CAS CLINIQUE / CASE REPORT

MASSES IN THE EXTENSOR MECHANISM OF THE KNEE
An Unusual Presentation of Gout

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ABSTRACT : Tophaceous gout presenting as a soft tissue mass in an unusual location can pose a diagnostic challenge for radiologists. Tophi sometimes occur in a variety of unusual anatomic locations making them difficult to distinguish from tumors such as sarcomas. We report two cases of gout in the extensor mechanism of the knee, with imaging findings that were initially concerning for a neoplasm. One mass occurred in the patellar tendon and the other mass involved the quadriceps tendon. Both lesions had enigmatic imaging findings and to arrive at a definitive diagnosis, incisional biopsies were performed.

Keywords : gout, extensor mechanism, tophus, tendon, knee

Jabour P, Masrouha K, Gailey M, El-Khoury GY. Masses dans le mécanisme extenseur du genou : une présentation inhabituelle de goutte tophacée. J Med Liban 2013 ; 61 (3) : 183-186.

RÉSUMÉ : La goutte tophacée, qui se présente sous forme de masse de tissu mou dans des endroits inhabituels du corps, peut constituer un défi pour les radiologistes. Les tophi apparaissent parfois dans des emplacements anatomiques variés et inhabituels, les rendant difficiles à être différenciés de certaines tumeurs telles que les sarcomes. Nous rapportons deux cas de goutte décelés dans le mécanisme extenseur du genou, dont les résultats d'imagerie initiaux semblaient correspondre à une néoplasie. La première masse fut détectée dans le tendon patellaire et la seconde dans le tendon du quadriceps. Les deux lésions présentaient des images énigmatiques nécessitant une biopsie incisionnelle afin d'obtenir un diagnostic définitif.

Mots-clés : goutte, mécanisme extenseur, tophus, tendon, genou

INTRODUCTION

Gouty arthritis is the result of monosodium urate crystal deposition within joints and other soft tissues after chronic hyperuricemia. The condition affects 1-2% of adults in developed countries, and is the most common inflammatory arthritis in men [1]. When left untreated, acute gout attacks can lead to chronic tophaceous gout. Tophi consist of monosodium urate crystals surrounded by chronic mononuclear and giant-cell reactions [2]. Common locations for tophi include the olecranon bursa, the helix of the ear, the Achilles tendon, within and/or around finger and toe joints, especially at the first metatarsophalageal joint, around the knees, and within the pre-patellar bursae. Other locations include the flexor tendons of the hand, the carpal tunnel, and even the median nerve, which may lead to carpal tunnel syndrome [3]. Rare locations such as the eyes, vocal cords, heart, and colon have been reported [4-7]. Although tendon involvement with gout has been described in the upper extremity, particularly in the hand, there have been few reports of gout manifestations described in the tendons of the extensor mechanism of the knee [8-10]. Tophi presenting as soft tissue masses in these rare locations pose diagnostic challenges as they can mimic soft tissue tumors such as sarcomas.

We herein describe the clinical, pathologic, and radiographic features of two cases of gout in the extensor mechanism of the knee, involving the patellar and quadriceps tendons.

CASE REPORTS

Case one

A 59-year-old male, previously healthy, presented to our Sports Medicine Clinic with a five-year history of intermittent right knee pain which was initially diagnosed as patellar tendonitis or "jumper's knee." The right knee pain had been worsening significantly over the previous two months, resulting in difficulty walking and standing. Prior lab work and aspiration of the knee showed no evidence of infection or inflammatory arthropathy. He had been treated conservatively with anti-inflammatory medication with mild improvement. The patient was then referred to our Sports Medicine Clinic for definitive therapy.

Physical examination revealed swelling over the anterior aspect of his right knee. The patient was unable to achieve full extension of the knee because of the pain; his muscle strength was 4/5 with extension. The patient had tenderness and swelling over the patellar tendon. There was no redness or erythema which would have suggested infection.

