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Access Microbiology

Primary iliac bone tuberculosis: A case report

--Manuscript Draft--

Primary iliac bone tuberculosis: A case report

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Abstract

Tuberculosis is an infectious disease caused by the Mycobacterium tuberculosis complex. It is a major public health problem, and one of the world's leading causes of morbidity and mortality. It occurs in both pulmonary and extra-pulmonary forms, the pulmonary form being the most common. Primary iliac bone tuberculosis remains a rare clinical entity, even in endemic areas. Its diagnosis can be challenging due to its similarity to other bone conditions. We report a rare case of primary iliac bone tuberculosis in a 63-year-old patient on peritoneal dialysis, with the following medical history: hypertension, type II diabetes complicated by diabetic retinopathy and diabetic kidney disease. Recent advances in molecular biology, in particular with the advent of the Genexpert®, have considerably improved patient management, providing microbiological evidence in less than two hours.

Key words: Primary iliac bone tuberculosis, Peritoneal dialysis, Genexpert®

Data Summary

No data was generated during this research or is required for the work to be reproduced.

Introduction:

Tuberculosis is an infectious disease caused by the Mycobacterium tuberculosis complex. It is a major public health problem, and one of the world's leading causes of morbidity and mortality [1]. It occurs in both pulmonary and extra-pulmonary forms, the pulmonary form being the most common. Extra-pulmonary tuberculosis accounts for 10-15% of all tuberculosis cases, with around 10% of skeletal involvement, mainly of the spine, followed by

osteoarticular involvement [2]. Primary tuberculosis of the iliac bone is extremely rare, accounting for less than 1% of all cases of tuberculosis affecting the skeletal system [3]. Establishing its precise diagnosis can be difficult, as this condition can present with symptoms similar to many other pathologies. We report a rare case of primary iliac bone tuberculosis in a patient on peritoneal dialysis.

Case presentation

We present the case of a 63-year-old patient with the following medical history: hypertension, type II diabetes complicated by diabetic retinopathy and diabetic kidney disease that has been initiated on Peritoneal dialysis since 2021 by a peritoneal dialysis catheter, with two Iso and intermediate glucose-containing dialysate. The patient was admitted to nephrology for management of an infectious syndrome consisting of a fever of 38.5°C, chills and vomiting. The patient reported weight loss of 10 kg for 1 month, associated with inflammatory polyarthralgia of the large joints and low back pain for 5 days, hindering walking.

Clinical examination revealed localized pain in the left iliac wing. Blood pressure 130/70 mm Hg, weight 82.5 kg and diuresis preserved. Pleuropulmonary examination revealed SaO2 at 98%, respiratory rate at 17 cycles per minute and fine crackles at the lung bases

Biological assessment revealed a hemoglobin level at 8.6 g/dl, GMV 84 fl, CRP 94 and procalcitonin 2.57. Microbiologically, cytobacteriological examinations of urine and peritoneal dialysis fluid returned sterile. Blood cultures from aerobic and anaerobic bottles were also negative. Conventional methods for detecting the Mycobacterium tuberculosis complex, including direct examination and culture on three sputum samples collected on three successive days, as well as molecular biology approaches, all yielded negative results.

With acute pyelonephritis and infectious peritonitis cast aside, we proceeded to radiological exams: the computed tomography (CT) of the lumbar spine showed no particular findings except for some minimal arthritic changes at the thoracolumbar level. Magnetic resonance imaging (MRI) of the pelvis revealed a focus of osteomyelitis of the right femur and a focus of osteitis of the left ilium, with extension into the adjacent muscle soft tissues and suspicion of intramuscular collections (Figure 1).

Molecular biology testing for Mycobacterium tuberculosis complex was performed on a sample (Figure 2) obtained by ultrasound-guided puncture of one of the gluteal collections (Figure 3), which returned positive. Culture from this same sample on LJ medium tested positive after 21 days.

The diagnosis of iliac bone tuberculosis was established on the basis of radiological (MRI) and microbiological (PCR) results.

The patient was started on anti-tuberculosis treatment with dosages adjusted to his renal function. The course was marked by significant clinical and biological improvement, with normalization of inflammatory parameters and good tolerance to the anti-tuberculosis treatment.

