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Case report

Knee tuberculosis: A misleading clinical entity (case report)

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ABSTRACT

Introduction: Bone and joint infections are rare localizations of tuberculosis, and its diagnosis is challenging. The atypical clinical presentation may lead to delayed diagnosis and severe complications.

Case presentation: We report the case of a 72-year-old female diagnosed with tuberculosis of the knee. She was complaining of progressive right knee pain and swelling without systemic signs. She was misdiagnosed as having a flare-up of osteoarthritis, which led to a delayed diagnosis and a septic subluxation of the knee. We performed a knee arthrotomy, lavage, and stabilization with an external fixator. The microbiologic tests did not isolate any germs. However, a histological examination confirmed the diagnosis by revealing a caseating granuloma surrounded by epithelioid cells. The patient treated with anti-tuberculosis therapy had a good evolution. Three months post-surgery, the external fixator was replaced with a removable knee brace.

Discussion: Osteoarticular tuberculosis is often caused by the hematogenous route. The lack of specificity in clinical and radiological signs makes the diagnosis difficult, especially at the early stage, leading to delays in diagnosis and complications.

Nevertheless, the recognition of predisposing factors to tuberculosis, with persisting symptoms despite treatment, should draw the intention of further investigation.

The treatment of osteoarticular tuberculosis is primary medical with antituberculosis chemotherapy. However, surgical treatment is reserved for specific indications and mostly to treat complications.

Conclusion: The lack of specificity in clinical and radiological signs in osteoarticular tuberculosis may mislead the physician. Nevertheless, focusing on predisposing factors, especially in endemic areas, may guide diagnosis and avoid complications.

1. Introduction

Each year, around 10 million people are infected with *M. tuberculosis*, and death occurs in 1.4 million [1]. Despite the progress in the medical treatment of tuberculosis, it remains a public health challenge in underdeveloped countries [2]. Populations with poor socio-economic conditions and multimorbid subjects are more likely to be affected [3].

In most cases, tuberculosis involves the lung [4]. The skeletal system is only involved in 1 to 3% of cases [5,6]. The most frequently involved sites in osteoarticular tuberculosis are the spine (40%), hip (25%), and knee (8%), respectively [7]. Osteoarticular tuberculosis remains a challenging diagnosis, because of the following reasons: atypical clinical symptoms, low specificity of diagnostic methods or tools, wide use of antibiotics, and uninformed clinicians regarding tuberculosis epidemiology [8]. As a result, the diagnosis is often made at a late stage, to the detriment of complications that can affect the functional or even vital prognosis.

We report the case of an elderly multimorbid patient who had tuberculous arthritis of the knee. Clinical presentation with insidious and atypical symptoms leads to a misdiagnosis as a flare-up of osteoarthritis. She was treated with symptomatic treatment, which resulted in knee joint destruction and septic dislocation.

This case report has been reported in line with the SCARE Criteria [9].

2. Case presentation

We present the case of a 72-year-old patient of rural origin with poor socioeconomic conditions. She had a medical history of arterial hypertension, diabetes, dyslipidaemia, and Alzheimer's disease; otherwise, no

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previous history of tuberculosis. She complained of continuous and progressive right knee pain and swelling in the last three months, which forced her to use a crutch to walk. No constitutional symptoms were reported, no fever or deterioration of the general condition. She consulted a primary care physician, and she was treated for a flare-up of osteoarthritis with symptomatic treatment. The evolution was marked by worsening pain and functional impairment.

Three months later, she presented to our hospital for pain in her right knee with total functional impotence. The physical examination revealed painful, swollen right knee with local redness and heat. The patellar tap test was positive. Knee mobilization revealed joint instability in both the coronal and sagittal planes. The vascular and neurological examinations didn't show any complications. General examination: asthenia with no fever and no respiratory symptoms. Biology revealed a positive inflammatory syndrome (WBC = 13,000, CRP = 120). An X-ray of the knee showed joint destruction with subluxation of the knee (Fig. 1). Computed tomography (CT) scans (Fig. 2) was performed showing a cortical bone interruption surrounded by areas of osteolysis.

