Published in final edited form as:

Orthopedics. ; 34(3): 223. doi:10.3928/01477447-20110124-33.

Intratendinous Tophaceous Gout Imitating Patellar Tendonitis in an Athletic Man

Dr. Jeremy M. Gililland, MD,

Department of Orthopedic Surgery, University of Utah, Salt Lake City, Utah

Dr. Nicholas P. Webber, MD,

Aurora Advanced Healthcare, Milwaukee, Wisconsin

Dr. Kevin B. Jones, MD,

Department of Orthopedic Surgery, University of Utah, Salt Lake City, Utah

Dr. R. Lor Randall, MD, and

Department of Orthopedic Surgery, University of Utah, Salt Lake City, Utah

Dr. Stephen K. Aoki, MD

Department of Orthopedic Surgery, University of Utah, Salt Lake City, Utah

Abstract

Patellar tendon-related pain is common in the athletic patient. When it occurs in skeletally mature patients participating in running, jumping, or kicking sports, the diagnosis of jumper's knee patellar tendonitis is usually made. If patellar tendon pain is associated with a mass, the differential diagnosis should be broadened to include crystalline arthropathy.

This article presents a case of a highly athletic 45-year-old man with a history of gout, anterior knee pain, and an enlarging mass in the region of the patellar tendon. Conservative management failed, and an excisional biopsy found it to be an intra-tendinous gouty tophus. To our knowledge, only 1 report exists documenting a patellar tendon mass secondary to gout, and no case report exists documenting this problem in an athlete. The interplay between athletics and gout has not been well described. Despite the long-term protective nature of fitness, transient elevations in uric acid associated with athletic endeavors may contribute acutely to manifestations of gout in some athletes. Resultant intra- or extra-articular pathology may present as, and easily be mistaken for, a sports-related injury. Without appropriate medical management, tophaceous deposition may continue to occur and treatment of the resultant mass may require surgical intervention.

Patellar tendon-related pain is common in the athletic patient. When it occurs in skeletally mature patients participating in running, jumping, or kicking sports, the diagnosis of jumper's knee patellar tendonitis is usually made. Skeletally immature patients may present with osteochondritis related-pain, as in Sinding-Larsen-Johannson or Osgood-Schlatter disease. Patellar tendon pain may be associated with a mass, and if present, the differential diagnosis should be broadened to include infection, benign and malignant neoplastic processes, and crystalline arthropathy.

The interplay between athletics and gout has not been well described. Despite the long-term protective nature of fitness, transient elevations in uric acid associated with athletic

Correspondence should be addressed to: Jeremy M. Gililland, MD, Department of Orthopedic Surgery, University of Utah, 590 Wakara Way, Salt Lake City, UT 84108, (jeremy.gililland@hsc.utah.edu).

Drs Gililland, Webber, Jones, Randall, and Aoki have no relevant financial relationships to disclose.

endeavors may contribute acutely to manifestations of gout in some athletes.¹⁻⁴ Resultant intra- or extra-articular pathology may present as, and easily be mistaken for, a sports-related injury.⁵ If gout is not suspected, the patient may fail several courses of conservative management without appropriate medical management of the gout. Without appropriate medical management, tophaceous deposition may continue to occur, and treatment of the resultant mass may require surgical intervention.^{6,7}

Several case reports exist presenting some of the rare neoplastic causes of patellar tendon masses, such as giant cell tumor of tendon sheath and extra-osseous osteochondroma. However, to our knowledge, only 1 report exists documenting a patellar tendon mass secondary to gout,⁸ and no case report exists documenting this problem in an athlete.

Case Report

A highly athletic 45-year-old man was referred to our orthopedic sarcoma service for evaluation of a large patellar tendon mass. He had a 10-year history of left anterior knee pain with a slowly enlarging mass in the region of the patellar tendon. During this time, he continued to compete in marathons and Ironman triathlons despite the pain. He had been previously diagnosed with jumper's knee patellar tendonitis, for which he underwent conservative management with physical therapy and nonsteroidal anti-inflammatory drugs (NSAIDs) with no improvement. His symptoms continued to worsen until he stopped all running activities 9 months prior to evaluation in our clinic.

