Hemipagetic Disease of the Left Proximal Femur and Acetabulum: MRI and CT Findings in a Patient with Hip Pain

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ABSTRACT

Paget's disease of bone (osteitis deformans) is a chronic disorder characterized by abnormal bone remodeling, leading to enlarged, deformed, and sclerotic bones. Monostotic or unilateral (hemipagetic) involvement is less common than polyostotic disease. We report a case of a 58-year-old female who presented with left hip joint pain. Imaging evaluation included computed tomography (CT) and magnetic resonance imaging (MRI) of both hip joints. CT revealed regions of sclerosis involving the left acetabulum and proximal femur. MRI demonstrated cortical thickening of the left femoral shaft, sclerosis of the femoral head, neck, and intertrochanteric region appearing hypointense on T1 and T2-weighted images and slightly hyperintense on STIR images. Numerous cystic spaces were noted within the left femoral head and neck with associated marrow edema. The trabeculae were thickened and coarsened. No cortical breach or soft tissue component was identified, effectively excluding Paget's sarcoma. The joint space was preserved with no significant fluid or synovial thickening. An incidental subserosal fibroid was noted on the left lateral wall of the uterus. The diagnosis of hemipagetic disease (unilateral Paget's disease) was made. This case highlights the characteristic imaging features of Paget's disease in its sclerotic phase and underscores the importance of MRI for detecting complications such as sarcoma and for differentiating from other sclerotic bone lesions.

Keywords: Paget's disease; Hemipagetism; Sclerotic bone lesion; Hip pain; MRI

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Introduction

Paget's disease of bone, also known as osteitis deformans, is a focal disorder of bone remodeling that affects 2–3% of the population over 55 years of age, with a slight male predominance.[1] The disease is characterized by an initial phase of excessive osteoclastic bone resorption followed by a compensatory increase in osteoblastic activity, resulting in a disorganized mosaic of woven and lamellar bone.[2] This leads to bone enlargement, deformity, and increased fragility. The etiology remains unclear but is thought to involve a combination of genetic susceptibility and paramyxoviral infection.[3]

The most commonly affected sites include the pelvis (70%), femur (55%), tibia (45%), skull (40%), and spine (35%).[4] While polyostotic involvement (multiple bones) is more common, monostotic or unilateral (hemipagetic) disease occurs in approximately 10–20% of cases.[5] Hemipagetic disease, where only one side of the body or a single limb is involved, is a recognized but less frequent presentation. Patients may be asymptomatic or present with bone pain, joint pain (often mistaken for osteoarthritis), bowing deformities, or pathological fractures.[6] A feared complication is the development of Paget's sarcoma (osteosarcoma), which occurs in less than 1% of patients but carries a poor prognosis.[7]

Imaging plays a crucial role in diagnosis, assessment of disease activity, and surveillance for complications. Radiographs typically show a combination of osteolysis (early phase), cortical thickening, trabecular coarsening, and bone enlargement (late phase).[8] Computed tomography (CT) provides detailed evaluation of cortical and trabecular architecture. Magnetic resonance imaging (MRI) is particularly valuable for detecting marrow changes, associated soft tissue masses, and excluding sarcomatous transformation.[9] We present a case of a 58-year-old female with left hip pain who was found to have unilateral Paget's disease involving the left proximal femur and acetabulum, with characteristic imaging findings and no evidence of malignant transformation.

Case Presentation

A 58-year-old female presented with a chief complaint of pain in the left hip joint. The pain was insidious in onset, dull in character, and had been progressively worsening over several months. There was no history of trauma, fever, or weight loss. Her past medical history was otherwise unremarkable. No previous imaging studies were available for comparison. On physical examination, there was tenderness over the left hip region, but no visible deformity, swelling, or limitation of joint movement was noted.

Imaging evaluation was performed using both computed tomography (CT) and magnetic resonance imaging (MRI) of both hip joints for comparison. CT screening of the hip joints showed regions of sclerosis involving the left acetabulum and the left proximal femur (Figure 1). The right hip joint appeared normal.

