arrows). These findings were consistent with tuberculosis.

smears did not show any evidence of TB. Based on the biopsy results, we consulted with an internal medicine of tuberculosis specialist and started the patient on a daily anti-TB regimen, HRZE, which included isoniazid 100 mg (H), rifampin 600 mg (R), pyrazinamide 500 mg (Z), and ethambutol 400 mg (E). During follow-up, she complained a limited range of motion (ROM) and continuous knee pain in her everyday life. Follow-up x-rays showed rapid degenerative changes to the knee along with destruction of the joint. After 9 months of treatment with HRZE, the patient's day-to-day life had become difficult due to the pain caused by the severe destruction of the knee joint (Figure 4A and B). A total knee arthroplasty (TKA) and biopsy were performed (Figure 5). Additional TB treatment regimen(HR) was continued for a year to prevent a recurrence of infection due to TB reactivation after TKA [4]. The patient recovered without any infection at the operation site, and experienced a postoperative alleviation of her pain with no sign of recurrence of the



Figure 4: (A) At 3 months after surgery, radiography showed osteopenic state and mild swelling. (B) At 9 months after surgery, imaging showed severe joint destruction, even after treatment with anti-tuberculosis drugs.

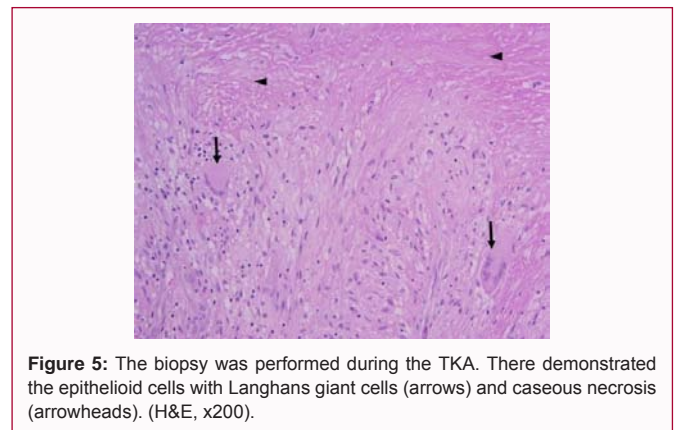


Figure 5: The biopsy was performed during the TKA. There demonstrated the epithelioid cells with Langhans giant cells (arrows) and caseous necrosis (arrowheads). (H&E, x200).

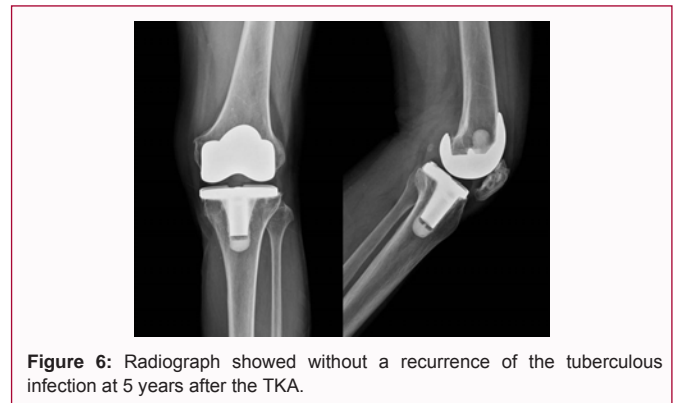


Figure 6: Radiograph showed without a recurrence of the tuberculous infection at 5 years after the TKA.

cystic mass (Figure 6). The patient maintained without a recurrence of a tuberculous infection 5 years after the TKA.

Discussion

The knee is the third most common site of extrapulmonary TB, accounting for about 10% of skeletal TB lesions [8]. The most common symptom of skeletal TB is diffuse swelling with a subsequent progressive loss of movement. Occasionally it can manifest as multiple discharging sinuses and a triple deformity of the knee [8]. Although rare, the occurrence of a Baker's cyst along with TB of the knee has been previously described [1,5].

A Baker's cyst is defined as a collection of fluid in the gastrocnemius–semimembranosus bursa of the knee, and usually results from an anatomical defect at the bursa–joint interface, compounded by pathologies which cause effusion of the knee [3,7]. The causes of knee effusions are commonly noninfectious, and secondary to meniscal tears, chondral lesions, osteoarthritis,

seronegative/seropositive spondyloarthropathy, or pyrophosphate arthropathy [4,5]. Although uncommon, infective etiologies can also result in a Baker's cyst. Labropoulos et al. [7] confirmed in a casual analysis study the rare occurrence of a tubercular etiology in a Baker's cyst. The presence of a tubercular popliteal cyst has been previously reported in a patient with tubercular arthritis, and can present as a ruptured popliteal cyst secondary to tubercular arthritis.

A Baker's cyst by itself has no specific radiographic features, but features of causative pathology can, at times, be seen on radiographs. In our case, we did not find anything significant on the radiographs of the knee. Osteoarticular TB has classical radiographic features, such as the Phemister triad, which consists of juxta-articular osteoporosis, peripheral osseous erosions, and narrowing of the joint space; however, in the early stages, radiographic features are usually nonspecific [8]. The slow growth pattern of *Mycobacterium tuberculosis* and a deficiency of proteolytic enzymes explain the preservation of the joint space in the early stage of osteoarticular TB [9]. These early changes are better detected on MRI, which shows articular affection and synovial thickening, as seen in the case of our patient [6].

Our patient complained of pain and a diffuse swelling over the proximal aspect of her left calf. The MRI of the left leg revealed a popliteal cyst (probably an infectious etiology) with no other abnormalities; hence, we planned excision and biopsy. Our patient started an anti-TB regimen as soon as the histopathology report confirmed a diagnosis of tubercular synovitis. Despite a complete excision of the cyst and appropriate anti-TB medication, the patient suffered residual functional impairment due to pain and joint destruction, as demonstrated at 9 months follow-up. It is thought that immune insufficiency due to the long-term use of steroids to treat a vitiligo affects the activation of TB and joint destruction [2]. Following this thought process, we decided to perform a TKA to treat her rapidly progressed extrapulmonary TB-induced arthritis with anti-TB drugs.

Conclusion

This case highlights that an infected Baker's cyst can be a rare cause of unilateral lower-extremity pain and swelling. An infected or ruptured cyst can be confused clinically with deep vein thrombosis or cellulitis, and these conditions can even coexist [10]. Generally,

it is difficult to consider a primary diagnosis of a TB cyst in a soft tissue periarticular joint mass. We therefore report that in the case of our patient, the TKA was necessary due to a failure to accelerate the advancement of knee joint destruction after the cyst excision and treatment with anti-TB drugs.

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