# Rare Presentation of Mycobacterium Tuberculosis Mimicking Prostate Cancer - Clinical Vignette

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## Abstract

Mycobacterium tuberculosis is primarily known to affect the lungs with cavitary lesions and enlarged lymph nodes as the first telltale sign. However, if the bacteria spreads to extrapulmonary areas such as the bones, and lacks lymphadenopathy, then the differential diagnosis may become misleading. We present a case of a 68-year-old male with a chief complaint of chronic left hip pain upon which computer tomography identified lytic lesions on the left hip. Given the mildly elevated prostate-specific antigen with a family history of prostate cancer, a bone biopsy was warranted. The biopsy revealed non-caseating granulomas and the DNA probe identified the mycobacteria tuberculosis complex. This case signifies that atypical presentations of mycobacterium tuberculosis may mimic other diagnoses and more invasive techniques such as a biopsy may be necessary.

## Introduction

Tuberculosis is a mycobacterium that commonly infects the lungs and causes a myriad of pulmonary symptoms. However, although rare, tuberculosis can infect the bones and joints, also known as osteoarticular tuberculosis. The bone that is most commonly affected is the vertebrae. The symptoms of osteoarticular tuberculosis and metastatic prostate cancer can overlap and are hard to differentiate without further investigation. This case is about a 68-year-old male who presents with progressively worsening hip pain. A positive family history for prostatic cancer, mildly elevated PSA, and lesions on the computer tomography (CT) scan initially misled the differential diagnosis towards metastatic prostate cancer. However, a DNA probe of the hip biopsy revealed mycobacterium tuberculosis complex.

## Case Presentation

A 68-year-old male, with a past medical history significant of hypertension, hyperlipidemia, Type 2 Diabetes Mellitus, epilepsy, cerebral vascular attack, coronary artery disease, status-post pacemaker, and chronic left hip pain for 35 years, was referred to our institution's emergency department by an orthopedic clinic for further evaluation for his progressively worsening chronic left hip pain. The patient used crutches as he was unable to ambulate without assistance due to severe left hip pain. He claimed the pain worsened five months ago after he returned from the Dominican Republic. He stated that the pain initially was located on his left middle thigh and after two months it migrated to his hip which exacerbated his chronic hip pain. He described the pain as persistent aching and throbbing. He denied any other associated symptoms. The lower extremity CT scan conveyed an aggressive permeative lytic destructive bone process of the left iliac bone adjacent to the sacroiliac joint and involvement of the sacrum which was concerning for nonspecific neoplastic process (Figure 1 & 2).

Upon admission, the patient was alert, oriented and his vitals were stable. His physical exam was only remarkable for pain upon ambulation. The digital rectal exam conveyed a smooth prostate without any nodules. The patient's family history is significant for paternal prostate cancer. His labs were remarkable for hemoglobin of 10.6 G/DL, mean corpuscular volume of 79.4%, platelet count of 432 K/UL, Blood Urea nitrogen of 22 mg/dl, and alkaline phosphatase of 119 U/L. Throughout his stay at the hospital, his white blood cell count fluctuated with a minimum of 9.8 K/UL and a maximum of 12.5 K/UL.

As per hematology and oncology specialist recommendation, a pan CT scan of the chest, abdomen, and pelvis with oral and intravenous contrast was done. The CT of the abdomen and pelvis with contrast identified similar results as the CT scan of the lower extremity done upon admission. The CT of the chest with contrast was unremarkable.

