Tarsal Tunnel Syndrome Associated with Gout Tophi: A Case Report

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Tarsal tunnel syndrome is an entrapment neuropathy of the posterior tibial nerve or its branches in the fibro-osseous tunnel beneath the flexor retinaculum. This pathology is associated with multiple etiologies, including trauma, space-occupying lesions, and impaired biomechanics. We report a case of tarsal tunnel syndrome associated with gout tophi in a patient with untreated gout along with a review of the relevant literature on tarsal tunnel syndrome.

Key Words: Tarsal tunnel syndrome, Gout, Tophi

CASE REPORT

The present case was approved by the Institutional Review Board at our institution, and informed consent was obtained from the patient. A 55-year-old male patient was presented to our department with a complaint of pain and numbness in the plantar and medial half of the right foot. The numbness had appeared six months prior to his visit, which was reportedly getting worse over time. The pain and numbness had not been relieved by nonoperative treatments, such as, activity modification, physical therapy, and oral anti-inflammatory medicine. The patient had been diagnosed with gout for one year but was only treated with intermittent anti-inflammatory drugs.

A physical examination revealed swelling at the sustentaculum tali region, which exhibited positive Tinel’s sign, and a hypesthesia on the plantar and medial half of the foot including the first, second, and third toes. The laboratory exams revealed a serum uric acid level of 9.49 mg/dL (normal range, 3.2∼7.2 mg/dL), and normal serum creatinine and blood urea nitrogen levels. On simple radiographs and computed tomographs, osteolytic changes with subcortical cysts and multiple calcifications were evident in the talar body and in the first and second tarsometatarsal joints (Fig. 1). The magnetic resonance imaging (MRI) scans revealed an ill-defined mass of low signal intensity in the talar body on...
Diagnosis of gouty tophi. Microscopically, the tophus consists of a collection of urate crystals within the necrotic debris surrounded by a zone of inflammatory exudates of histiocytes, monocytes, polymorphonuclear leukocytes, and multinucleated giant cells (Fig. 4). The patient was placed in a splint for postoperative two weeks, after which range of motion and weightbearing were allowed as tolerated. In addition, urate-lowering drugs were started immediately after surgery and uric acid levels were maintained within normal limits throughout the follow-up period. Numbness and pain gradually subsided after surgery and eventually disappeared at postoperative six months.

However, severe pain and swelling of the subtalar joint area and a palpable mass on the Achilles tendon of the left ankle were evident at six months after surgery. T2-weighted MRI of the left ankle revealed ill-defined nodular masses with a heterogeneous signal intensity at the subtalar joint and posterior aspect of the Achilles tendon. Interestingly, the mass lesion at the left subtalar joint was similar to the previous lesion of the right ankle on MRI, despite the lack of neurologic symptoms. Unlike the previous occasion, symptoms were relieved by oral anti-inflammatory medications. The patient continues to be followed regularly and no neurologic symptoms and pain were present until postoperative 14 months.

DISCUSSION

Tarsal tunnel is a fibro-osseous channel that contains medial tendons and posterior tibial neurovascular bundle that extends from the medial aspect of the ankle to the midfoot. Furthermore, the posterior tibial nerve bifurcates into the medial and lateral plantar nerves within the tarsal tunnel in most cases, and the medial plantar nerve, which is the larger of the two terminal branches, is more
case, the patient had not received any treatment for gout despite having suffered severe pain of the first metatarsophalangeal joint for six months. We were able to confirm intra-articular tophi and joint destruction in the contralateral subtalar joint by an MRI after surgery, although no TTS symptoms were apparent.

The reason for peripheral tophaceous deposition is unclear. When the local solubility limits of uric acid are exceeded, monosodium urate crystal deposition in the joints and soft tissues causes clinical manifestations, including arthritis and soft tissue masses (i.e., tophi). Tophi are most often seen in tissues that have a poor blood supply and low temperature, such as the ear helix and first metatarsophalangeal joint. However, local factors that contribute to tophus formation are changes in perioperative pH level, lower body temperature, explaining nocturnal attacks; and the level of articular dehydration due to diuretics. Involvement of peripheral joints and soft tissues has been attributed to these areas being cooler than the core body temperature. This temperature-dependent alteration in monosodium urate solubility has been proposed as a reason for

Figure 3. (A, B) Intraoperative photo shows a gouty tophus compressing the medial plantar nerve. (C) The excised mass was composed of a yellowish tissue.

Figure 4. Histopathologic findings with H&E stain (A: ×100, B: ×200) show the presence of crystal deposits surrounded by a scalloping of palisaded histiocytes and multinucleated giant cells (arrows) containing an amorphous–appearing pale to pink deposits in the center (arrowheads).

commonly involved in TTS than the lateral plantar nerve. Numerous conditions, such as, trauma, SOLs, and deformities of the foot have been reported to cause or to be causally related with TTS. However, TTS caused by gouty tophi is extremely rare condition and, to the best of our knowledge, this is the second report of TTS caused by gouty tophi.

Gout is a common cause of acute monoarticular arthritis and the initial attack usually affects a single joint. It usually affects the first metatarsophalangeal joint of the foot and less commonly other joints, such as the wrists, elbows, knees and ankles. Chronic gout typically results in polyarthropathy with an eccentric, tophaceous, soft tissue deposits. Most tophi are located subcutaneously which can be diagnosed easily without imaging studies, however, tophi are sometimes deposited within a joint. Moreover, the presence of intra-articular tophi has been reported to be correlated with longer disease duration and poor tolerance to medication. Poorly controlled gout can also cause multiple joints involvement of tophi in an ascending fashion with arthritis and bone destruction. In our case, the patient had not received any treatment for gout despite having suffered severe pain of the first metatarsophalangeal joint for six months. We were able to confirm intra-articular tophi and joint destruction in the contralateral subtalar joint by an MRI after surgery, although no TTS symptoms were apparent.

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our bilateral ankles and feet peripheral tophaceous deposits.

TTS is diagnosed based on detailed history taking and clinical examination. Moreover, electrodiagnostic studies provide additional information for the diagnosis and treatment planning. An MRI is also helpful for evaluating TTS due to its ability to precisely define the neurovascular and musculoskeletal structures and pathologies of these structures. In particular, in TTS with a SOL, MRI is useful for localizing the lesions within the tarsal tunnel and for determining their extents and relationships with the posterior tibial nerve. In our case, the patient had pain and paresthesia of the foot as well as a positive Tinel’s sign on the tarsal tunnel area. Although electrodiagnostic studies were not performed, we were able to diagnose TTS because SOL was confirmed in the spot with a positive Tinel’s sign by MRI.

Some authors have reported that surgical outcomes are poor when surgical treatment is delayed, and assert that a cause of TTS is idiopathic. An early surgical treatment is recommended when SOL is confirmed as the etiology of TTS. Thus far, although little information is available about the surgical outcome for TTS caused by gouty tophus, most case reports recommend surgical treatment for chronic carpal tunnel syndrome due to gouty tophus. In our patient, paresthesia and Tinel’s sign were completely resolved at postoperative six months. Nevertheless, there are risks of poor wound healing, surgical wound dehiscence, cicatrix irritation and recurrence of tophaceous discharge post excision, therefore, these complications should be considered during surgical planning.

REFERENCES