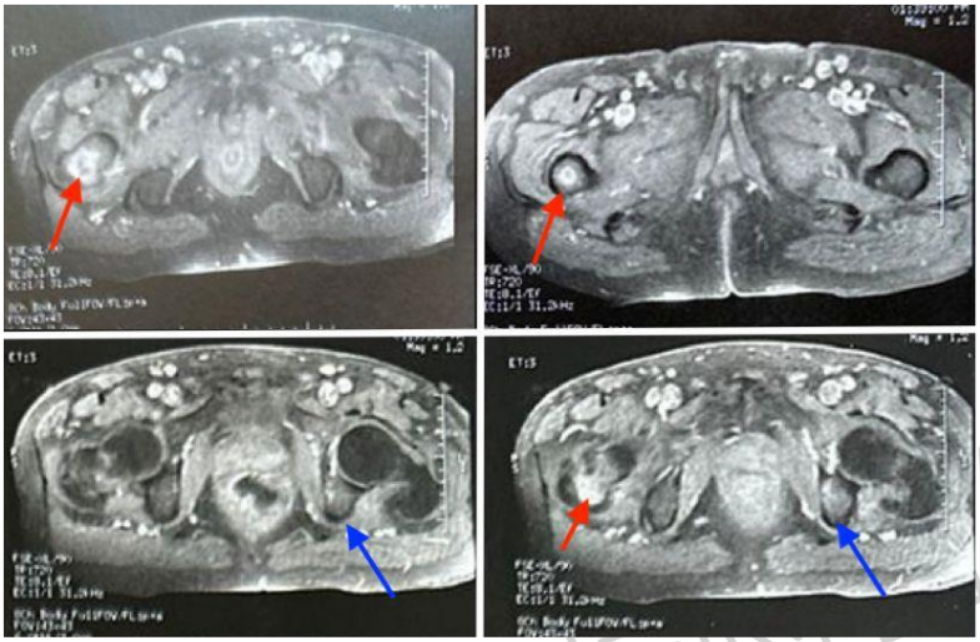

Figure 1: Axial T1-weighted sequences after gadolinium injection showing the intramedullary focus in the right greater trochanter and metaphysis (red arrow) as well as in the left iliac bone (blue arrow), enhanced post-injection, corresponding to foci of osteomyelitis.

Figure 2: Sample obtained by puncture of the gluteal collection.

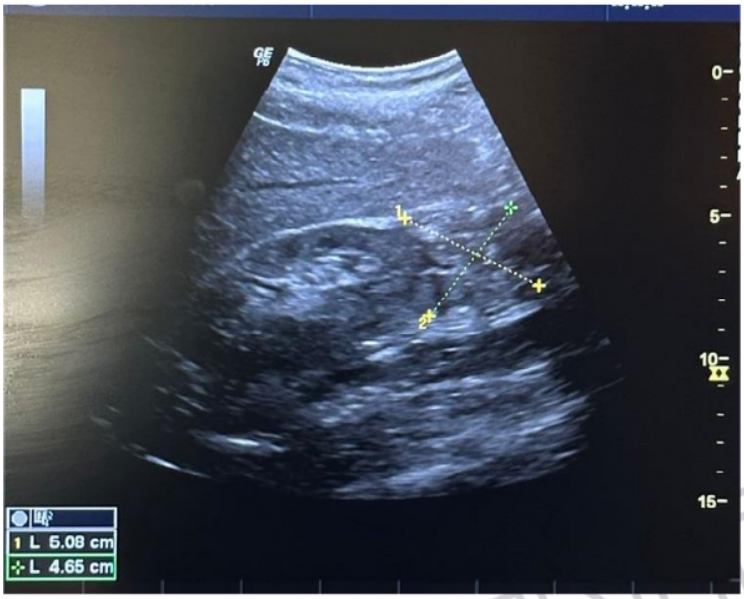

Figure 3: Ultrasound of soft tissues (gluteal muscles) showing a gluteal collection measuring 5.08 cm x 4.65 cm.

Discussion:

Infections remain a major concern in terms of morbidity and mortality among dialysis patients. Various hospital cohorts and studies indicate that the risk of tuberculosis in hemodialysis and peritoneal dialysis patients is 3 to 25 times higher than in the general population, mainly due to the impaired cellular immunity associated with renal failure [4,5]. In this context of immunosuppression, tuberculosis (Tb) is particularly frequent, atypical and severe [6]. Morocco is classified among countries with a moderate incidence of tuberculosis. According to WHO estimates in 2021, there are approximately 35,000 cases, corresponding to an incidence rate of 94 per 100,000 population. The distribution of tuberculosis cases by location reveals a significant proportion of extra-pulmonary forms (49%) compared to pulmonary forms (51%) [7].

Iliac bone tuberculosis remains a rare manifestation of extra-pulmonary tuberculosis. Its diagnosis can be challenging due to its similarity to other bone conditions.

