Gouty Tophus of the Popliteus Tendon Masquerading as an Intra-Articular Mass: A Case Report

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Abstract

Background: Gout is a common metabolic arthritis resulting from monosodium urate (MSU) crystal deposition. While the knee is frequently affected, involvement of deep periarticular structures such as the popliteus tendon is uncommon and may mimic aggressive soft tissue lesions.

Case Report: We present a case of a 64-year-old male who presented with acute lateral knee pain and stiffness. Magnetic resonance imaging (MRI) demonstrated a soft tissue mass infiltrating the popliteus tendon with adjacent cortical erosion of the lateral femoral condyle, initially raising concern for an aggressive pathology. The diagnosis of gout was confirmed by the presence of negatively birefringent MSU crystals in the synovial fluid.

Results: The patient was managed conservatively with non-steroidal anti-inflammatory drugs, colchicine, and long-term urate-lowering therapy, resulting in significant clinical improvement.

Conclusion: This case highlights the importance of considering gout in the differential diagnosis of unusual periarticular soft tissue lesions of the knee to avoid unnecessary surgical intervention and ensure appropriate medical management.

Keywords: Gout, Popliteus tendon, Knee, Tophi, MRI in gout.

Introduction

Gout is a metabolic arthropathy characterized by the deposition of monosodium urate (MSU) crystals in joints and periarticular tissues, with tophi being the hallmark of chronic disease [1]. The knee is the third most common site for gouty involvement [2]. However, isolated involvement of deep-seated structures such as the popliteus tendon remains distinctly uncommon in clinical practice, though some imaging studies suggest the popliteal groove may serve as a "shelter" for MSU crystals [3].

Deep-seated gouty tophi can present a diagnostic challenge as they often mimic aggressive musculoskeletal conditions, including pigmented villonodular synovitis (PVNS), infection, or neoplasms [2]. MRI features of tophi are often non-specific, making clinical and laboratory correlation essential [2].

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This case is unique because the tophus was localized to the popliteus tendon and caused significant cortical erosion, mimicking an aggressive intra-articular mass. We describe the clinical presentation, multimodality imaging findings, and successful conservative management of this condition.

Case Report

A 64-year-old male presented with a three-week history of acute-onset left knee pain. There was no history of preceding trauma or systemic symptoms of infection. The pain was localized to the lateral aspect of the knee and was exacerbated by weight-bearing and knee flexion. Physical examination revealed varus malalignment of the left knee and localized tenderness over the lateral joint line, particularly along the lateral femoral condyle. Knee flexion was limited to 90 degrees due to pain. No ligamentous instability or neurovascular deficits were noted.

Laboratory investigations showed an elevated serum uric acid level of 8.9 mg/dL (reference range: 3.5–7.2 mg/dL). Inflammatory markers were mildly elevated (ESR 28 mm/hr, CRP 12 mg/L), while the complete blood count was normal.

Plain radiographs of the left knee demonstrated a well-defined, punched-out cortical erosion at the lateral femoral condyle

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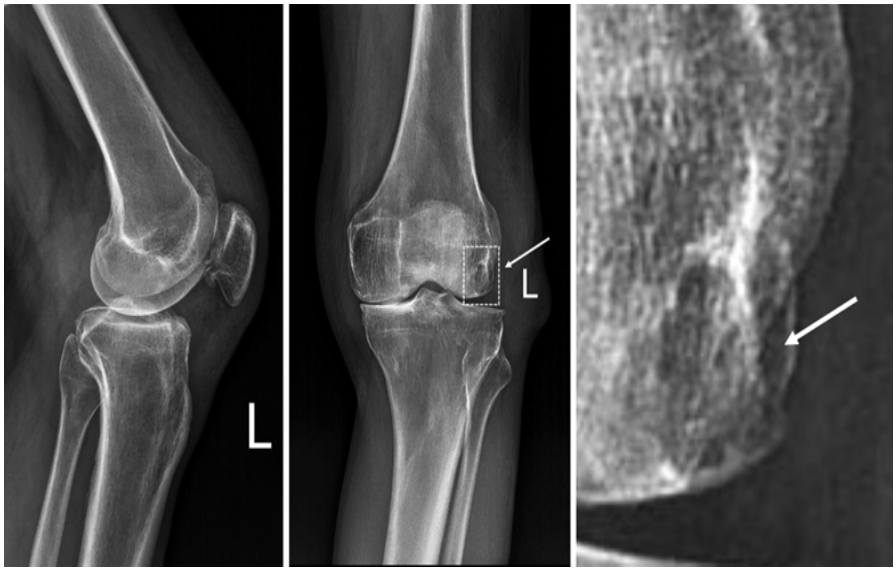

Figure 1: Standing lateral and anteroposterior plain radiographs of the left knee demonstrating a well-demarcated punched-out cortical erosion located at the lateral femoral condyle (arrow). Note the background degenerative changes with joint space narrowing and marginal osteophyte formation.