We proceeded to an arthrotomy performed by a senior surgeon with lavage and synovectomy. In per-operative, we found frank pus, an inflamed and hypertrophied synovial, a massive chondrolysis, and extensive ligamentous destruction. We took multiple bacteriological samples, synovial biopsies, and we stabilize the knee with an external fixator (Fig. 3).

The bacteriological examination using Gram and acid-fast stain did not isolate any germs. Histopathologic examination with hematoxylin and eosin stain revealed multiple granulomas with multi-nucleated giant cells and foci of caseous necrosis. The diagnosis of skeletal tuberculosis was then established.

An extension assessment by thoraco-abdomino-pelvic tomography looking for another location of tuberculosis revealed concomitant peritoneal involvement. The patient was put on anti-tuberculosis therapy, with a good and rapid response to the treatment.

Three months post-surgery, the patient was bothered by the external fixator, and the knee was relatively more stable with the constitution of periarticular fibrosis. Thus, we removed the external fixator and stabilized the knee with a removable knee brace (Fig. 4).

At the last follow-up, eight months post-surgery, the patient reported relief from pain and swelling, and she was able to walk with a crutch.

Given the patient's unfavourable socio-economic conditions, rural origin, and the extensive destruction of the joint, a knee arthrodesis will be planned after nine months of antibiotic treatment.

3. Discussion

Osteoarticular infection by *Mycobacterium tuberculosis* usually occurs by the hematogenous route [10]. Generally, after bacteraemia. The apparent or latent primary focus is pulmonary, lymphatic, or visceral. The intra-articular passage mainly occurs through the sub-synovial vessels or indirectly through epiphysial lesions, which erode into the joint-space. The immune response to tuberculosis infection results in the formation of a cold abscess made up of serum, leukocytes, caseous material, and tuberculosis bacilli [10]. Osteoarticular tuberculosis frequently affects the spine, up to 50% in some series [3,11]. Extra-spinal involvement such as knee tuberculosis is rare, and it is often chronic, slow-progressing and destructive.

Systemic tuberculosis symptoms, primarily anorexia, weight loss, night fever and sweats are only present in 20 to 30% of cases [3]. Local symptoms are dominated by pain and tenderness [3,11]. Limitation of motion is usually present in advanced arthritis [3].

A plain x-ray is usually non-conclusive. Three radiographic features are seen classically with tuberculous arthropathy, called the triad of Phemister. This triad includes juxta-articular osteoporosis, peripheral osseous erosion, and gradual narrowing of the intra-articular space [12]. These features are not pathognomonic for tuberculosis. They mimic other osteoarticular lesions, such as rheumatoid arthritis and fungal disease [3]. Objective abnormalities in computed tomography are detected earlier than in plain x-ray. It is more accurate for the diagnosis and evaluation of lesion assessment [3].

Clinical and radiological signs of knee tuberculosis are not specific, especially at an early stage. That leads to misdiagnosis of other more common pathologies, like osteoarthritis in our case. This situation usually delays the diagnosis and causes complications, like the extensive joint destruction in the presented case.

