Varicosities Induced Tarsal Tunnel Syndrome: a case report

Hui-Chung Teng[1] Yi-Jiun Chou[2] Meng-Yuan Tsai[1] Clement Kuen-Huang Chen[3]

Department of Radiology[1], Department of Orthopaedics[2], Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan
Department of Medical Imaging[3], Chi Mei Medical Center, Tainan, Taiwan

ABSTRACT

A 54-year-old male patient suffered from numbness at the medial aspect of the right ankle for months. Tinel's sign was positive. Magnetic resonance imaging (MRI) showed serpentine and worm-like tubular structures within the tarsal tunnel with intermediate signal intensity on T1-weighted images, high signal intensity on T2-weighted images, and strong *gadolinium*-contrast enhancement, which allowed specific diagnosis of varicose veins. After failed nonoperative management for months, surgical decompression was performed and varicose veins compressing the posterior tibial nerve was found. The patient was symptom free during postoperative out-patient department follow-ups without recurrence for years.

Tarsal tunnel syndrome (TTS) is an entrapment neuropathy of the posterior tibial nerve and its terminal branches. The syndrome is first described in 1962 by Keck and Lam in two separate case reports [1, 2]. Reported etiologies of TTS include space-occupying lesions (tumors, varicosities, hypertrophic muscle, accessory muscle or bone), inflammatory process (tenosynovitis), post-traumatic change (fibrosis, fracture of posterior process of the talus), ankle or foot deformity (rearfoot valgus deformity, tarsal coalition), etc [3]. The varicosity is not a rare cause of TTS in the previous literature. The clinical information is helpful for the diagnosis of TTS, and MRI can help identify specific underlying etiology. In the literature, MRI demonstration of varicosities induced TTS is limited [3, 4]. Only one report of two cases with clinical data and MRI has been found in English literature. We report a case of TTS resulting from varicose veins with characteristic MRI findings, surgical confirmation, and good clinical result.

CASE REPORT

A 54-year-old man came to our orthopedic clinic due to numbness over the medial aspect of the right ankle for several months. No obvious pain or deformity of foot or ankle was noted. Physical examination revealed Tinel's sign over the medial aspect of the right ankle. Muscle power of bilateral lower legs and feet was normal. He suffered from gouty arthritis for several years without regular treatment. No other systemic disease such as diabetes mellitus or collagen vascular disease was found. Routine radiographs of the right ankle were unremarkable. MRI of the right ankle showed serpentine and worm-like tubular structures with intermediate signal intensity on T1-weighted images, high signal intensity on T2-weighted images, and strong *gadolinium (*Gd)-contrast enhancement within the tarsal tunnel between the flexor digitorum longus and flexor hallucis longus tendons (Fig. 1). No focal flow void or filling defect was identified in the lesion. MRI appearance allowed specific diagnosis of varicose veins. No other space-occupying lesion or abnormality was discerned. Conservative measures including foot elevation, nonsteroid anti-inflammatory medication and elastic stocking were given initially for months but without effect. Then surgical intervention was performed under general anesthesia. A curve incision was made over the right medial malleolar

Correspondence Author to: Clement Kuen-Huang Chen
Department of Medical Imaging, Chi Mei Medical Center, Tainan, Taiwan

Figure 1

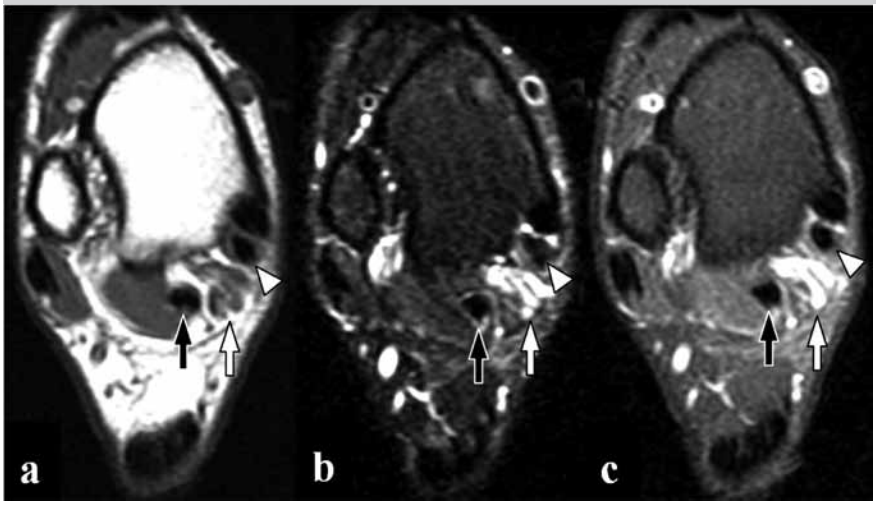

Figure 1. Axial T1-weighted (a), fat-suppressed T2-weighted (b), and Gd-enhanced fat-suppressed T1-weighted (c) MR images demonstrate varicose veins (white arrow) within the tarsal tunnel, between the flexor digitorum longus (arrowhead) and flexor hallucis longus tendons (black arrow).

region. The flexor retinaculum was released and the tarsal canal was carefully examined. Varicose veins compressing the posterior tibial nerve was found (Fig. 2). Neurolysis and resection of varicose veins were performed. Postoperatively the clinical symptoms resolved, and the patient was symptom free during out-patient department follow-ups. No recurrence was noted for ten years.

DISCUSSION

The tarsal tunnel is a channel that the posterior tibial neurovascular bundle and medial flexor tendons of the ankle pass through. It has an osseous floor (the medial aspect of the calcaneus and talus) and is roofed with a deep fascia, the flexor retinaculum. Several fibrous septae extend from the undersurface of the flexor retinaculum to circumscribe each medial tendon and neurovascular bundle respectively. This causes the neurovascular bundle more sensitive to the compressive forces or space occupying lesions in the tarsal tunnel [4, 5].