The patient reported a medical history significant for gout, diagnosed 2 years prior with a serum uric acid concentration of 9.4 mg/dL (normal, 4.0–8.5 mg/dL). Since that time his gout had been well controlled on allopurinol, with plasma uric acid concentrations ranging from 6.5–6.8 mg/dL. He had no prior history of any tophaceous soft tissue deposits.

On physical examination, he was found to have tenderness along the patellar tendon with palpable fullness compared to the contralateral extremity. Resisted active extension of the knee produced pain in the region of the patellar tendon. Plain radiographs and magnetic resonance imaging (MRI) revealed mild patellofemoral joint osteoarthritis along with apparent degeneration of the patellar tendon with a large fusiform mass in the midsubstance of the tendon, measuring 2×2×7 cm. The mass was slightly radio-opaque and had heterogeneous intermediate T1 and T2 signal on MRI (Figures 1–6).

This mass did not appear to be consistent with patellar tendonitis, and it was felt this was a benign appearing process warranting biopsy for further evaluation. Given the benign appearance, duration of symptoms, failure of conservative management, and significant activity limitation, excisional biopsy was recommended. A discussion was had with the patient regarding the risks and benefits of surgical intervention and consent was obtained.

Intraoperatively, the anterior fibers of the patellar tendon were incised longitudinally. A white caseous material was encountered and removed with a curette. The inferior pole of the patella was excised as it came to a sharp edge, which may have been contributing to the patient's symptoms. The tendon was repaired using a running 0 Vicryl suture (Ethicon, Inc, Somerville, New Jersey). Cultures for aerobes, anaerobes, fungi, and acid-fast bacilli all showed no growth at final report. Gout had not been entertained in the differential diagnosis, and our histology specimen was fixed in formalin. The uric acid stains were negative, but the specimen was again fixed in formalin, which is known to cause degradation of monosodium urate crystals.⁹ The histology showed granulomatous inflammation associated with crystalline material most consistent with gout without evidence of neoplastic change.

At 1-year follow-up, the patient was doing well. He had no recurrence of the patellar tendon mass. His anterior knee pain had completely resolved, and he was back to cycling and running without difficulty. On examination, he had full strength with resisted knee extension, and he had full active and passive range of motion of his knee. Follow-up MRI showed some homogenous low-signal thickening of the patellar tendon consistent with scar tissue formation without any evidence of gouty tophus recurrence (Figures 7, 8). Since learning that this mass was a gouty tophus, the patient started seeing a rheumatologist for management of his gout, and his plasma uric acid concentrations have remained well controlled.

Discussion

Tendinopathy is a frequently described manifestation of extra-articular gout most commonly presenting in the Achilles tendon and tendons of the hand and wrist.^{6,7,10–15} Gouty tendinopathy of the flexor tendons at the wrist is a well-documented cause of carpal tunnel syndrome.^{11,13,14}

Gouty tendinopathy leading to spontaneous tendon rupture has been reported in various tendons, including the hand flexors, quadriceps, Achilles, tibialis anterior, and peroneal tendons. In a report of 42 patients with spontaneous rupture of the Achilles tendon treated surgically, a 14% incidence of gout was noted.¹⁰ Tophaceous gout involving the patella is well documented in the literature, especially in the bipartite patella and as a cause of pathological patella fracture.^{16–19} While the patellar tendon has been mentioned as a location of gouty involvement, only 1 case report exists in the literature.⁸ To our knowledge, no report exists of an athlete presenting with gouty patellar tendinopathy mimicking jumper's knee.