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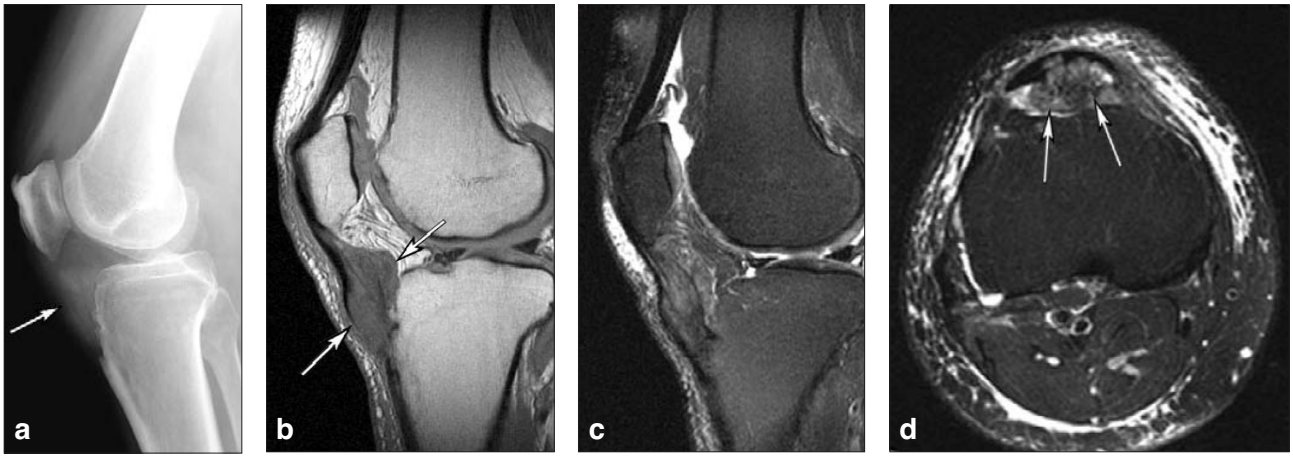

Figure 1. (**a**) Lateral radiograph of the left knee shows soft tissue fullness inferior to the patella (arrow). (**b**) T1-weighted sagittal MR image shows a low signal intensity mass infiltrating the entire patellar tendon (arrows). This mass has similar signal intensity as the muscle. (**c**) Fat suppressed T2-weighted sagittal MR image shows a large heterogenous mass within the patellar tendon. The mass has low to intermediate signal intensity. (**d**) Axial fat suppressed T2-weighted axial image through the patellar tendon reveals the mass infiltrating the patellar tendon. There is extensive soft tissue edema anterior to the knee. There is also soft tissue edema or fluid between the subcutaneous fat and the superficial fascia posterior to the gastrocnemius muscle.

Radiographs on initial presentation demonstrated a large mass occupying the majority of the left patellar tendon and erosion of the tibial tuberosity (Fig. 1a). Magnetic resonance (MR) imaging revealed a large heterogenous mass of the patellar tendon that had low to intermediate signal intensity on T1-weighted images and low signal intensity on T2-weighted images (Fig. 1b, 1c, and 1d). These findings were concerning for a soft tissue neoplasm, particularly clear cell sarcoma because the lesion appeared to arise within the tendon.

An incisional biopsy was performed which revealed the presence of a large gouty tophus infiltrating the entire patellar tendon (Fig. 2a, 2b, 2c, and 2d). The tendon was thoroughly debrided and a patellar tendon allograft was done since the native tendon was markedly thinned and unstable. The patient did well postoperatively, with an uneventful recovery, and was started on allopurinol. Unfortunately, we do not have a uric acid level for this patient on our electronic medical records.

Case two

A 67-year-old female, previously healthy, presented to our Orthopedic Clinic with left knee pain of one year duration. Physical examination revealed a stiff left knee and pain with attempted knee flexion. The knee was stable on varus and valgus stress. Palpation revealed no soft tissue masses. There were no overlying skin changes.

Lateral radiographs of the right knee revealed a lytic lesion of the superior pole of the patella, at the insertion of the quadriceps tendon (Fig. 3a). Subsequent MR imaging of the right knee revealed a heterogenous mass involving the quadriceps tendon with low signal intensity on T1-weighted and low to intermediate signal intensity on T2-weighted images (Fig. 3b and 3c). A small joint effusion was also detected (Fig. 3d). These findings were concerning for a soft tissue sarcoma or focal pigmental villonodular synovitis. An incisional biopsy was performed, and it revealed a gouty tophus which was treated with extensive debridement. The serum uric acid level was 14.0 mg/dl (normal range 2.4-7.0 mg/dl). She was treated with allopurinol in addition to prednisone for flares of arthritic symptoms. Six weeks postoperatively, the patient was doing well with no pain or knee instability.

She was treated with knee range of motion exercises by physical therapy to prevent long-term knee stiffness, and medical management for her gout. Two months after the initial presentation, she was doing well clinically with no complications. At two years follow-up her serum uric acid level was 4.5 mg/dl.

DISCUSSION

When gout presents as a soft tissue mass in the tendons of the extensor mechanism it poses a diagnostic challenge for radiologists as it may raise the concern for a soft tissue neoplasm such as a sarcoma [8-9]. To our knowledge, there are only two case reports in the English language literature describing patellar and/or quadriceps tendon involvement with gout [11-12]. MR imaging findings in the second case report were similar to those described in this report [12].

