A Ganglion Cyst at the Foot Causing Tarsal Tunnel Syndrome Detected by Magnetic Resonance Imaging

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Introduction

Tarsal tunnel syndrome (TTS) is caused by compression of the posterior tibial nerve as it passes through the posterior tarsal tunnel. It is much more common in the posterior tarsal tunnel than in the anterior by compression of the deep peroneal nerve as it passes beneath the superficial fascia of the ankle [1]. TTS may be associated with exacerbation of symptoms at night, by exercise or rest, or by elevating or lowering the extremity, and symptoms confined to the lateral planter nerve, medial planter nerve, or medial calcaneal nerve [2]. Failure to diagnose and treat neuropathies effectively can cause permanent neuropathic pain and functional disability. In most cases, TTS develops from unknown causes and can be treated conservatively. However, early surgical intervention is mandatory when neuropathy arises from a progressing occult pathology to avoid repeated steroid injections, prescription of several medication for neuropathic pain, and to prevent permanent neuropathic pain. MRI and electromyography, together with clinical history and physical examination, can help to make the differential diagnosis.

Case Report

The patient was a 31-year-old man with a 6-month history of pain, numbness, and paresthesia on the left great toe and the first metatarsal area in the sole. The pain was constant and burning. Symptoms were aggravated by pressure on the sole such as walking and weight bearing. Symptoms had initially localized in the great toe and sole but gradually extended to the second and third toes. Patient had been prescribed lot of local steroidal injections but had no permanent relief. A physical examination did not reveal specific abnormalities except a local tenderness just below and down to the medial malleolus over the foot. There was no palpable swelling. We then performed an MRI which revealed a unilocular, ganglion cyst around the medial planter nerve in the digitorum muscles of the foot. [Fig.1 and 2]. Nerve-conduction studies showed that conduction velocity was reduced in the right medial plantar nerve. There was no apparent weakness of the intrinsic muscles of the right foot, but a subtle T2 high signal change in the abductor hallucis and flexor digitorum brevis muscle was seen on MRI. We suspected subacute muscle denervation and planned the patient for surgery. Intra-operatively, ganglion cyst was found close to the medial planter nerve and after meticulous dissection nerve was freed from the ganglion cyst [Fig. 3 and 4]. After surgery two weeks later, the patient had dramatic response with improved symptoms.

Discussion

The most common cause of compression of the posterior tibial nerve around the tarsal tunnel is trauma to the ankle, but any occult pathology, such as a space-occupying lesion like a ganglion cyst, can cause similar neuropathic pain [3]. Tarsal tunnel syndrome is an entrapment neuropathy caused by compression of the posterior tibial nerve and its branches, between the calcaneum and the medial malleolus under the cover of the flexor retinaculum [4, 5]. TTS can be misdiagnosed as ankle arthritis and lumbar radiculopathy [6]. However, patients with ankle arthritis have radiologic evidence of it. TTS can be distinguished from lumbar radiculopathy because patients suffering from TTS have no reflex changes, and motor and sensory changes are localized to the distribution of the distal posterior tibial nerve and its branches. Secondary TTS by a ganglion is unusual,[4,5] but it can occur. Kirby and colleagues [7]) found that ganglion cysts were the most common benign lesion of the foot, accounting for nearly one-third of all cases. The size and location of the ganglion cyst is influences entrapment neuropathy because the volume of the tarsal tunnel compartment ranges from 18 cm3 to 21 cm3 in normal individuals [8]). In addition, Takakura and colleagues ([9] mentioned that a large ganglion can easily be diagnosed by MRI, but is difficult if it is smaller than 0.5 × 0.5 × 0.5 cm. A cystic and completely anechoic fluid collection around the ankle detected by USG commonly represents a ganglion cyst [10].
Conclusion

In conclusion, neuropathy arising from progressing occult pathology should be diagnosed early with high degree of suspicion by modern imaging facilities and treated adequately to avoid permanent neuropathic pain and functional disability. When a suddenly exacerbated case of neuropathy is encountered, a space-occupying lesion such as a ganglion cyst should be considered and clinicians must try to detect it as soon as possible. MRI may be a helpful device for this effort. The unique clinical symptoms and signs of our diagnosis of a ganglion causing medial plantar nerve compression were confirmed by MRI and then operative findings.

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Consent "Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal."

Authors' contributions "IH Wand AQS analyzed and interpreted the patient data regarding the disease. MJ discussed the case with radiology and pathology experts and formulated the investigative and treatment plan. AQS and IHW performed the biopsy. IHW was responsible for followup and prepared the manuscript. All authors read and approved the final manuscript."

References

Illustrations

Illustration 1

Figure 1

MRI showing unilocular hyperintense cystic lesion in digitorum muscles of foot.
Illustration 2

Figure 2

MRI showing ganglion cyst.
Illustration 3

Figure 3

Ganglion cyst pressing on a medial planter nerve detected intraoperatively.
Illustration 4

Figure 4

Removed ganglion cyst
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