## Case Presentation - Continued

The Pan-CT confirmed that the lytic lesions were only localized to the hip. Hematology and Oncology specialist also recommended a hip bone biopsy, prostate-specific antigen (PSA) panel, serum protein electrophoresis, and iron studies. The PSA was 5.66 ng/ml. The iron studies conveyed serum iron of 31 ug/dl and ferritin of 172 ng/ml. The serum protein electrophoresis showed total protein of 6.9 g/dL, albumin of 3.2 g/dL, serum alpha-1-globulin of 0.4 g/dL, alpha-2-globulin of 1.2 g/dL, beta-1-globulin of 0.4 g/dL, beta-2 globulin of 0.5 g/dL, and gamma-globulin of 1.1 g/dL. These results were consistent with acute inflammatory patterns. The iliac soft tissue biopsy identified fragments of predominantly necrotic tissue with a fragment of fibrocollagenous tissue with rare non-necrotizing granulomas (Figure 3). The DNA probe of the bone biopsy identified mycobacterium tuberculosis complex. The patient was started on rifampin, isoniazid, pyrazinamide, ethambutol (RIPE), and vitamin B6 for two months and continued rifampin, isoniazid, and vitamin B6 for seven months.

On follow-up, the patient was ambulating without assistance. The patient claimed that the hip pain has significantly subsided after the initiation of the RIPE therapy.

## Images

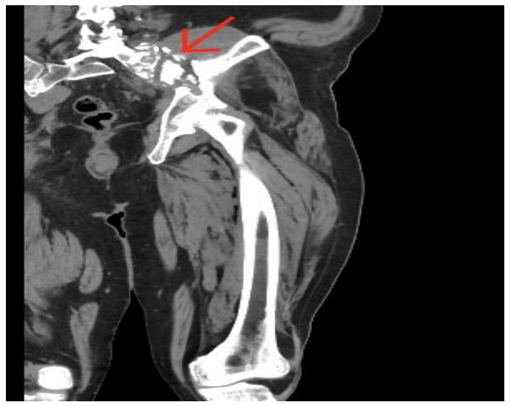

**Figure 1:** Coronal CT scan of the lower extremity identifying the lesion on the left hip.

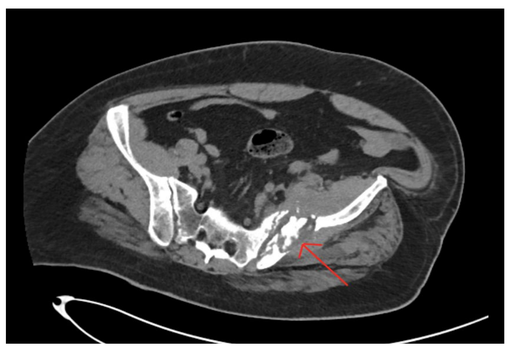

**Figure 2:** Axial CT scan of the lower extremity identifying the lesion on the left hip

## Images

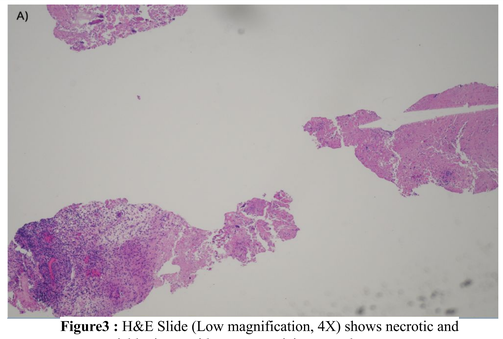


**Figure3 :** H&E Slide (Low magnification, 4X) shows necrotic and viable tissue with non-necrotizing granuloma.

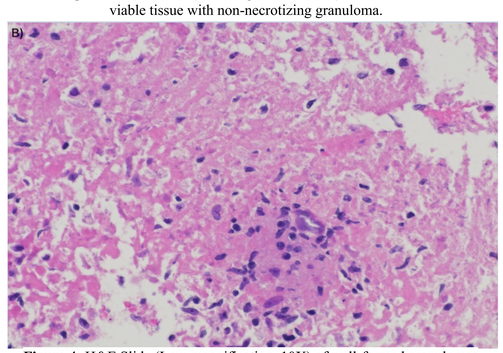


**Figure 4:** H&E Slide (Low magnification, 10X) of well-formed granulomas showing the epithelioid histiocytes and multinucleated giant cells