TTS is reported more common in female patients [3, 6, 7, 8], although it's exact incidence is not known. The patients' age ranges from seven to 76 years, with the majority during the fourth and fifth decades of life [3, 4, 7]. Clinical symptoms include pain, numbness or sensory disturbance in the territory of the posterior tibial nerve and its branches. These symptoms may be worse at night or after exercise. In chronic cases muscle weakness can be present [4, 7]. A Tinel's sign presenting as distal paresthesia along the plantar and medial aspect of the foot and great toe induced by percussion of the posterior tibial nerve is present in most of these cases.

The etiology of TTS can be identified in 50-80% cases. In the literature, varicose vein accounts for 0-33% of TTS

Figure 2

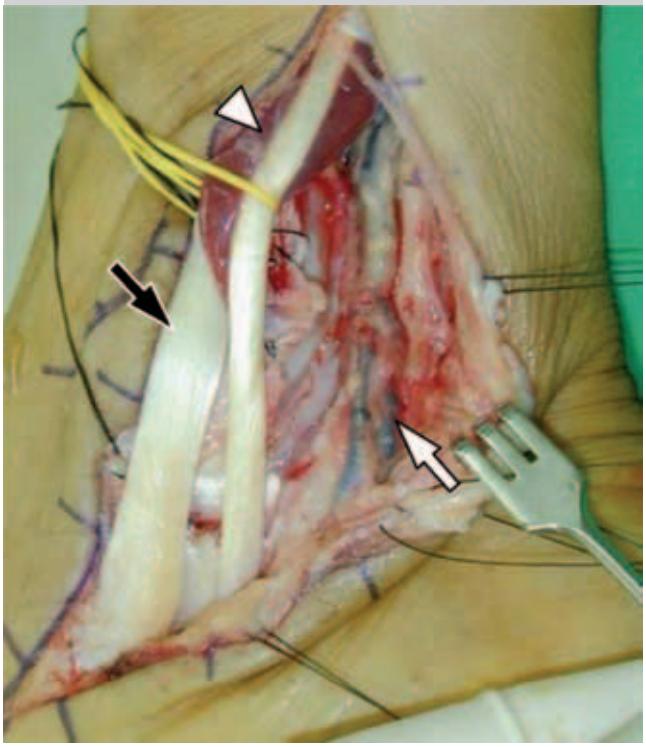

Figure 2. Intraoperative photograph shows prominent varicose veins (white arrow) in the tarsal tunnel. Note the retracted posterior tibialis tendon (black arrow) and flexor digitorum longus tendon (arrowhead).

[3, 4, 7, 8]. There are only two cases report of varicosities induced TTS initially diagnosed by MRI and confirmed with surgery [3].

Plain radiograph and computed tomography scan can

identify osseous causes of TTS such as fracture, exostosis, and coalition. MRI is superior in detecting soft-tissue causes of TTS including varicosities, tumors, fibrosis, accessory or hypertrophic muscles, and other inflammatory or post-traumatic etiologies [9]. Kerr and Frey [4] presented 33 feet with TTS diagnosed by MRI. Eight of these cases (24%) were caused by varicose veins. With the application of multiplanar reconstruction and novel pulse sequences, MRI can provide excellent soft tissue contrast, well depict the anatomy and structures of the tarsal tunnel, identify underlying etiologies of TTS and define their relationship with the posterior tibial neurovascular bundle [5].

Conservative measures, including medication, orthotics, and physiotherapy, are usually applied first in the management of TTS. Surgical decompression is indicated for those cases with failed nonoperative management. Among the cases of TTS with surgical decompression, 44-95% had satisfactory result [8, 10].

In summary, the varicosity is a not rare but treatable cause of TTS. MRI can help identify its characteristc features, depict extent and size of the lesion and its relationship to the posterior tibial neurovascular bundle, which are important to the definitive diagnosis and surgical management.

REFERENCES

1. Charles K. The tarsal-tunnel syndrome. J Bone Joint Surg Am 1962; 44: 180-182
2. Lam SJ. A tarsal-tunnel syndrome. Lancet 1962; 2: 1354-1355
3. Pasku DS, Karampekios SK, Kontakis GM, Katonis PG. Varicosities as an etiology of tarsal tunnel syndrome and the significance of tinel's sign: report of two cases in young men and a review of the literature. J Am Podiatr Med Assoc 2009; 99: 144-147
4. Kerr R, Frey C. MR imaging in tarsal tunnel syndrome. J Comput Assist Tomogr 1991; 15: 280-286
5. Erickson SJ, Quinn SF, Kneeland JB, et al. MR imaging of the tarsal tunnel and related spaces: normal and abnormal findings with anatomic correlation. AJR Am J Roentgenol 1990; 155: 323-328
6. Lau JT, Daniels TR. Tarsal tunnel syndrome: a review of the literature. Foot Ankle Int 1999; 20: 201-209
7. Baba H, Wada M, Annen S, Azuchi M, Imura S, Tomita K. The tarsal tunnel syndrome: evaluation of surgical results using multivariate analysis. Int Orthop 1997; 21: 67-71
8. Urgüden M, Bilbaşar H, Ozdemir H, Söyüncü Y, Gür S, Aydin AT. Tarsal tunnel syndrome - the effect of the associated features on outcome of surgery. Int Orthop 2002; 26: 253-256
9. Hudes K. Conservative management of a case of tarsal tunnel syndrome. J Can Chiropr Assoc 2010; 54: 100-106
10. Sung KS, Park SJ. Short-term operative outcome of tarsal tunnel syndrome due to benign space-occupying lesions. Foot Ankle Int 2009; 30: 741-745