Pes Anserine Bursitis
An Extra-Articular Manifestation of Gout


Abstract

While hospitalized with polymyositis, a medically complex 56-year-old male experienced an acute exacerbation of gout. Both ultrasound and magnetic resonance imaging cross-sectional modalities were used to detect, localize, and characterize a soft tissue mass. The tumor was ultimately found to be secondary to gouty inflammation of the pes anserine bursa, a previously unrecognized manifestation of acute gout.

The term “pes anserinus” (Latin for goose foot) refers to the common insertional tendon of the sartorius, gracilis, and semitendinosus muscles on the anteromedial surface of the proximal tibia. As the three tendons approach the insertion, they come together to form a conjoined tendon that anatomically resembles a goose’s webbed foot. The pes bursa is a synovial lined sac that lies deep to the pes anserinus and superficial to the tibial attachment of the medial collateral ligament (MCL) and the medial tibial plateau.1-3 This bursa does not communicate with the knee joint.1,4

Repetitive trauma or stress to the pes bursa and surrounding structures, especially in the setting of obesity, arthritis, or anatomic dysmorphism of the knee joint, may result in acute inflammation and fluid distension of this bursa. Patients typically present with knee pain, which is aggravated by climbing or descending stairs. On examination, local swelling and tenderness are noted over the proximal, anteromedial aspect of the knee joint.1,4 Anatomically, fluid distension of the pes bursa results in its expansion proximally and posteriorly.2

To our knowledge there have been no documented cases of gout in the pes anserine bursa. In 1984, Abeles10 described a case of extra-articular gout, in which pain and swelling were localized to a 1 cm area over the posteromedial aspect of the knee. Notably, the region of the pes anserine bursa was unremarkable on physical exam without swelling or tenderness. The swelling, in this case, may have represented a dis-tended gastrocnemius-semimembranosus bursa, a popliteal cyst, or a ganglion cyst. However, there was no diagnostic imaging performed. In the case presented in this paper, pes bursitis was confirmed anatomically by ultrasound (US) and magnetic resonance imaging (MRI); gout was diagnosed biochemically by polarized microscopy.

Case History

A 56-year-old male with end-stage renal disease, type 2 diabetes mellitus, hypertension, chronic hepatitis B infection, osteoarthritis, and gout (multiple previous acute gouty attacks of the right knee and left foot) was admitted to the hospital with polymyositis. During his admission, he developed pain and swelling on the medial aspect of his left knee. His serum uric acid level was elevated at 592 μmol/L (9.95 mg/dL). US of the knee was performed (Figs. 1 and 2).

Results

Ultrasound

A linear, high frequency (12 MHz) US probe (HDI 5000, Phillips Medical Systems, Andover, Massachusetts, USA) was used to scan the medial aspect of the knee, where a notable soft tissue mass was found. Along the anteromedial aspect of the left knee, a subcutaneous lobular, encapsulated, fluctuant mass measuring approximately 8x3x2 cm was delineated. The mass was predominantly hyperechoic, with mobile internal echoes, and demonstrated enhanced through-transmission, consistent with complex fluid. The
structure was multiloculated with intervening septations; no solid components were identified. Doppler interrogation demonstrated neither peripheral nor internal vascularity. The pes anserine tendons were intimately related to this complex fluid collection, seen as echogenic bands coursing through the more relatively hypoechoic fluid. The collection was limited to the medial aspect of the knee, remaining anterior to the semimembranosus tendon. No communication with the joint was identified. The extensor mechanism was unremarkable. The popliteal artery and vein were normal.

**Figure 1** Ultrasound of the medial left knee, just inferior to the joint margin, in the longitudinal axis, demonstrates a locule of the encapsulated lobular mass, being heterogeneously hyperechoic with enhanced through-transmission, with some dependent debris, consistent with complex fluid. Arrows define the margin of the collection. MC, medial condyle.