MRI of both hip joints was then performed using T1-weighted, T2-weighted, and STIR sequences. The findings were as follows. There was cortical thickening involving the shaft of the left femur, appearing hypointense on both T1 and T2-weighted images, consistent with sclerosis (Figure 2). Sclerosis was also noted involving the left femoral head, neck, intertrochanteric region, and proximal shaft, appearing as hypointensity on T1 and T2 sequences, with slight hyperintensity on STIR images (Figures 2 and 5). Numerous cystic spaces were seen within the head and neck of the left femur on STIR images, associated with marrow edema (Figure 4). The trabeculae of the left femur were thickened and coarsened on T1 images. Sclerosis also involved the left acetabulum, with a few cystic spaces within it. Importantly, there was no cortical breach, no soft tissue component, and no evidence of an associated soft tissue mass on any sequence, effectively ruling out Paget's sarcoma. The joint space of both hip joints was normal, with no significant fluid collection or synovial thickening. The muscles and neurovascular bundles were normal. Both iliac bones, the sacrum, sacroiliac joints, and sacral plexus were normal.

An incidental finding was noted on the T2-weighted images: a subserosal fibroid on the left lateral wall of the uterus, measuring approximately 2.8 × 2.1 cm and another measuring 8.2 × 7.4 mm (Figure 3). This finding was noted for clinical correlation with pelvic ultrasound.

Based on the combined CT and MRI findings, the diagnosis of hemipagetic disease (unilateral Paget's disease) involving the left proximal femur and left acetabulum was made. The absence of cortical destruction or soft tissue component excluded Paget's sarcoma. The patient was advised clinical follow-up and further evaluation by an endocrinologist or rheumatologist for possible medical therapy with bisphosphonates.

Discussion

This case illustrates the classic imaging features of Paget's disease in its sclerotic phase, presenting unilaterally in the left proximal femur and acetabulum of a 58-year-old female. The term "hemipagetism" or hemipagetic disease refers to involvement of a single limb or one side of the body, which is less common than polyostotic disease.[10] In this patient, the right hip and pelvis were completely spared, making the diagnosis of unilateral disease straightforward.

The imaging findings in Paget's disease depend on the phase of the disease. In the early lytic phase, there is progressive bone resorption, often seen in the skull as osteoporosis circumscripta or in long bones as a "blade of grass" lucency advancing from the subchondral region.[4] In the mixed phase, there is a combination of lysis and sclerosis. In the late sclerotic phase, as seen in this patient, there is cortical thickening, trabecular coarsening, and bone enlargement. The classic description of Paget's disease on radiographs includes "cotton wool" appearance in the skull, "picture frame" vertebrae, and "bowing" of long bones.[1] In this case, the proximal femur showed thickened, coarsened trabeculae and cortical thickening without obvious deformity—consistent with early to moderate sclerotic Paget's.

MRI findings in Paget's disease are characteristic but not specific. In the sclerotic phase, affected bone

appears hypointense on both T1 and T2-weighted sequences due to the replacement of normal fatty marrow by dense sclerotic bone.[8] However, active Paget's disease may show intermediate to slightly hyperintense signal on T2-weighted images due to increased vascularity and marrow edema.[9] In this patient, the sclerotic areas were hypointense on T1 and T2, but on STIR images, they appeared slightly hyperintense, indicating ongoing marrow edema and possibly active disease. The numerous cystic spaces seen within the femoral head and neck on STIR are likely areas of fat marrow or cystic degeneration, which can be seen in Paget's disease.

The most critical role of MRI in Paget's disease is the exclusion of Paget's sarcoma, which occurs in less than 1% of patients but is highly aggressive.[7] Sarcomatous transformation typically presents as a destructive soft tissue mass extending from the bone, with cortical disruption, irregular margins, and contrast enhancement.[6] The absence of any cortical breach or soft tissue component in this case is reassuring. Other differential diagnoses for sclerotic bone lesions include osteoblastic metastases (prostate, breast), osteosarcoma, and bone islands. However, the pattern of diffuse involvement of the entire proximal femur and acetabulum with cortical thickening and trabecular coarsening is highly characteristic of Paget's disease.[5]

The incidental finding of uterine fibroids on the same MRI study is not directly related to Paget's disease but serves as a reminder to thoroughly evaluate all visualized structures. Subserosal fibroids are common benign tumors in women of this age group and require no intervention unless symptomatic.

