Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

A Hip Prosthesis Infected with Mycobacterium Tuberculosis: A Case Report and Literature Review

Alloul N[1,2*], Habboubat I[1,2], Oucharqui S[1,2], Benaissa E[1,2], Elouennass M[1,2]

[1]Laboratory of Bacteriology, Mohamed V Military Teaching Hospital, Rabat, Morocco
[2]Faculty of Medicine and Pharmacy, Mohammed V University, Rabat, Morocco

DOI: https://doi.org/10.36347/sjmcr.2025.v13i08.019 | **Received:** 12.06.2025 | **Accepted:** 04.08.2025 | **Published:** 11.08.2025

***Corresponding author:** Alloul N
Laboratory of Bacteriology, Mohamed V Military Teaching Hospital, Rabat, Morocco

Abstract | **Case Report**

Tuberculosis infection of joint prostheses remains a rare but serious complication, often underdiagnosed due to its nonspecific clinical presentation. We report a rare case of a 55-year-old man with a total hip prosthesis implanted in 2017, admitted for impairment and instability of the left lower limb. Imaging revealed loosening of the acetabular implant. Bacteriological analysis of a deep sample, although negative on conventional staining, identified *Mycobacterium tuberculosis* by the molecular GeneXpert test, confirmed by culture. The patient was treated medically without initial prosthesis removal, with a favorable outcome. This case highlights the importance of considering a tuberculous etiology in any atypical prosthetic infection, especially in endemic areas, and the central role of molecular diagnosis in early management.

Keywords: Total hip arthroplasty, Tuberculosis infection, *Mycobacterium tuberculosis*, GeneXpert, Osteoarticular infection.

INTRODUCTION

Infection is considered one of the most severe complications of arthroplasties due to its potentially severe consequences, including prolonged morbidity, multiple surgeries, and sometimes significant functional loss. Fortunately, it remains rare, affecting approximately 0.3% of knee and 1.9% of hip replacements, respectively [1]. Most prosthetic joint infections are caused by classical pathogens such as *Staphylococcus aureus* and coagulase-negative staphylococci, responsible for over half of the cases [2]. In contrast, infections caused by mycobacteria are significantly less common and often underdiagnosed. Although rarely implicated, *Mycobacterium tuberculosis* represents a significant diagnostic and therapeutic challenge. Symptoms are often insidious, with a slow progression, and diagnosis is frequently delayed due to the nonspecific clinical presentation and difficulty isolating the pathogen using conventional microbiological techniques [4]. This article describes a case of prosthetic hip joint infection due to *Mycobacterium tuberculosis* complex, highlighting the importance of considering this rare but potentially devastating pathogen, particularly in immunocompromised patients or those from tuberculosis-endemic regions. Management involves a combination of surgical intervention and prolonged antituberculosis therapy.

CASE REPORT

A 55-year-old was admitted for complete functional impairment and instability of the left hip. His medical history included a total hip arthroplasty (THA) in 2017 following a femoral fracture. The patient had no prior history of tuberculosis exposure or treatment. The clinical course began one year prior to admission with progressive instability and partial functional impairment of the left hip, accompanied by pain during movement, exacerbated by a fall on the operated hip. The patient did not initially seek medical attention. Three months before admission, he developed a localized swelling with purulent discharge from the surgical scar with a general health deterioration. He did not any systemic signs of tuberculosis or respiratory symptoms. On clinical examination, the patient was conscious but generally unwell, weighing 57 kg, measuring 172 cm, with a BMI of 19. Hemodynamically and respiratory stable. Locomotor examination revealed complete functional loss and marked instability of the left lower limb, associated with significant muscle atrophy, neutral

rotation, and a 2 cm shortening of the limb. The surgical scar showed inflammatory signs but no fistula or discharge at the time of examination. Sensation was intact with no downstream motor deficit. The posterior tibial pulse was palpable. Pelvic radiography revealed loosening of the acetabular implant (Figure 1). CT scan confirmed migration of the acetabular component into the pelvic cavity. Chest X-ray was unremarkable.

Figure 1: Anteroposterior pelvic radiograph showing loosening of the acetabular implant. © Imaging Department, Mohamed V Military Teaching Hospital, Rabat.

