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CASE REPORT

[^{99m}Tc]Tc-MDP scintigraphy in osteopoikilosis

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ABSTRACT

Osteopoikilosis (OPK) is a rare, benign sclerosing bone dysplasia often discovered incidentally during radiographic evaluations. We report the case of a 37-year-old male with bilateral hip pain and radiographic evidence of multiple sclerotic lesions, initially raising concern for osteoblastic metastasis. Laboratory findings were unremarkable. [^{99m}Tc]Tc-Methylene diphosphonate (MDP) scan performed three hours after administration of 20 mCi (740 MBq) of radiotracer showed no increased uptake at lesion sites, ruling out metastasis and supporting the OPK diagnosis. Further evaluation revealed similar radiographic findings in the patient's asymptomatic brother, confirming familial OPK. This case highlights the diagnostic importance of nuclear imaging in distinguishing OPK from metastatic disease and emphasizes the need for awareness to avoid unnecessary interventions.

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INTRODUCTION

Osteopoikilosis (OPK) is a rare, benign sclerosing bone dysplasia [1]. It is often discovered incidentally on radiographs performed for unrelated reasons. Although typically asymptomatic, up to 20% of cases report joint pain or effusion. Due to its radiographic resemblance to osteoblastic metastases, accurate diagnosis is crucial to avoid unnecessary diagnostic or therapeutic interventions [2, 3].

CASE PRESENTATION

A 37-year-old male presented to the rheumatology department with a six-month history of bilateral hip pain. The discomfort, initially intermittent, had progressed to constant pain exacerbated by activity. There was no history of trauma, constitutional symptoms, or signs of systemic disease. Physical examination revealed normal hip joint range of motion with mild discomfort on movement. Neurologic and sacroiliac joint assessments were unremarkable. Laboratory evaluations including CBC, CRP, ESR, calcium, phosphate, alkaline phosphatase, thyroid function tests, and autoimmune markers were within normal limits. Pelvic radiography demonstrated multiple well-circumscribed sclerotic lesions measuring 3–8 mm (Figure 1), raising suspicion for OPK. Additional shoulder X-rays showed similar lesions. To further evaluate and exclude osteoblastic metastases, a whole-body bone scintigraphy was requested. We performed a [^{99m}Tc] Tc-Methylene diphosphonate (MDP) scan three hours following intravenous injection of 20 mCi (740 MBq) of the radiotracer. The scan revealed no areas of abnormal osteoblastic activity. Mild degenerative uptake was noted in the spine, shoulders, elbows, wrists, and knees, with no uptake corresponding to the sclerotic lesions seen on plain radiographs (Figure 2). These findings supported a diagnosis of OPK.

Given the known familial pattern of OPK, we investigated the patient's asymptomatic sibling. Pelvic radiography of his brother revealed similar sclerotic lesions (Figure 3), confirming a familial case.

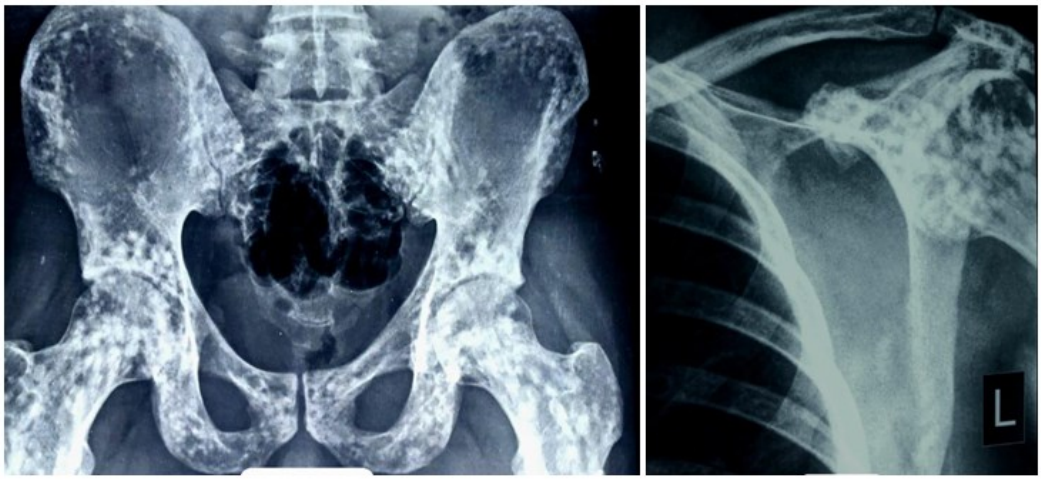

Figure 1. An anteroposterior X-ray of the pelvis and shoulder regions demonstrating multiple sclerotic bone lesions in the pelvis, proximal portions of both femora, scapulae, and proximal portions of the humerus

DISCUSSION

Osteopoikilosis is a rare, benign bone dysplasia marked by multiple small, well-defined sclerotic lesions, often symmetrically distributed near joints. With an estimated prevalence of 1 in 50,000, it is typically inherited in an autosomal dominant pattern with high penetrance, linked to mutations in the LEMD3 gene [4]. Radiographically, it can mimic osteoblastic metastases, but bone scintigraphy with [^{99m}Tc]Tc-MDP typically shows no increased tracer uptake due to the low metabolic activity of the lesions [5]. This normal scan pattern is a key distinguishing feature from metastatic disease. Although rare, increased uptake may occur in younger patients or during active bone remodeling [6-8].