However, a history of predisposing factors to tuberculosis is usually

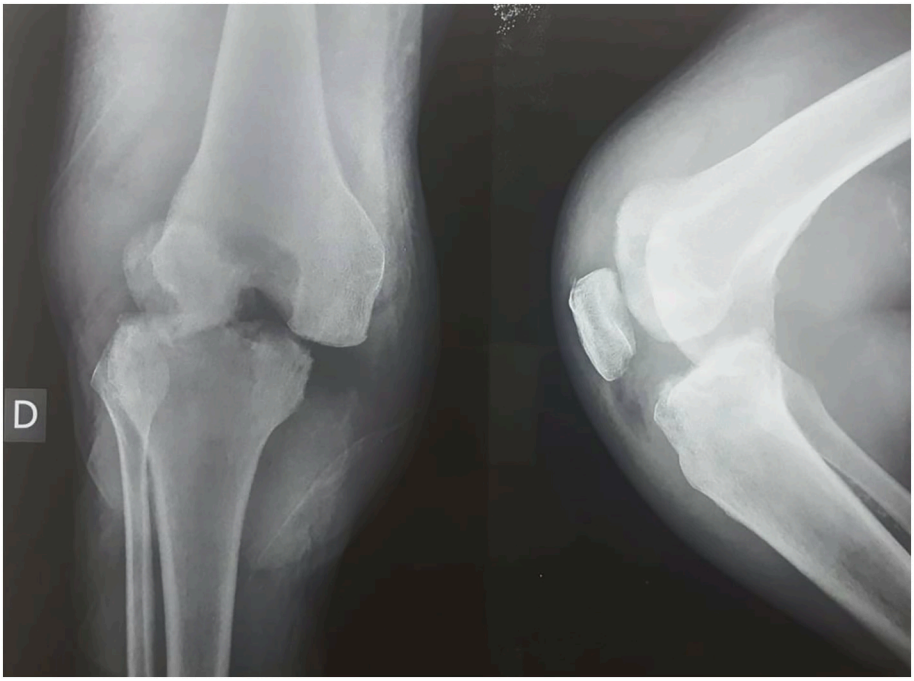

Fig. 1. An X-ray of the knee shows joint destruction and subluxation of the knee.

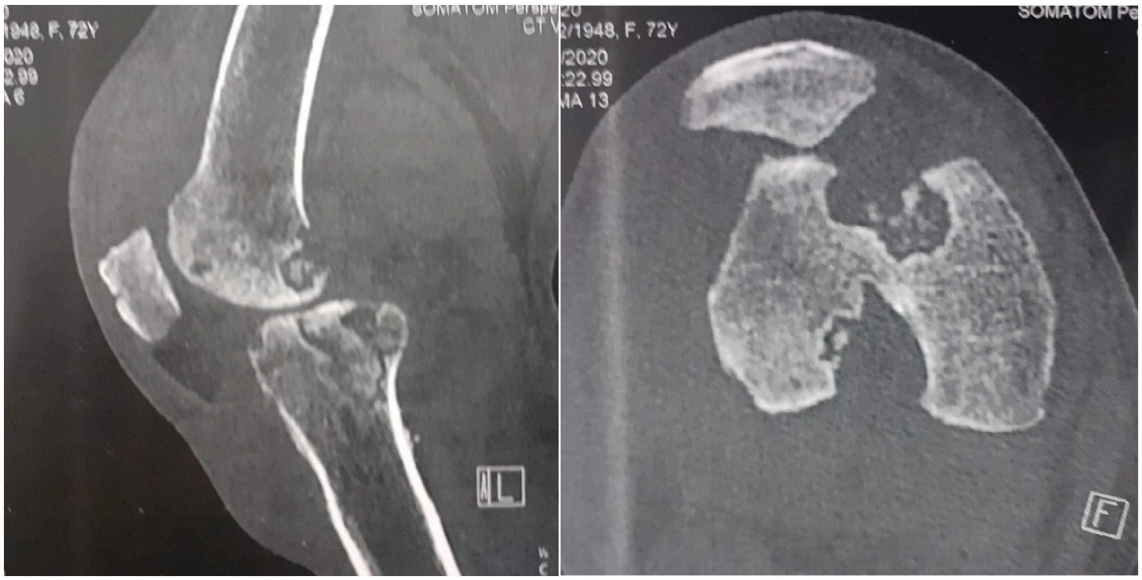

Fig. 2. A CT scan of the knee reveals a cortical bone defect.