Management of Paget's disease includes bisphosphonates (e.g., zoledronic acid, alendronate) to suppress bone turnover, relieve pain, and prevent complications such as fractures and deformities.[10] This patient was referred for medical management. Follow-up imaging is generally not required unless new symptoms develop, as the disease tends to progress slowly.

Limitations of this case report include the lack of serum alkaline phosphatase levels, which would have confirmed active disease, and the absence of histopathological confirmation. However, the imaging findings are sufficiently characteristic for a confident radiological diagnosis. Long-term follow-up to monitor for potential sarcomatous transformation is recommended.

Conclusion

Hemipagetic disease involving the left proximal femur and acetabulum in a 58-year-old female presents with characteristic imaging features: cortical thickening, sclerotic trabeculae, cystic changes, and marrow edema on MRI, with no evidence of malignant transformation. CT and MRI are complementary modalities for diagnosis and for excluding Paget's sarcoma. Radiologists should recognize the unilateral presentation of Paget's disease and differentiate it from other sclerotic bone lesions to guide appropriate medical management.

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Figure Legends

Figure 1: CT screening of the hip joints (axial or coronal view) shows regions of sclerosis involving the left acetabulum and left proximal femur (white arrows). The right hip appears normal.

Figure 2: Coronal T1-weighted MRI shows cortical thickening of the shaft of the left femur with hypointensity, indicating sclerosis in the proximal femur (arrow). The contralateral femur shows normal marrow signal.

Figure 3: Axial T2-weighted MRI of the pelvis shows a subserosal fibroid on the left lateral wall of the uterus (asterisk), measuring approximately 2.8 × 2.1 cm, an incidental finding.

Figure 4: Coronal STIR MRI demonstrates numerous cystic spaces within the head of the left femur (arrowheads) with associated marrow edema. The cysts appear hyperintense on STIR.

Figure 5: Coronal T2-weighted MRI shows sclerosis involving the left proximal femur, seen as hypointensity (curved arrow), with preservation of the joint space and no cortical disruption.