Plain radiographic features of gout in the hands and feet are fairly characteristic. They include soft tissue or intraosseous tophi along with adjacent erosion, marginal sclerosis, and overhanging cortical margins [13-15]. However, those presenting as soft tissue masses in unusual locations such as the tendons of the extensor mechanism can pose a diagnostic dilemma. Our first case showed evidence of a soft tissue mass of intermediate intensity and no calcification, with erosion of the tibial tuberosity. If there had been a history of gout in this patient the findings would have been typical for a tophus, however, given the

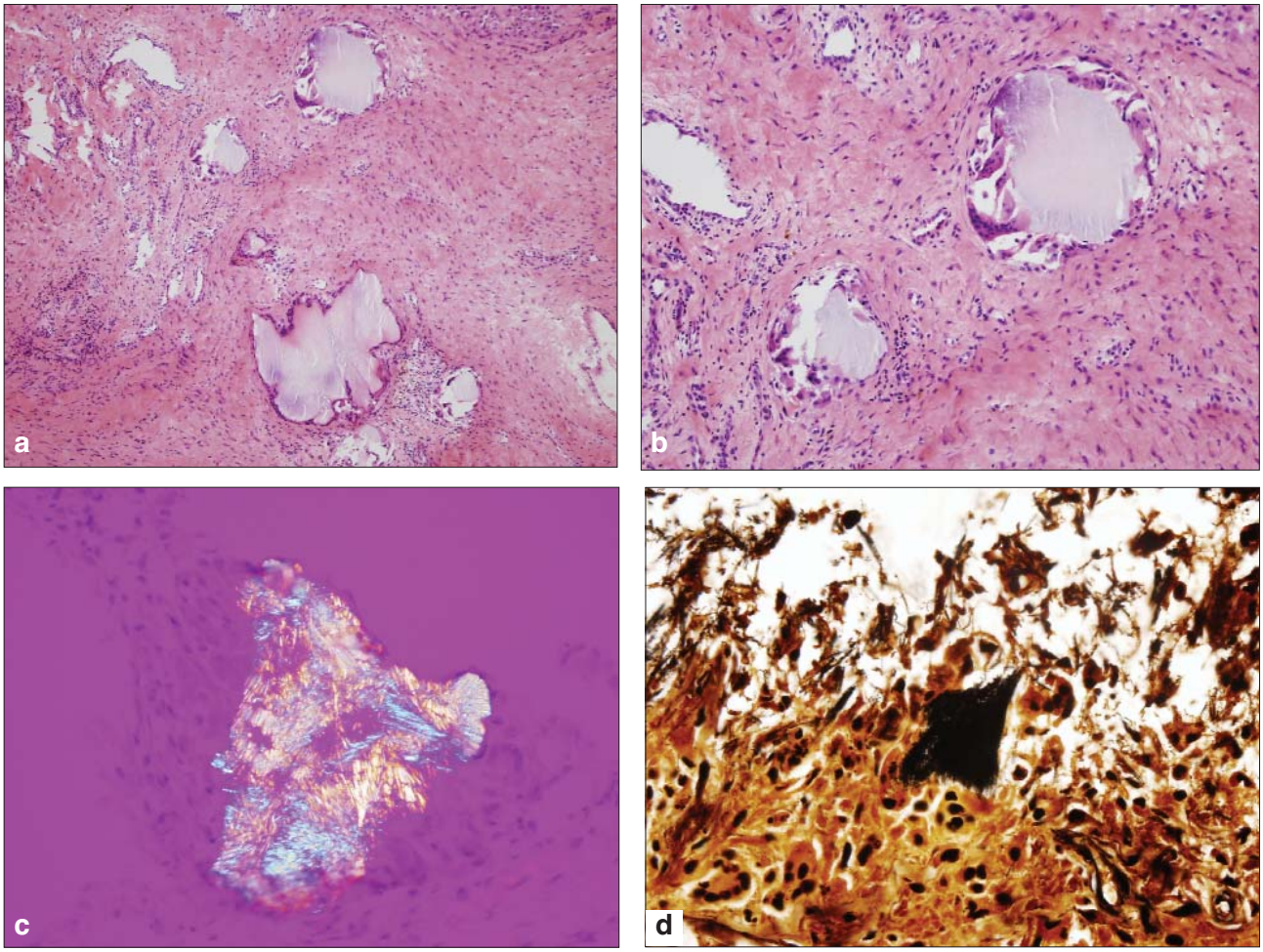

Figure 2. (**a**) 100x magnification showing fibrous tissue with scattered refractile crystalline particles surrounded by a foreign body giant cell reaction and chronic inflammation. (**b**) 200x magnification showing two refractile particles with surrounding multinucleated giants cells and inflammation. (**c**) Polarized needle shaped crystals: 400x magnification showing the negatively birefringent, yellow needle-shaped urate crystals. (**d**) Urate IHC: 600x magnification of immunoperoxidase slide showing the positive marking of the urate crystals.