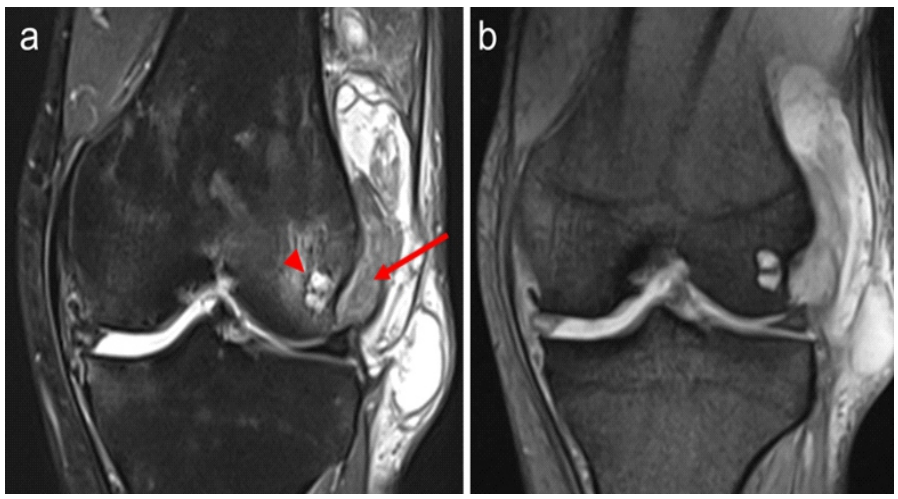

Figure 2: MRI of the left knee. (a) Coronal fat suppressed PD -weighted image demonstrates a mass-like intra-articular lesion at the lateral side of the knee joint. The popliteus tendon is partly engulfed by the lesion (long arrow). Subjacent cortical erosions of the lateral femoral condyle are noted at the level of the popliteal sulcus (arrowhead). Associated overlying bursitis and small joint effusion are also evident. (b) Coronal Gradient Echo sequence revealing no blooming, denoting absence of hemosiderin deposits.

(Fig. 1). MRI of the knee revealed a large soft tissue mass measuring 8 × 5 × 2 cm in the lateral aspect of the knee joint, infiltrating the popliteus tendon and causing cortical erosion of the adjacent lateral femoral condyle (Fig. 2a). The lesion appeared isointense on T2-weighted sequences and showed no blooming on gradient-echo sequences, effectively ruling out Pigmented Villonodular Synovitis (PVNS) (Fig. 2b). To further delineate the extent and characteristics of the lesion, axial T2-weighted and coronal T1-weighted images were obtained (Fig. 3).

The diagnosis was confirmed through ultrasound-guided aspiration of the knee joint. Polarized light microscopy of the synovial fluid revealed negatively birefringent, needle-shaped MSU crystals.

The patient was managed conservatively. The acute flare was treated with non-steroidal anti-inflammatory drugs (NSAIDs) and colchicine. This was followed by the initiation of long-term urate-lowering therapy with allopurinol. The patient demonstrated significant clinical improvement, with marked pain reduction and progressive restoration of knee range of motion.

At the six-month follow-up, the patient reported complete resolution of symptoms and had returned to all activities of daily living without limitation. Physical examination revealed a full, painless range of motion of the knee, with no evidence of joint effusion or localized tenderness along the popliteal groove.

Discussion

Gouty tophi are organized deposits of MSU crystals surrounded by an inflammatory granulomatous response [1]. While tophi are most common in the first metatarsophalangeal joint, they can occur in various atypical sites, including tendons, ligaments, and bursae. Involvement of the popliteus tendon is a recognized but less frequently reported presentation that can closely mimic more aggressive pathologies [3, 4].

The popliteus tendon's location within the lateral compartment makes it susceptible to crystal deposition, possibly due to the relatively lower temperature or mechanical factors in the popliteal sulcus [3]. As seen in this case, tophi can cause significant pressure-related or inflammatory erosions of the adjacent bone, which may be mistaken for malignant processes on initial imaging [4].