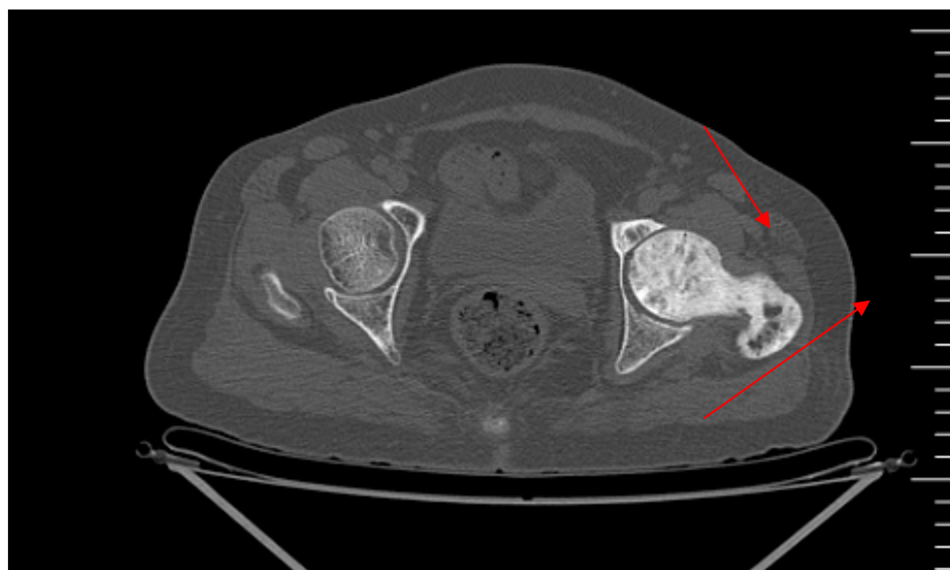


Figure 1

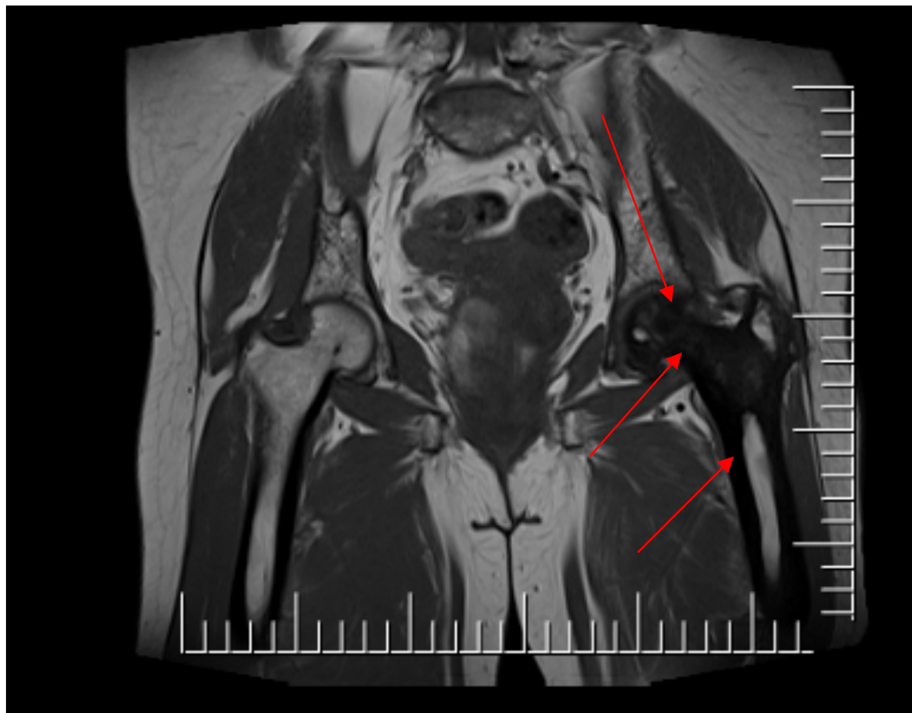
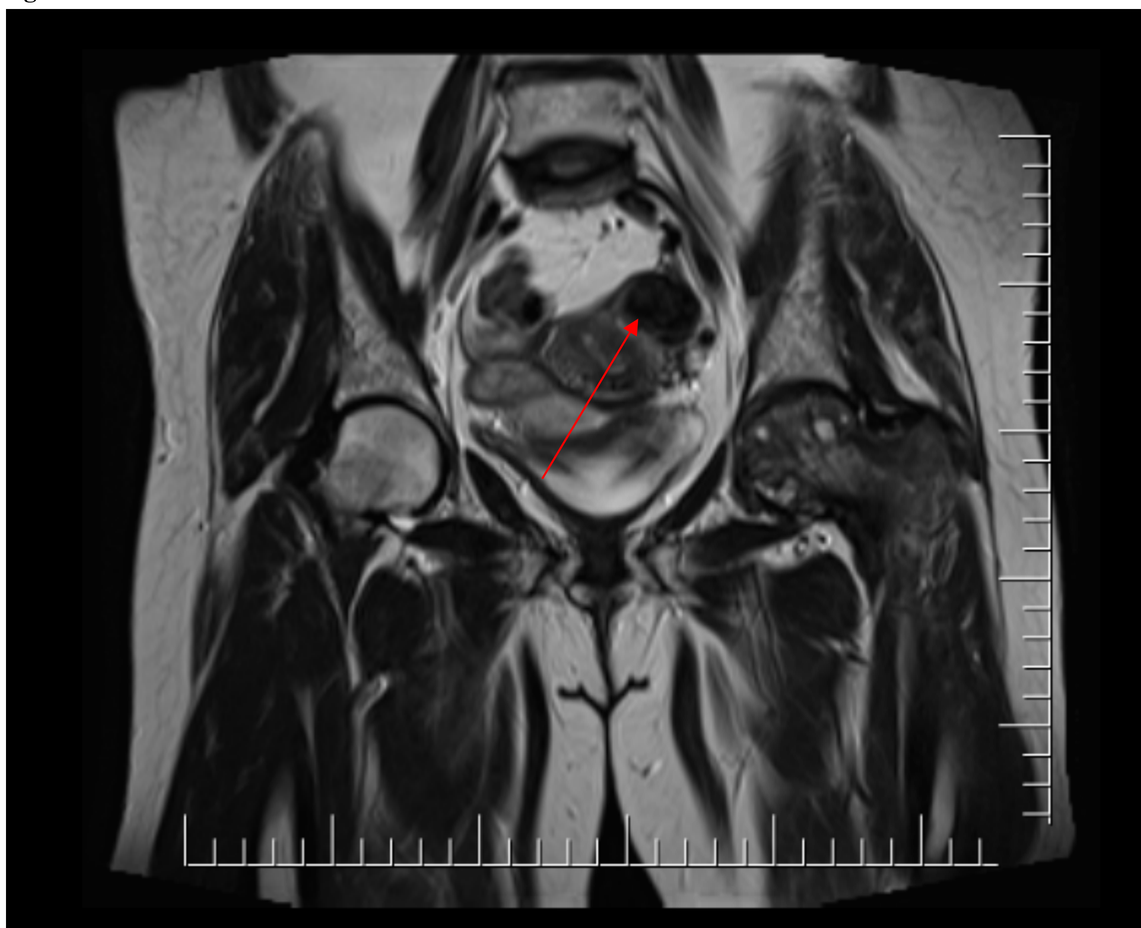