**Figure 2** Ultrasound of the medial left knee, in the transverse axis, at the level of the medial tibial plateau (MP), shows the inferior aspect of the complex fluid collection (arrowheads). Most inferiorly, as the tibial insertion is approached, the more echogenic pes anserine tendons (arrows) are discretely identified, separated by fluid.

**Figure 3** Axial (A) and coronal (B) proton density-weighted images with fat suppression, demonstrate the traversing pes anserine tendons (arrows) encased by the fluid distended pes bursa. (SA, sartorius; GR, gracilis; ST, semitendinosus; black triangle = mesotenon of gracilis tendon).
The complex fluid collection was subsequently aspirated under US guidance. Fluid analysis included examination by compensated polarized light microscopy. This revealed many aggregates of needle-like crystals, which demonstrated negative birefringence, consistent with monosodium urate (MSU) crystals. Calcium Pyrophosphate crystals were not identified. A differential cell count was not available. Gram stain, aerobic, anaerobic, fungal, and mycobacterial cultures were all negative. These results suggested acute gout as the cause of the patient’s knee pain and focal swelling. MRI was recommended by the radiologist in order to characterize further the origin of his cystic mass (Figs. 3 and 4).

**Magnetic Resonance Imaging**

MRI was performed 8 days after the initial US on a 1.5-T scanner (Symphony; Siemens Medical Solutions, Erlangen, Germany), using a quadrature extremity coil and included the following sequences:

1. Axial, proton density-weighted, fat suppressed, turbo spin-echo (repetition time msec/echo time, 2500/13; turbo factor (TF) 5), 4-mm section thickness, 1-mm spacing, 512x256 matrix, NEX 1, FOV 14 cm.
2. Sagittal, intermediate-weighted, turbo spin-echo (2500/46; TF 7), 4-mm section thickness, 1-mm spacing, 512x256 matrix; NEX 1, FOV 14 cm.
3. Sagittal, intermediate-weighted, fat suppressed, turbo spin-echo (2740/46; TF 7), 4-mm section thickness, 1-mm spacing, 512x256 matrix; NEX 1, FOV 14 cm.
4. Sagittal, MEDIC 3.5-mm section thickness, 1-mm spacing, 512x256 matrix; NEX 1, FOV 16 cm.
5. Coronal proton density-weighted, fat suppressed, turbo spin-echo (2500/14, TF 5), 3.5-mm section thickness, no spacing, 512x256 matrix; NEX 1, FOV 14 cm.

MRI demonstrated a large mass that was draped along the anteromedial aspect of the medial joint compartment and upper tibia. Superiorly, it started at the supracondylar level, and, most distally, it extended to at least 5 cm below the medial tibial plateau, although the inferior-most margin was not included within the field of view. The visualized portion of the lesion extended over a longitudinal distance of 10 cm, with maximal cross-sectional dimensions of 6.2x2.1 cm.

The mass was predominantly characterized by homogeneous, very high signal on fat-suppressed intermediate weighted images, consistent with a dominant fluid compo-
Gout shows a marked predilection for the great toe. The disease, when narrowing is common and usually uniform, is relatively preserved until the later stages of the marginal areas of the joint and proceed centrally. The tophi eroding into bone. Intra-articular erosions commence thin sclerotic borders and overhanging margins, result from permanent radiographic abnormalities. Periarticular, dense inflammatory findings may be present. After years of epididymal musculoskeletal changes; however, nonspecific hyperuricemia and the deposition of uric acid crystals, both membranous and medial gastrocnemius tendons were all intact. The regional subcutaneous fat and upper calf musculature did not demonstrate any edema. The underlying tibial cortex was intact, without evidence of pressure erosion or remodelling. The tibial marrow signal was normal. The cruciate ligaments, both menisci, lateral stabilizers, and extensor mechanism were all intact. A mild joint effusion and mild tricompartamental degenerative cartilage changes were noted. There was no gross synovitis or intra-articular body present.

The patient was treated with an oral corticosteroid, prednisone (10 mg daily), for both his acute gouty pes anserine bursitis and polymyositis. Symptoms related to the patient’s bursitis promptly resolved. He was started on Allopurinol 300 mg daily for treatment of hyperuricemia.