An initial diagnosis of aseptic loosening of the THA was made, and the patient underwent transcondylar traction. Superficial and deep pus samples were collected for microbiological analysis, including staining, culture, and molecular testing for *Mycobacterium tuberculosis*. Laboratory findings showed an elevated CRP of 43 mg/L and leukocytosis at 16 G/L. Direct examination using auramine and Ziehl-Neelsen staining was negative. However, the GeneXpert MTB/RIF test (Cepheid, Sunnyvale, CA, USA) detected *M. tuberculosis* in deep pus within 2 hours, prompting initiation of antituberculous therapy. Two weeks later, liquid culture was positive, followed by growth on Lowenstein-Jensen medium at three weeks (Figures 2 and 3).

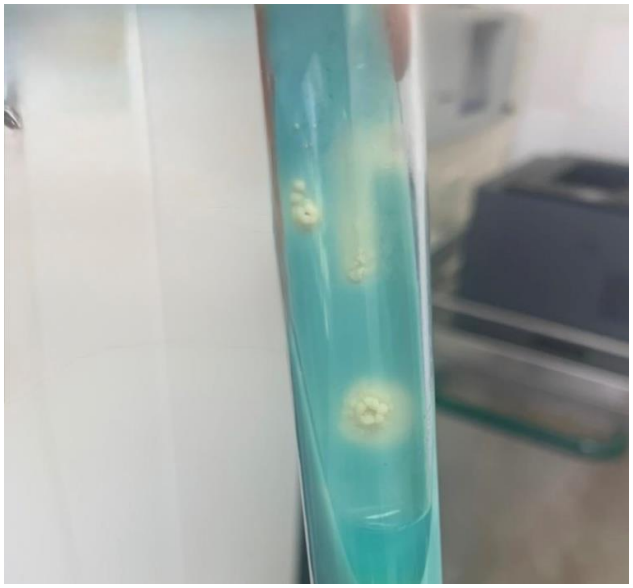

Figure 2: **Macroscopic appearance of *Mycobacterium tuberculosis* colonies on Löwenstein-Jensen medium, showing characteristic beige cauliflower-like morphology. © Laboratory of Bacteriology, Mohamed V Military Teaching Hospital**

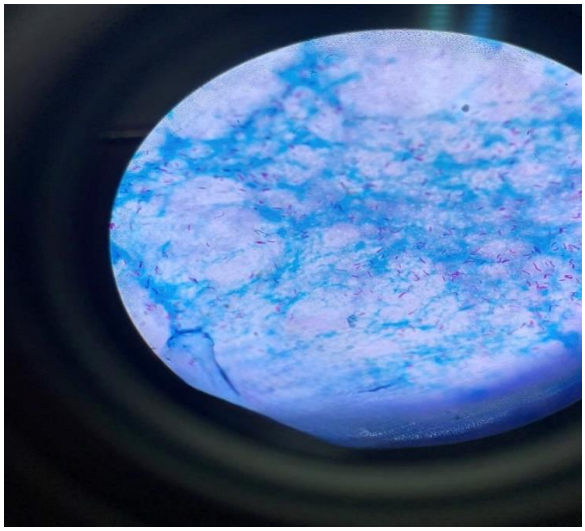

Figure 3: **Microscopic appearance of *Mycobacterium tuberculosis* after Ziehl-Neelsen staining: red bacilli on a blue background. © Laboratory of Bacteriology, Mohamed V Military Teaching Hospital**

DISCUSSION

Prosthetic joint infections (PJIs) caused by *Mycobacterium tuberculosis* raise several important clinical, diagnostic, and therapeutic considerations. PJIs occur in less than 1% of total hip arthroplasties [1]. The most frequent bacterial causes of PJIs include coagulase-negative staphylococci, *Staphylococcus aureus*, aerobic Gram-negative bacilli, and anaerobes. However, the involvement of *M. tuberculosis*, though rare, must be considered, particularly in at-risk patients or those with a history of latent or active tuberculosis [3-5]. Pathophysiological mechanisms include reactivation of latent infection or hematogenous inoculation, typically affecting hips or knees. Khater et al. [5] reported reactivation cases up to 42 years after initial infection, emphasizing the potential role of surgical intervention or trauma in disrupting a dormant tuberculosis granuloma. Reactivation from latent sites such as lungs, kidneys, or mesenteric lymph nodes can lead to secondary seeding of the prosthesis [5]. Trauma is a known predisposing factor for skeletal tuberculosis, and tissue damage around the prosthesis may contribute to reactivation, possibly through mechanical disruption of old tuberculous granulomas [6].