Figure 2



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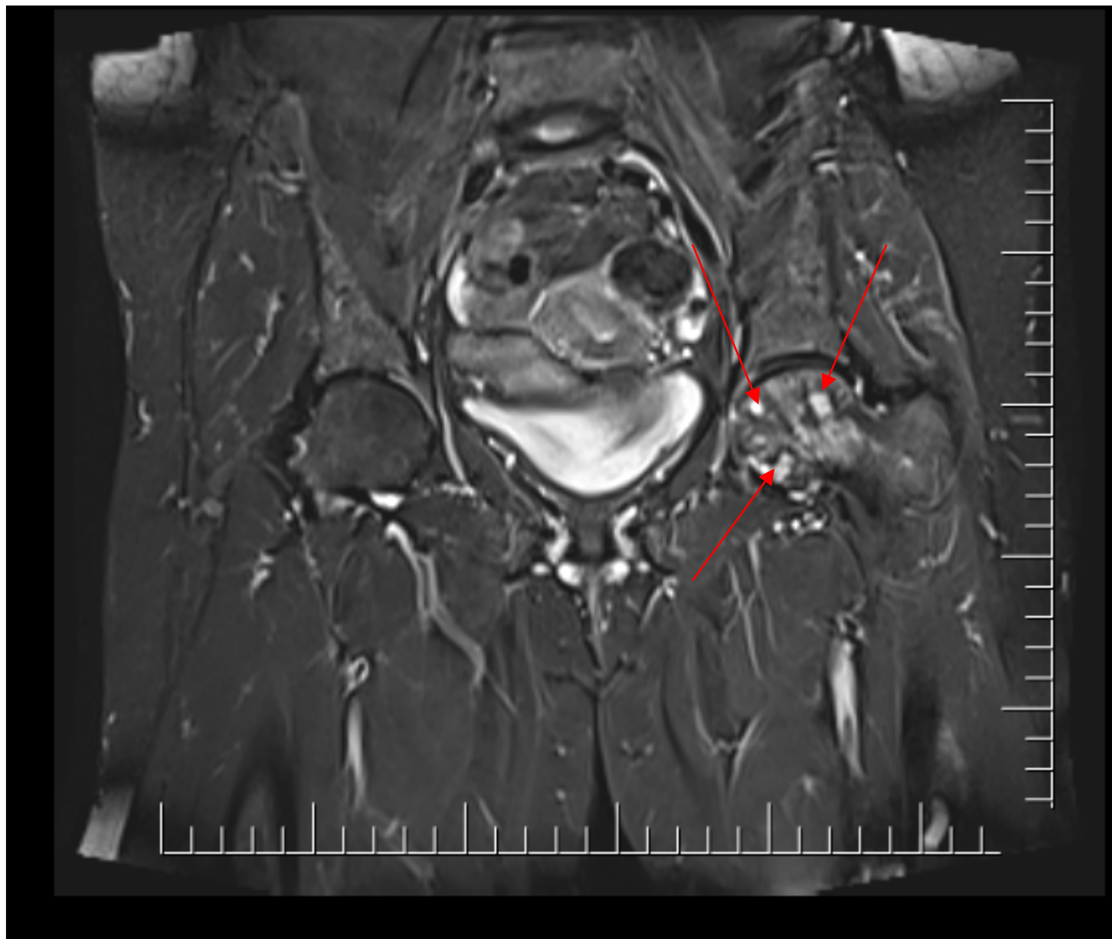