MRI is a powerful tool for evaluating periarticular masses, although tophus signal intensity can vary. Typically, tophi are isointense to muscle on T1-weighted images and show variable signal on T2-weighted images depending on the degree of hydration and calcification [2]. In our patient, the absence of blooming on gradient-echo sequences was crucial in excluding PVNS, which typically shows low signal intensity due to

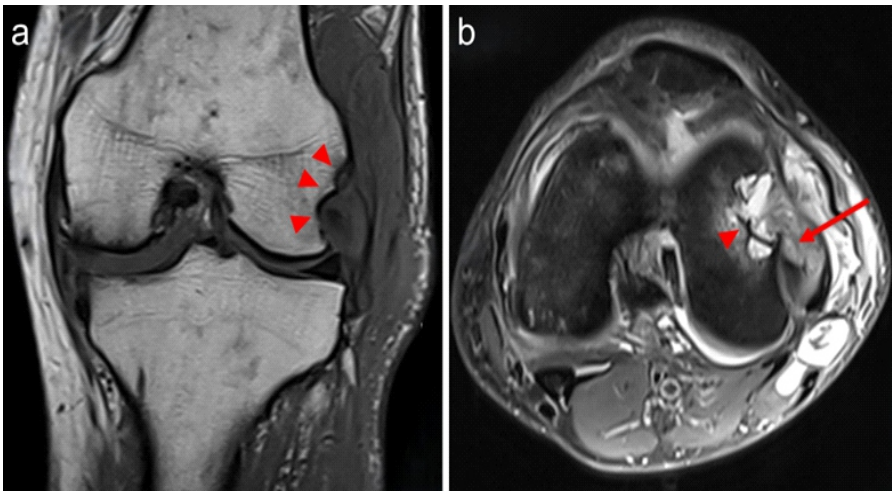

Figure 3: (a) Coronal T1-weighted MRI of the left knee demonstrates a low signal intensity soft tissue lesion along the lateral aspect of the knee, closely related to the popliteus tendon, with associated cortical erosion of the lateral femoral condyle (arrowheads). (b) axial T2-weighted image demonstrates a diffusely thickened intra-articular popliteus tendon with intermediate signal intensity and an infiltrative appearance (arrow). Subjacent cortical erosions of the lateral femoral condyle are noted at the level of the popliteal sulcus (arrowhead). Associated overlying bursitis and small joint effusion are also evident.

hemosiderin deposition [5]. The addition of axial T2 and coronal T1 sequences provided better anatomical localization and characterization of the tophus's relationship with the popliteus tendon.

The differential diagnosis for such a mass includes PVNS, synovial chondromatosis, soft tissue sarcoma, and chronic infection [2]. Given the non-specific imaging findings, crystal analysis remains the gold standard for diagnosis. The identification of MSU crystals in this case allowed for a definitive diagnosis and the avoidance of unnecessary surgical biopsy or intervention of a benign, medically treatable condition.

Management of tophaceous gout is primarily medical, focusing on urate-lowering therapy (ULT) to maintain serum uric acid levels below 6 mg/dL. Sustained ULT leads to the gradual dissolution of MSU crystals and reduction in tophus volume [6]. Surgery is generally reserved for cases with mechanical complications, nerve compression, or diagnostic uncertainty [7, 8]. Our patient's excellent response to conservative therapy underscores the effectiveness of medical management even in cases with significant bone erosion.

Conclusion

Gouty involvement of the popliteus tendon is exceptionally rare and may closely mimic aggressive intra-articular or periarticular pathology on imaging. Awareness of this atypical presentation is essential for both clinicians and radiologists when evaluating knee lesions associated with cortical erosion, particularly in hyperuricemic patients. Integration of clinical findings, laboratory data, and targeted imaging—along with definitive crystal analysis—allows accurate diagnosis and helps avoid unnecessary surgical intervention. This case further demonstrates that conservative medical management with urate-lowering therapy can be effective, even in the presence of significant bone erosion.

Clinical Message

Gouty tophi involving the popliteus tendon may closely mimic aggressive intra-articular masses or malignancy, particularly when associated with cortical erosion. Although MRI can help narrow the differential diagnosis and exclude conditions such as pigmented villonodular synovitis (PVNS), definitive diagnosis relies on the identification of monosodium urate crystals. Awareness of this atypical presentation is essential to avoid unnecessary surgical intervention and to ensure appropriate medical management with favourable outcomes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflict of Interest: NIL; **Source of Support:** NIL

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