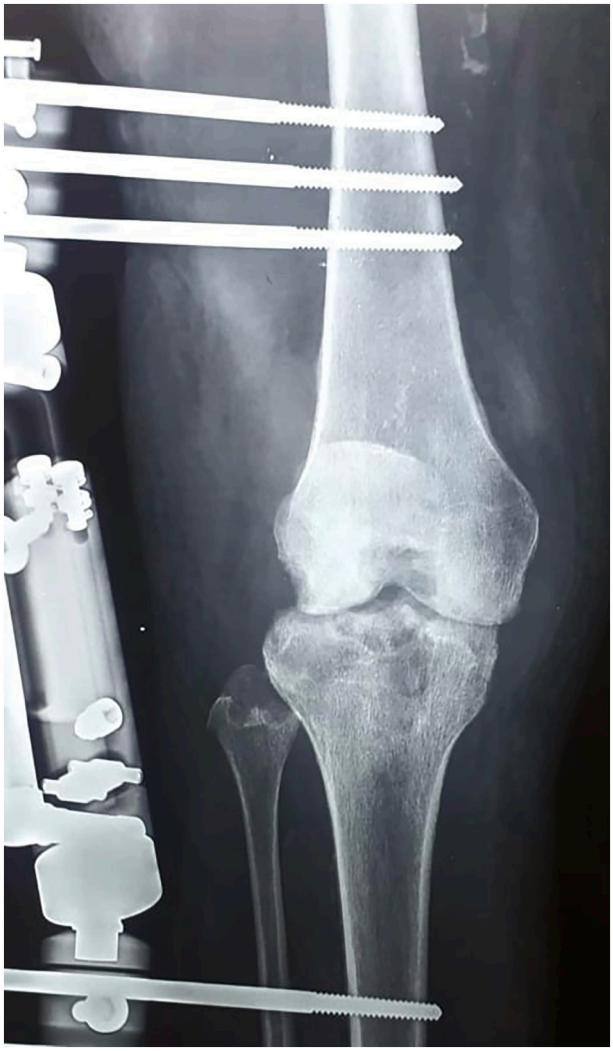

Fig. 3. An X-ray shows stabilization of the knee with an external fixator.

present in patients with osteoarticular tuberculosis. I. Procopie et al. [3] studied these factors and grouped them into individual and socioeconomic factors. Individual factors relative to the patient, like the presence of immunosuppressive diseases such as diabetes in our elderly and multimorbid patients. Socioeconomic factors: relative to the leaving environment like our patient who was from endemic area, and leaving in poor socioeconomic condition with poor sanitation and overcrowded house [3].

The presence of predisposing factors to tuberculosis with persistent symptoms of the knee, in our patient despite treatments, should draw attention to further investigation. Simple tests, such as chest radiology, the Tuberculin Skin Test, and the interferon gamma-release test, have a reasonable level of sensibility [11], and may guide the diagnosis.

The gold standard for the diagnosis of knee tuberculosis is the isolation of acid-fast bacilli by Ziehl and Neelsen stain on microscopy and culture from bone, synovial, soft tissue, or synovial fluid. But, negative cultures are frequent, and Koch bacilli is only isolated in 10–30% of culture specimens [1,3].

Histological examination with isolation of caseating granulomas surrounded by epithelioid cells, lymphocytes, plasma cells, and giant cells gives a significant value to the diagnosis. Histological examination has a greater sensitivity than microbiologic tests and may confirm the diagnosis in up to 80% of cases [1].

In our case, a knee arthrocentesis with microbiological examination or better yet, a synovial biopsy of the knee could establish an early diagnosis of knee tuberculosis and avoid complications.

Indication for synovial biopsies has developed and expended in clinical practice over the past few years, especially after the development of ultra-sound guided biopsy, which has good reliability and a low rate of complications [13].

The treatment of knee tuberculosis is primary medical with antituberculosis chemotherapy. The selection of drugs is usually the same as that for pulmonary tuberculosis (isoniazid, rifampin, pyrazinamide, and streptomycin or ethambutol). This treatment is divided into two phases: An initial phase based on quadruple therapy that lasts two months. A secondary phase with dual therapy lasts from 4 to 7 months or longer in specific cases [14]. The optimal duration of treatment for musculoskeletal tuberculosis is uncertain. For most patients, 6 to 9 months of treatment is enough [8], but extended treatment (9–12 months) is warranted for patients with extensive or advanced disease [15].