Figure 4

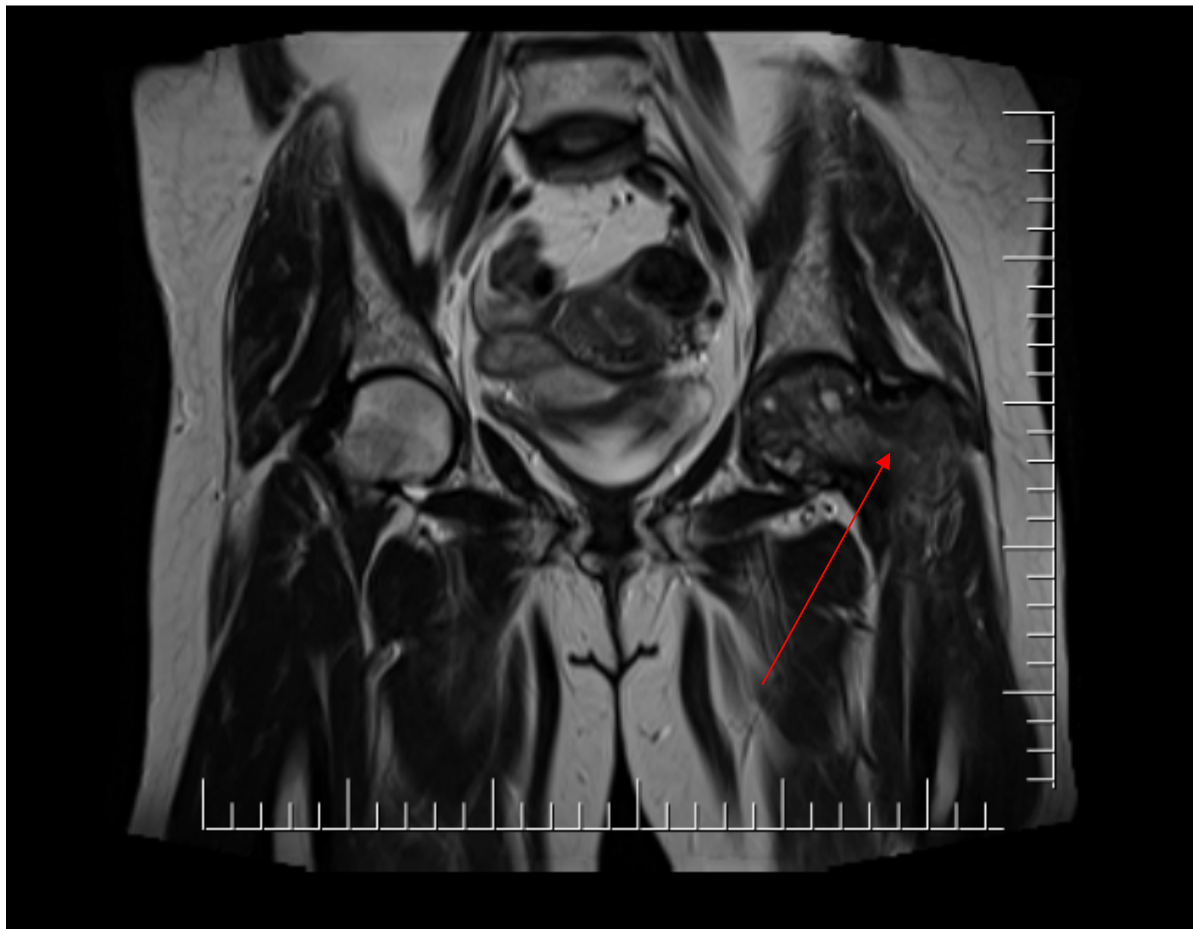

Figure 5