Musculoskeletal soft tissue disorders are a frequent cause of pain and disability in athletes as well as in patients with gout. The interplay between athletics and gout has not been well described. Increasing level of fitness is thought to decrease the incidence of gout. In a study of 28,990 male runners, the self-reported incidence of gout decreased with increased distance running and fitness level.⁴ However, long-distance running has also been reported to precipitate gouty flares in young men, which is thought to be due to elevated plasma hypoxanthine and uric acid levels following prolonged exercise.^{1,2}

Plasma uric acid concentration has been demonstrated to increase significantly following 5000-m and 42-km marathon events.³ Therefore, despite the long-term protective nature of fitness, these transient elevations in uric acid may contribute acutely to manifestations of gout in some athletes, especially those with a history of the disease who participate in endurance events such as marathon running and triathlons. The resultant intra- or extra-articular pathology may present as, and easily be mistaken for, a sports-related injury.⁵

Diagnosis in this population may be challenging. A thorough review of the medical, family, and social history may be the most helpful diagnostic tool available. Laboratory tests may not be helpful, since plasma uric acid concentrations may be normal at the time of presentation due to the transient nature of the uric acid flairs in this population.¹ Computed tomography (CT) scan is the most specific imaging modality in the setting of tophaceous gout as monosodium urate crystalline deposits have a specific density of approximately 160 to 170 Hounsfield units.^{8,20} Computed tomography scanning has been shown to be superior to both MRI and ultrasound in this setting.²⁰ In the athletic patient population, MRI is often the imaging modality of choice used to evaluate presumed sports-related injuries. Therefore, a good clinical suspicion for the possibility of gouty involvement is important so as to choose the appropriate imaging modality in these patients.

Treatment of gout is primarily medical with NSAIDs, colchicine, allopurinol, and the uricosurics, such as probenecid. However, these treatments are primarily preventative and do not address existing tophaceous disease. Surgical indications in the setting of gouty tophi include severe deformity, loss of function, and persistent pain refractory to conservative therapies.^{6,7} If medical modalities fail and operative intervention is indicated, it is important that intraoperative cultures are obtained to rule out infectious causes of granulomatous disease. Furthermore, it is imperative that the specimens be transported in ethanol rather than formalin to avoid degradation of the monosodium urate crystals.^{9,13}

An appropriate diagnosis due to a sound clinical suspicion is needed to watch for such a rare cause of patellar tendonitis in patients who may have MRI findings inconsistent with patellar tendonitis and have failed conservative management. Such patients may benefit from CT imaging to establish the diagnosis, and surgical excision may be necessary. Surgical intervention helps relieve the pain and deformity of gouty tophi while appropriate medical management helps prevent further deposition. Appropriate management of this population allows return to and maintenance of their desired activity level.

References

1. Gunawardena H, Churn P, Blake DR. Running for gout research [published online ahead of print April 19, 2005]. *Rheumatology (Oxford)*. 2005; 44(8):1073–1074. [PubMed: 15840595]
2. Moore GE, Anderson AL. Runner with gout and an aortic valve nodule. *Med Sci Sports Exerc*. 1995; 27(5):626–628. [PubMed: 7674864]
3. Sutton JR, Toews CJ, Ward GR, Fox IH. Purine metabolism during strenuous muscular exercise in man. *Metabolism*. 1980; 29(3):254–260. [PubMed: 7374440]
4. Williams PT. Effects of diet, physical activity and performance, and body weight on incident gout in ostensibly healthy, vigorously active men. *Am J Clin Nutr*. 2008; 87(5):1480–1487. [PubMed: 18469274]
5. Jennings F, Lambert E, Fredericson M. Rheumatic diseases presenting as sports-related injuries. *Sports Med*. 2008; 38(11):917–930. [PubMed: 18937522]
6. Sainsbury DC, Hidvegi N, Blair JW. Intra-tendinous gout in a repaired flexor digitorum profundus [published online ahead of print May 1, 2008]. *J Hand Surg Eur Vol*. 2008; 33(4):528–529. [PubMed: 18450796]
7. Weniger FG, Davison SP, Risin M, Salyapongse AN, Manders EK. Gouty flexor tenosynovitis of the digits: report of three cases. *J Hand Surg Am*. 2003; 28(4):669–672. [PubMed: 12877858]
8. Gerster JC, Landry M, Rappoport G, Rivier G, Duvoisin B, Schnyder P. Enthesopathy and tendinopathy in gout: computed tomographic assessment. *Ann Rheum Dis*. 1996; 55(12):921–923. [PubMed: 9014587]
9. Primm DD Jr, Allen JR. Gouty involvement of a flexor tendon in the hand. *J Hand Surg Am*. 1983; 8(6):863–865. [PubMed: 6643960]
10. Beskin JL, Sanders RA, Hunter SC, Hughston JC. Surgical repair of Achilles tendon ruptures. *Am J Sports Med*. 1987; 15(1):1–8. [PubMed: 3544884]
11. Champion D. Gouty tenosynovitis and the carpal tunnel syndrome. *Med J Aust*. 1969; 1(20):1030–1032. [PubMed: 5795976]
12. Gonzalez MH, Cooper ME. Gouty tenosynovitis of the wrist. *Am J Orthop (Belle Mead NJ)*. 2001; 30(7):562–565. [PubMed: 11482511]
13. Janssen T, Rayan GM. Gouty tenosynovitis and compression neuropathy of the median nerve. *Clin Orthop Relat Res*. 1987; (216):203–206. [PubMed: 3815949]
14. Pledger SR, Hirsch B, Freiberg RA. Bilateral carpal tunnel syndrome secondary to gouty tenosynovitis: a case report. *Clin Orthop Relat Res*. 1976; (118):188–189. [PubMed: 954275]
15. Wurapa RK, Zelouf DS. Flexor tendon rupture caused by gout: a case report. *J Hand Surg Am*. 2002; 27(4):591–593. [PubMed: 12132081]