## Discussion

Tuberculosis primarily affects the lungs, however, involvement of extrapulmonary areas, such as the lymph nodes may occur [1]. Osteoarticular tuberculosis (OATB), also known as TB of the bone and joint or musculoskeletal TB, is an ancient disease that dates back to Egyptian mummies 9000 years ago [1]. It is considered a rare form of TB, accounting for 1–5% of all TB cases, however, it is still the third most common type of extrapulmonary tuberculosis (EPTB), after pleural and lymph nodes, making up 18% of all EPTB cases [1,2]. In Europe and the USA, with the rising number of cases of about 20-40%, and the debilitating nature of the disease, more extensive case studies on the topic is required [3]. According to WHO, the incidence of all forms of TB, with 91 cases per 100 000, in the Dominican Republic have been estimated to be among the highest in the Americas. However, it represents a major diagnostic challenge as the condition is often misdiagnosed, especially when it mimics other pathologies such as prostate cancer. The misdiagnosis is also attributed to the scarcity of the incidence and prevalence of OATB, a lack of information about the disease and statistical data in literature [4]. Most patients with OATB are not accurately diagnosed during the initial stages of the disease due to the vague, overlapping, and gradual onset of symptoms.

The most common site of OATB is the anterior inferior portion of the vertebral body, also known as Pott's Disease [4]. TB can spread hematogenously to the paravertebral venous plexus [5]. In addition, although rare, literature has found that the hematogenous bone metastases from the lungs also occur through Batson's plexus [5]. This is because 13 % of the blood from the bronchial arteries returns through the bronchial veins to reach the azygous and the accessory hemiazygos systems that drain to the Batson's plexus [5].

## Discussion - Continued

The predisposition for other large joints and bones can also be explained by the rich vascular supply of the vertebrae and growth plates of the long bones [5,6]. The pathophysiology of OATB can be described when a granuloma erodes the cartilaginous endplate of either a joint or a disc space and narrows it [7].

In addition to the rarity of OATB, what makes this case most noteworthy is the overlap of symptoms concurrent with bone pathology from prostate cancer. The findings of this case made it difficult to differentiate tuberculosis from metastatic lesions without biopsy confirmation. First, a positive family history of prostate cancer doubles the risk of prostate cancer in this patient [7]. Secondly, the lack of lymphadenopathy in this patient further complicated the differential diagnosis. In a study of 533 cases, it was found that lymph nodes were actually only present in 30-40% of cases and lymphadenitis was observed in a mere 13.5% of cases [8]. Finally, the digital rectal exam has limited sensitivity and negative predictive value even in patients positive for prostate cancer symptoms, at 28.6% and 84.2% respectively [9]. The negative findings were not grounds to rule out malignancy. Thus, it becomes key that histopathology through a biopsy remains the gold standard for diagnosis of prostatic cancer or OATB [8,10].

The urinalysis for this patient revealed sterile pyuria with a negative culture and chest x-rays [10]. Correspondingly, the prostate-specific antigen (PSA) levels in prostate cancer were elevated with a mean of 8.26 ng/ml. In addition, as seen in this patient, clinical evidence suggests that TB does in fact begin as non-necrotizing and then develops into full caseous necrotizing granulomas through a hypersensitivity reaction, precipitated by CD4+ T cells once faced with a high antigenic load [11]. Other cases have also shown that OATB reveals bone and joint lesions to be paucibacillary [11]. Therefore, it is crucial to utilize advanced techniques early on for prompt diagnoses of patients with non-specific symptoms. This can aid in formulating an appropriate treatment plan to avoid progression of OATB.

## Conclusion

In this case, the patient presented with chronic left hip pain. Given the family history of prostate cancer, and lesions on the left hip identified by the CT, the initial assessment leaned towards prostate cancer. However, the negative DRE and mildly elevated PSA warranted a biopsy. The biopsy revealed necrotic fibrocollagenous tissue with rare non-necrotizing granulomas. Mycobacterium tuberculosis was confirmed with a DNA probe. Therefore the patient was immediately started on the RIPE therapy with resolution of his ambulation issues.

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