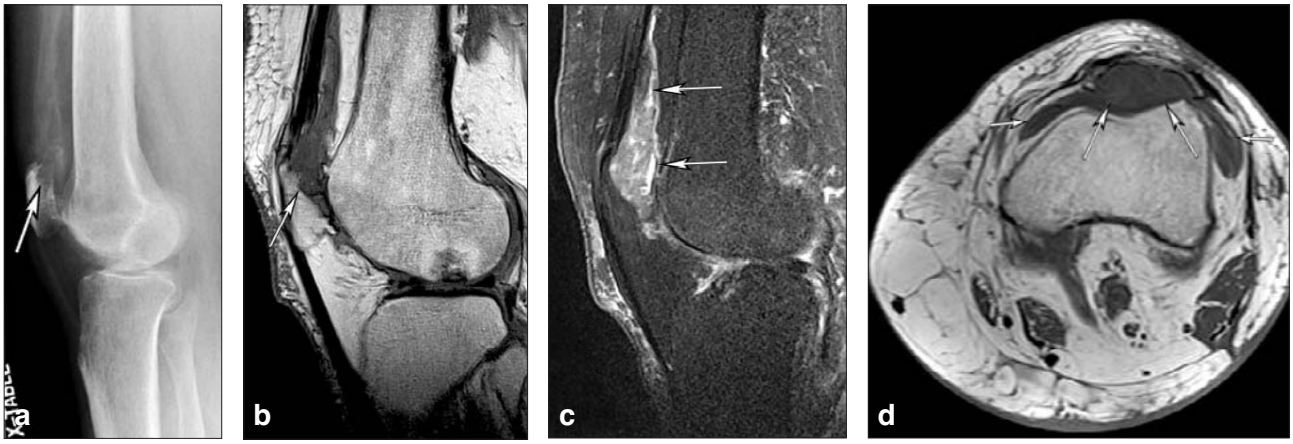

Figure 3. (**a**) Lateral radiograph of the right knee shows erosion at the superior pole of the patella (arrow). The distal 5 cm of quadriceps tendon are thickened. (**b**) T1-weighted sagittal MR image shows a low signal intensity elongated mass situated along the posterior aspect of the distal quadriceps tendon. This mass is seen eroding the posterior superior pole of the patella (arrow). (**c**) T2-weighted sagittal MR image shows a moderately high signal intensity mass lying along the posterior aspect of the quadriceps tendon and patella (arrows). (**d**) Axial T1-weighted image shows a low signal intensity mass (arrows) situated posterior to quadriceps tendon. A small joint effusion is also present (small arrows).

patient's negative history, these findings were concerning for a malignancy. The second case had less typical findings and the lytic lesion seen over the superior pole of the patella was suggestive of a soft tissue neoplasm.

On MR imaging tophi usually demonstrate homogenously low signal intensity on T1-weighted images and heterogeneously low to intermediate signal intensity on T2-weighted images, as seen in our two cases [16-19]. On the other hand, malignant soft tissue neoplasms generally have high signals on T2-weighted images. Marked tophi enhancement with gadolinium may be seen due to the presence of granulation tissue and increased vascularity [16-19]. Yu *et al.* supported the use of MR imaging in the setting of unexplained knee joint limitation to evaluate the possibility of gout as a cause [20]. Although our MR image findings in the first case showed low to intermediate signal intensity of T2-weighted images, the heterogeneous, infiltrating mass, with surrounding soft tissue edema raised the possibility of an infiltrating tumor. The second case had less typical findings of tophi with moderately high signal intensity on T2-weighted images, which also raised the suspicion for a malignancy.

In patients with enigmatic imaging findings and no past history of gout, as in these two cases, the best approach for reaching a definitive diagnosis is by CT-guided or incisional biopsy of the lesion.

CONCLUSION

We reported on two cases of tophaceous gout involving the extensor mechanism of the knee with enigmatic imaging findings. The diagnosis was arrived at by an incisional biopsy. CT-guided or incisional biopsy should be considered when imaging alone does not provide a definitive diagnosis.

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