16. Enomoto H, Nagosi N, Okada E, Ota N, Iwabu S, Kamiishi S. Hemilaterally symptomatic bipartite patella associated with bone erosions arising from a gouty tophus: a case report [published online ahead of print October 9, 2006]. *Knee*. 2006; 13(6):474–477. [PubMed: 17029961]
17. Kobayashi K, Deie M, Okuhara A, Adachi N, Yasumoto M, Ochi M. Tophaceous gout in the bipartite patella with intra-osseous and intra-articular lesions: a case report. *J Orthop Surg (Hong Kong)*. 2005; 13(2):199–202. [PubMed: 16131688]
18. Price MD, Padera RF, Harris MB, Vrahas MS. Case reports: pathologic fracture of the patella from a gouty tophus. *Clin Orthop Relat Res*. 2006; (445):250–253. [PubMed: 16601419]
19. Tashiro S, Sugita T, Nakamura S, Kurata Y. Gout tophus in the bipartite patella. *Orthopedics*. 2002; 25(11):1295–1296. [PubMed: 12452351]
20. Gerster JC, Landry M, Dufresne L, Meuwly JY. Imaging of tophaceous gout: computed tomography provides specific images compared with magnetic resonance imaging and ultrasonography. *Ann Rheum Dis*. 2002; 61(1):52–54. [PubMed: 11779759]

Figure 1.
Preoperative AP radiograph showing an enthesophyte near inferior pole of the patella.

Figure 2. Preoperative lateral radiograph showing mild patellofemoral joint osteoarthritis, an enthesophyte near inferior pole of the patella, and a slightly radio-opaque fusiform mass in the midsubstance of the patellar tendon.

Figure 3.
Preoperative sunrise radiograph showing mild patellofemoral joint osteoarthritis.

Figure 4. Preoperative T1 sagittal MRI showing mild patellofemoral joint osteoarthritis along with apparent degeneration of the patellar tendon with a 2×2×7-cm heterogeneous intermediate-intensity fusiform mass in the midsubstance of the patellar tendon.

Figure 5. Preoperative T2 sagittal MRI showing mild patellofemoral joint osteoarthritis along with apparent degeneration of the patellar tendon with a 2×2×7-cm heterogeneous intermediate-intensity fusiform mass in the midsubstance of the patellar tendon.

Figure 6. Preoperative T2 axial MRI showing apparent degeneration of the patellar tendon with a 2×2-cm heterogeneous intermediate-intensity mass in the midsubstance of the patellar tendon.

Figure 7. Postoperative T2 sagittal MRI showing mild patellofemoral joint osteoarthritis along with homogenous low-signal thickening of the patellar tendon consistent with scar tissue formation without any evidence of gouty tophus recurrence.

Figure 8. Postoperative T2 axial MRI showing homogenous low-signal thickening of the patellar tendon consistent with scar tissue formation with no evidence of gouty tophus recurrence.