Tarsal Tunnel Syndrome Secondary to a Ganglion

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ABSTRACT
A case of tarsal tunnel syndrome secondary to a ganglion is described. Both ultrasonography and magnetic resonance imaging clearly showed the presence of a ganglion compressing the medial plantar nerve within the tarsal tunnel. The detection of a space-occupying lesion in a patient with tarsal tunnel syndrome is important as surgery is advised.

Key Words: Ganglion, Magnetic resonance imaging, Tarsal tunnel syndrome, Ultrasonography

CLINICAL DETAILS
A 39-year-old teacher presented with an insidious onset of numbness over the right foot for approximately one month. The patient did not have a history of trauma. Numbness mainly involved the medial aspect of the sole and the big toe. There was no numbness over the lateral aspect of the sole or the heel region. Physical examination showed bilateral, flexible, flat feet. There was diffuse swelling immediately posterior and distal to the medial malleolus of the right foot (Figure 1). Neurological examination of the right foot confirmed a significant decrease in light touch sensation over the medial portion of the sole and the medial three-and-a-half toes. Tinel’s sign (distal tingling) was elicited by percussion over the tarsal tunnel. An initial diagnosis of tarsal tunnel syndrome was made. Plain radiographs did not reveal any specific bony abnormality. Ultrasonography showed an echo-free cystic lesion, measuring 1.6 cm x 1 cm x 5 cm, between the flexor digitorum
longus and the medial plantar nerve in the tarsal tunnel (Figure 2). There was no ultrasonographic evidence of tenosynovitis. The lesion showed no doppler signal on colour doppler study and was not compressible. Magnetic resonance imaging (MRI) of the right ankle showed an elongated tubular structure inside the tarsal tunnel, between the flexor digitorum longus and the flexor hallucis longus tendon, best shown in oblique sagittal images. The lesion was T1 hypointense and T2 hyperintense, with rim enhancement on contrast studies (Figure 3). A diagnosis of tarsal tunnel syndrome caused by a ganglion was made. Surgical decompression, with release of the tarsal tunnel and excision of the ganglion was performed. After release of the flexor retinaculum, the ganglion was located between the flexor digitorum longus tendon in front and the medial plantar nerve behind (Figure 4). The ganglion originated from the talocalcaneal joint and extended distally inferior to the deep fascia of the abductor hallucis muscle (Figure 5). Two months after surgery, a significant decrease in numbness of the sole was noted.
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COMMENTS

Tarsal tunnel syndrome was first described in 1962 by both Keck and Lam. It is an entrapment neuropathy, involving the posterior tibial nerve within the tarsal canal, behind the medial malleolus. The posterior tibial nerve gives rise to 3 branches, namely the medial plantar nerve, the lateral plantar nerve and the medial calcaneal branch. It courses through a fibro-osseous tunnel that is bounded by the flexor retinaculum superficially; the medial surface of the talus, sustentaculum tali, and the medial calcaneal wall laterally; and the abductor hallucis muscle inferiorly. The flexor retinaculum, previously called the lucinate ligament, can be difficult to distinguish from the aponeurotic fascia of the leg at its superior border. In a study of 31 feet in 20 cadavers, Dellon and Mackinnon noted great variability in the origin of the medial calcaneal branch, with 40% arising proximal to the tarsal tunnel and 25% having multiple branches within or proximal to the tunnel. The medial plantar nerve, the larger of the two terminal branches, courses obliquely through the tarsal tunnel, anterior to the medial plantar artery. It then passes deep to the abductor hallucis fascia and runs anteriorly between the abductor hallucis muscle and the flexor digitorum brevis muscle.

Tarsal tunnel syndrome is considered an idiopathic condition. Some cases are associated with trauma, while others are secondary to a space-occupying lesion. In a review of 24 reports on tarsal tunnel syndrome, documenting a total of 186 cases, Cimino noted that 25 cases were reported to be idiopathic, while no specific cause was reported in a further 64 cases. The aetiology given for the remaining 97 patients’ conditions included trauma (21), varicosities (16), heel varus (14), fibrosis (11), heel valgus (10), ganglion (3), diabetes (3), obesity (3), tight tarsal canal (3), hypertrophic abductor hallucis (3), rheumatoid arthritis (3), lipoma (2), and anomalous artery, acromegaly, ankylosing spondylitis, regional migratory osteoporosis, and flexor digitorum accessorius longus, each occurring in a single patient.

Mann states that traumatic causes include a severe ankle sprain, crush injury, fracture of the distal end of the tibia, dislocation of the ankle, or calcaneal fracture. Various space-occupying lesions can also produce the syndrome, including pigmented villonodular synovitis, lipoma, synovial cyst, intraneural degenerative cyst, ganglion cyst and neurilemmoma.

Nagaoka and Satou reviewed 30 patients with tarsal tunnel syndrome caused by ganglia — 16 men and 14 women, with a mean age of 40.5 years (12.0 to 70.0 years). The syndrome presented with numbness or pain in the toes and sole in most patients (97%). Nineteen patients had involvement of the medial plantar nerve alone. Six patients had involvement of the whole plantar aspect, while 3 patients had involvement of both the medial and lateral plantar nerve, and 2 patients had involvement of the medial plantar nerve and the calcaneal branch. All patients presented with numbness along the distribution of the medial plantar nerve. Nineteen patients had sensory disturbances limited to the medial distribution of the plantar nerve. Nineteen patients had sensory disturbances limited to the medial distribution of the plantar nerve, reflecting the high prevalence of ganglia arising from the talocalcaneal joint. Overall, the surgical outcome was excellent in 21 feet and good in 8. In one case, puncture was performed but resulted in persistent and intense irritation at the site of puncture. Consequently, puncture was not recommended by the authors, because of the risk of injuring branches of the tibial nerve in the tarsal tunnel.

In the case presented here, physical examination showed involvement of the medial plantar nerve. Careful palpation along the nerve showed a diffuse but definite swelling just posterior and distal to the medial malleolus, a sign consistent with the presence of a space-occupying lesion. Both ultrasonography and MRI clearly demonstrated the presence of a ganglion, compressing...
the medial plantar nerve within the tarsal tunnel. Surgical excision was performed with good result.

CONCLUSION
In patients presenting with tarsal tunnel syndrome, imaging assessment of a suspected space-occupying lesion is important. This is because the documented presence of a space-occupying lesion is an indication for excision, rather than conservative management.6

REFERENCES