A Ganglion Cyst around the Tarsal Tunnel Detected by Ultrasonography and MRI
— A case report —

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Tarsal tunnel syndrome is often misdiagnosed and it shares clinical features with other diseases of the lower extremity such as lumbar radiculopathy and arthritis. Failure to diagnose and treat neuropathies effectively can cause permanent neuropathic pain. We report a case of a ganglion cyst detected early using ultrasonography and MRI in a 51-year-old man who complained of rapidly aggravating pain, numbness and paresthesia on the great toe and the first metatarsal area in the sole, symptoms that resembled tarsal tunnel syndrome. Surgical treatment could be performed early with no permanent sequelae. We could also avoid repeated steroid injections or prescription medications.


Key Words: ganglion cyst, tarsal tunnel syndrome, ultrasonography.
CASE

The patient was a 51-year-old man with a 4-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.

A physical examination did not reveal specific abnormalities except a positive tarsal Tinel’s sign just below and behind the medial malleolus over the posterior tibial nerve. USG around the tarsal tunnel area showed an anechoic and cystic mass (Fig. 1).

We then performed an MRI and nerve-conduction studies. There was a $1.1 \times 1.4 \times 1.2$ cm unilocular, ganglion cyst around the tibial nerve division within the tarsal tunnel on MRI (Fig. 2). Nerve-conduction studies showed that conduction velocity was reduced in the left tibial nerve and the medial plantar nerve.

There was no apparent weakness of the intrinsic muscles of the left 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 transferred the patient to an orthopedic surgeon.

After surgery two weeks later, the patient was discharged with improved symptoms.

DISCUSSION

TTS 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.\textsuperscript{3,4} TTS can be misdiagnosed as ankle arthritis and lumbar radiculopathy.\textsuperscript{5} 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,\textsuperscript{3,4} but it can occur. Kirby and colleagues\textsuperscript{6} 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 cm\(^3\) to 21 cm\(^3\) in normal individuals.\textsuperscript{7} In addition, Takakura and colleagues\textsuperscript{8} mentioned that a large ganglion can easily be diagnosed by MRI, but is difficult if it is smaller than 0.5 \(\times\) 0.5 \(\times\) 0.5 cm. While USG does not provide a high degree of specificity for soft tissue masses, some common benign masses have typical imaging features. A cystic and completely anechoic fluid collection around the ankle commonly represents a ganglion cyst,\textsuperscript{9} and USG can show the cystic nature of the mass, define its extent, and in some cases reveal its origin.

In conclusion, neuropathy arising from progressing occult pathology should be 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 pain clinicians must try to detect it as soon as possible. USG may be a helpful device for this effort.

### REFERENCES