This case underscores the importance of early consideration of tuberculosis in the differential diagnosis of bone disorders, particularly in endemic regions. Classic symptoms such as local pain, fever and emaciation can be confusing, but as observed in our patient, osteoarticular tuberculosis can manifest as cold abscesses containing serum, leukocytes, caseous material, bone debris and Koch's bacilli. These abscesses follow a variety of routes, crossing the periosteum, ligaments and fascia planes [8]. Tuberculosis must therefore be strongly suspected in the presence of soft-tissue abscesses associated with joint pain, particularly in our context.

Biological diagnosis of extra-pulmonary forms of tuberculosis is often complex. Indeed, in these forms, the lesions are generally pauci bacillary and the sites from which biological samples are taken are often very difficult to access [9,10]. In our patient's case, iliac bone puncture was not feasible. We therefore opted for puncture of a nearby soft tissue collection.

The diagnosis of bone tuberculosis is guided by non-specific biological parameters, such as CRP (C-reactive protein) and procalcitonin, in combination with radiological images (CT and MRI). It is then confirmed by specific microbiological examinations, involving conventional techniques (direct examination and culture) and molecular biology.

Direct examination (DE) allows for the detection of the Koch's Bacillus after special preparation of the samples with Ziehl-Neelsen staining, enabling a rapid diagnosis within two hours. Although inexpensive and highly sensitive for bacillary forms, DE remains less informative in Extra-Pulmonary Tuberculosis (EPT). Its sensitivity is 70%, but its specificity remains very low [11].

The fluorescence microscope allows for the detection of Koch's Bacillus (BK) after staining with auramine. This method, less expensive, has an improved sensitivity of 84%, with a specificity of 97% [12]

Culture is the reference method for diagnosing tuberculosis, whether pulmonary or extrapulmonary. Its sensitivity ranges from 60 to 90%, with a specificity of 100%. This method can be used to diagnose microscopy-negative forms of tuberculosis, in particular extrapulmonary tuberculosis, which is often difficult to diagnose by direct examination. Culture allows for the performance of an antibiogram. Lowenstein-Jensen (LJ) medium is the most commonly used. The time required for colony growth is significantly extended, ranging from 3 to 4 weeks, and up to 6 weeks in paucibacillary forms [11]. The prolonged bacterial growth time can delay the initiation of anti-tuberculosis treatment, thereby unfavorably impacting the prognosis

The advent of molecular biology has revolutionized the diagnosis of tuberculosis, especially with the approval in 2010 by the WHO of the Xpert/MTB/Rif test or GeneXpert® [13]. This tool has significantly improved sensitivity and reduced the time required to confirm tuberculosis to less than two hours. For the diagnosis of extra-pulmonary tuberculosis, it stands out with a sensitivity of 77.3% and a specificity of 98.2% [11]. In addition to detecting the DNA of the Mycobacterium tuberculosis complex, GeneXpert ® also allows for the detection of rifampicin resistance. However, it is important to note that a negative GeneXpert ® result does not rule out tuberculosis. At a 3 month follow-up under anti-tuberculosis treatment, most of the clinical symptoms faded, yet remained the pain at 7/10 in intensity, impeding his two solution changes throughout the day. Accumulating 9 days without proper peritoneal dialysis, he was switched to emergency hemodialysis on a symptomatic uremic syndrom at 4.2g/L through a jugular catheter. At a 6 months follow-up, the patient is still ongoing hemodialysis through an arterioveinous fustula, at the propor dialysis dose and has regained his quality of life.

Conclusion

Primary iliac bone tuberculosis remains a rare clinical entity, even in endemic areas. Its diagnosis requires a rigorous approach combining clinical evaluation, medical imaging, and microbiological analyses to establish an accurate diagnosis. Recent advances in molecular biology, in particular with the advent of the Genexpert ®, have considerably improved patient management, providing microbiological evidence in less than two hours, thereby allowing early initiation of anti-tuberculosis treatment. Analyzing the journey that concluded with the diagnosis of primary bone tuberculosis in our patient, we were able to highlight the challenges encountered in the early diagnosis of this condition, often masked by atypical clinical presentations.

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Author contributions :

H.D and FSY. contributed to the initial drafting of the manuscript, I.A, S.E and Y.E. Performed the sample collection and interpreted the imaging results. while B.E, B.Y, M.A and C.M. revised it. E.L.M. provided final approval for the version to be published.

Conflicts of interest:

The authors declare that there are no conflicts of interest

Consent to publish

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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