The differential diagnosis for multiple sclerotic bone lesions includes other conditions such as mastocytosis and tuberous sclerosis. Mastocytosis lesions are often more diffuse and can be associated with cutaneous findings and systemic symptoms. Tuberous sclerosis is characterized by hamartomatous growths in multiple organs, and bone lesions (sclerotic areas) are often accompanied by other stigmata like facial angiofibromas and seizures. The key differentiating factor for OPK remains its characteristic symmetrical, peri-articular distribution on radiographs and, most

importantly, the typical lack of activity on bone scintigraphy, which is not a feature of the other mentioned conditions.

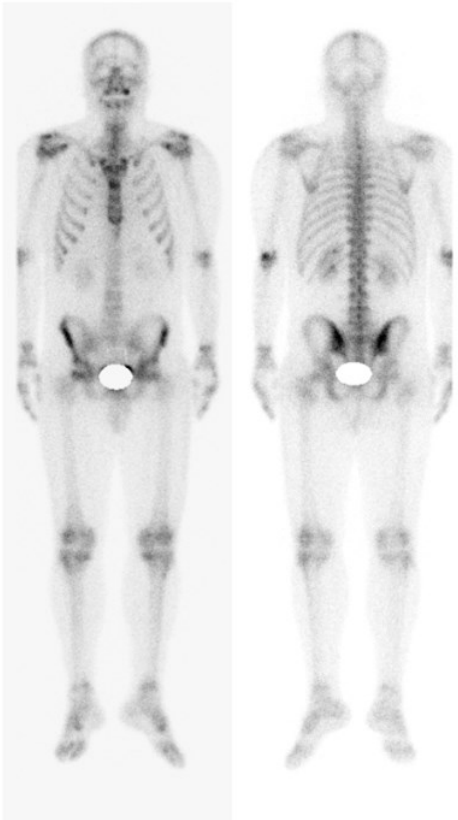

Figure 2. A whole-body bone scan in the anterior and posterior projections revealed no suspicious osteoblastically active bone lesions

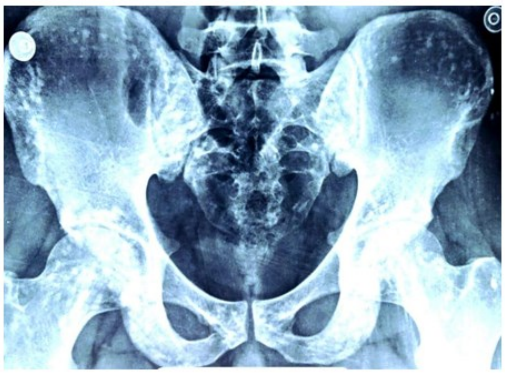

Figure 3. An anteroposterior X-ray of the pelvis of the patient's brother, demonstrating multiple sclerotic bone lesions in the head, neck, and intertrochanteric regions of both femurs and the pelvis

Recognizing the typical scintigraphic appearance of OPK is essential to avoid misdiagnosis, unnecessary investigations, and inappropriate treatment. Patient management is primarily conservative. Pain, when present, can be managed with analgesics such as NSAIDs (e.g., ibuprofen or naproxen). In cases of more significant discomfort, a short course of opioids may be considered. Physical therapy can be beneficial to strengthen supporting musculature and improve joint mechanics, potentially alleviating mechanical pain. Long-term follow-up is generally not required for OPK itself, as the condition is benign and non-progressive [9, 10]. However, patients should be reassured about the benign nature of their condition to alleviate anxiety. Re-evaluation is only necessary if new or atypical symptoms emerge.

CONCLUSION

This case underscores the importance of recognizing the characteristic imaging features of osteopoikilosis to distinguish it from more serious pathologies such as osteoblastic metastases. Whole-body bone scintigraphy plays a critical role in confirming the benign nature of the lesions by demonstrating lack of metabolic activity. The diagnosis of familial OPK further emphasizes the importance of screening relatives in suspicious cases. As a "do not touch" lesion, OPK typically requires no intervention beyond clinical monitoring and patient reassurance. Radiologists and nuclear medicine physicians should be aware of its presentation to avoid misdiagnosis and overtreatment.

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