Clinically, the presentation is often insidious, with joint pain being the most frequent symptom. Joint swelling and/or sinus tract formation may also occur but are nonspecific [7]. Diagnosis relies on culture and histological examination of tissue. Histopathology may reveal acid-fast bacilli or caseating granulomas. Culture remains essential for confirmation. GeneXpert is applicable to extrapulmonary specimens, with high sensitivity and specificity, making it a valuable tool due to its speed and simplicity. Other bacteria, particularly *S. aureus*, should be considered. Coinfection cannot be excluded, but persistent infection despite eradication of typical organisms may suggest tuberculosis [7]. The necessity of prosthesis removal alongside antituberculsis treatment remains debated [10]. A study of ten cases diagnosed during or shortly after arthroplasty showed successful outcomes with standard therapy alone, without prosthesis removal. However, infections diagnosed months or years post-arthroplasty often require surgical debridement in addition to medical therapy for cure [6]. In this case, the diagnosis was made four years after THA insertion. The prosthesis was retained, and the patient received antituberculosis therapy following national guidelines: 2 months of rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by 10 months of rifampicin and isoniazid. After four months, clinical improvement was observed.

Prophylactic antituberculosis treatment in patients with a history of latent or active tuberculosis remains controversial. Khater *et al.,* [5] suggested that it may reduce reactivation risk, but more robust clinical evidence is needed.

Radiographic imaging, though nonspecific, may show signs such as radiolucency at the bone-cement interface, cement fractures, or prosthetic component displacement, supporting the diagnosis [4].

CONCLUSION

Tuberculosis prosthetic joint infections are rare, and diagnosis relies heavily on a high index of clinical suspicion. As early diagnosis is associated with reduced morbidity, direct smear, culture, and GeneXpert testing for *Mycobacterium tuberculosis*, along with histological examination, should be systematically performed in patients with prior total arthroplasty presenting with signs of infection.

REFERENCES

1. Pulido L, Ghanem E, Joshi A, Purtill JJ, Parvizi J. Periprosthetic joint infection: the incidence, timing, and predisposing factors. *Clin Orthop Relat Res*.

2008;466(7):1710–1715. https://doi.org/10.1007/s11999-008-0209-4

2. Shen H, Tang J, Wang Q, Shen B, Kang P. Sonication of explanted prosthesis combined with incubation in BD Bactec bottles for pathogen-based diagnosis of prosthetic joint infection. *J Clin Microbiol*. 2015;53(3):777–781. https://doi.org/10.1128/JCM.02863-14
3. Atkins BL, Athanasou N, Deeks JJ, Crook DW, Simpson H, Peto TE, et al. Prospective evaluation of criteria for microbiological diagnosis of prosthetic-joint infection at revision arthroplasty. *J Clin Microbiol*. 1998;36(10):2932–2939. https://doi.org/10.1128/JCM.36.10.2932-2939.1998
4. Lusk RH, Wienke EC, Milligan TW, Laufenberg LJ, McCarthy M. Tuberculous and foreign-body granulomatous reactions involving a total knee prosthesis. *Arthritis Rheum*. 1995;38(9):1325–1327. https://doi.org/10.1002/art.1780380921
5. Khater FJ, Samnani IQ, Mehta JB, Harvill LM, Byrd RP Jr. Prosthetic joint infection by *Mycobacterium tuberculosis*: an unusual case report with literature review. *South Med J*. 2007;100(1):66–69. https://doi.org/10.1097/01.smj.0000232972.50186.4c
6. Spinner RJ, Sexton DJ, Goldner RD, Levin LS. Periprosthetic infections due to *Mycobacterium tuberculosis* in patients with no prior history of tuberculosis. *J Arthroplasty*. 1996;11(2):217–222. https://doi.org/10.1016/S0883-5403(05)80023-3
7. Tokumoto JN, Follansbee SE, Jacobs RA. Prosthetic joint infection due to *Mycobacterium tuberculosis*: report of three cases. *Clin Infect Dis*. 1995;21(1):134–136. https://doi.org/10.1093/clinids/21.1.134