However, surgical treatment of osteoarticular tuberculosis is reserved for specific indications and mostly to treat complications [3]. In

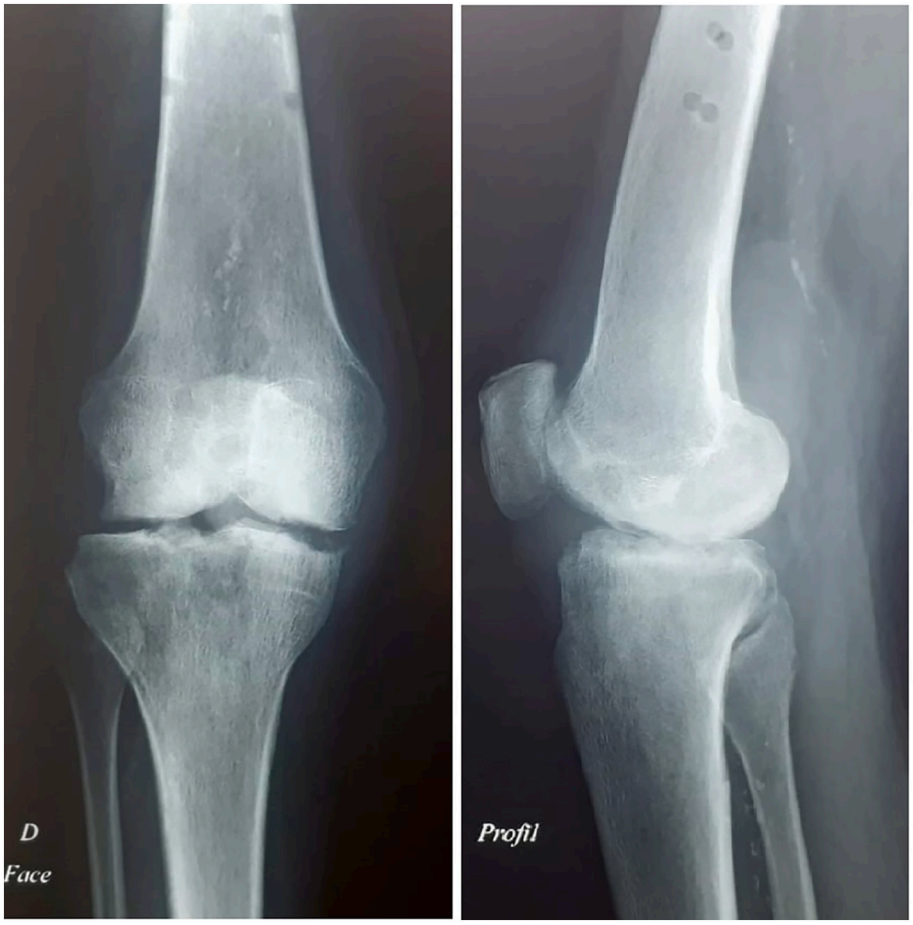

Fig. 4. An X-ray of the knee after removal of the external fixator.

the case of our patient, surgical treatment was mandatory to drain the joint abscess, complete debridement, and total synovectomy, which are essential for effective treatment of tuberculosis arthritis and lower risks of disease reactivation [16].

4. Conclusion

Osteoarticular tuberculosis is a challenging diagnosis. Lack of specificity in clinical and radiological signs with insidious and progressive evolution may mislead the physician. Despite the absence of systemic and pulmonary symptoms, the diagnosis of osteoarticular tuberculosis should be considered in endemic area especially with a persistent osteoarticular symptomatology in a multimorbid patient, from a poor socio-economic condition. So, further investigation may avoid late diagnosis of osteoarticular tuberculosis and its devastating complications.

Consent statement

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

The study is exempted from ethical approval.

Guarantor

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Ahmed Zendeoui: original draft writing.
Achraf Oueslati: Data analysis.
Ahmed Tounsi: Data collection.
Saber Saadi: Paper editing.
Tallel Znagui: Supervision.
Lotfi Nouisrif: Paper validation.

Declaration of competing interest

The author(s) declared no potential conflicts of interest.

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