Discussion
Gout is a common medical condition, characterized by hyperuricemia and the deposition of uric acid crystals, both intra-articular and periarticular. It is a heterogeneous disorder, comprising four phases: asymptomatic hyperuricemia, acute gouty inflammation of joints or bursae, intercritical gout, and chronic tophaceous gout.11

Imaging Features
Acute gouty arthritis typically does not result in any radiographic musculoskeletal changes; however, nonspecific inflammatory findings may be present. After years of episodic gouty arthritis, chronic tophaceous gout may lead to permanent radiographic abnormalities. Periarticular, dense nodular soft tissue masses represent tophi. Para-articular and extra-articular “punched out” erosions, with well-defined thin sclerotic borders and overhanging margins, result from tophi eroding into bone. Intra-articular erosions commence in the marginal areas of the joint and proceed centrally. The joint space is relatively preserved until the later stages of disease, when narrowing is common and usually uniform.12 Gout shows a marked predilection for the great toe. The overall distribution is usually asymmetric and polyarticular, with random involvement of other small joints of the feet and hands, as well as the wrists, elbows, and knees.12

As in our case, US allows characterization of soft tissue swelling about a joint that may represent underlying bursitis. Moreover, it is often used to guide aspiration of joint fluid for analysis. Computed tomography (CT), MRI, and nuclear medicine studies are not often performed to diagnose gout. Nonetheless, CT does allow evaluation of the extent of disease, particularly in areas that are not easily visualized on radiographs, such as the spine and sacroiliac joints. MRI allows visualization of the extent of soft tissue, chondral, and bone involvement. A 99mTechnetium methylene diphosphonate bone scan may demonstrate the distribution and extent of gouty arthritis. In acute flare-ups, increased uptake on all three phases of a bone scan is present. On positron emission tomography (PET) with 18-fluoro-2-deoxy-D-glucose, a gouty tophus may demonstrate moderately increased uptake but less than that expected of a malignancy.13,14

Differential Diagnosis
While a popliteal (Baker’s) cyst is the most common cystic lesion about the knee, the differential diagnosis should include meniscal, synovial, and ganglion cysts; bursitis; hematoma; and abscess in the appropriate clinical setting.15-17 Bursitis is a nonspecific finding that may relate to a variety of local and systemic processes, such as overuse, trauma, infection, hemorrhage, internal joint derangement, inflammatory arthropathy, and collagen vascular disease. There are three bursae medial to the knee: the pes anserine bursa, the MCL bursa, and the semimembranous MCL bursa. The pes anserine bursa lies deep to the pes anserinus and superficial to the tibial attachment of the MCL and the medial tibial plateau.1,3,15,16 The MCL bursa is located between the superficial and deep portions of the MCL. The semimembranous MCL bursa is located between the semimembranosus tendon and the MCL, with a deeper extension between the semimembranosus tendon and the medial tibial plateau. Finally, solid lesions that may have cystic components include pigmented villonodular synovitis, synovial hemangioma, and synovial sarcoma.16,18

Conclusion
While hospitalized with suspected polymyositis, this medically complex 56-year-old male experienced an exacerbation of his gout. Both US and MRI cross-sectional modalities were used to detect, localize, and characterize a soft tissue mass, ultimately found to be secondary to gouty inflammation of the pes anserine bursa, a previously unrecognized manifestation of acute gout. This paper reviews the imaging features of gout, including the classic radiographic findings of longstanding gout, as well as the corresponding findings on advanced imaging techniques, such as CT and MRI. The differential diagnosis of a cystic soft tissue mass around the knee is broad. Knowledge of joint, tendon, and bursal

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anatomy is essential in order to determine accurately the epicenter of pathology, which, in turn, may narrow the list of possible diagnoses. In this case, physical exam, biochemical fluid analysis, and US and MR imaging were combined to confirm the diagnosis of acute gout bursitis.

Disclosure Statement
None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

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