



Concurrent Lateral Dorsal Cutaneous and Deep Peroneal Intraneural Ganglion Cysts in the Foot



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ABSTRACT

Intraneural ganglion cysts are non-neoplastic collections of mucinous material within the epineurium of peripheral nerves. We present a rare case of 2 intraneural ganglion cysts in separate nerves of the foot, originating from different joints within the same joint complex. Our findings add to the large body of evidence supporting the unifying articular (synovial) theory. We emphasize the importance of delineating the cyst morphology and origins using high-resolution magnetic resonance imaging before surgery and searching for and resecting the articular branch or branches during surgery.

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Intraneural ganglion cysts are non-neoplastic mucinous collections of joint fluid within the epineurium of peripheral nerves. They typically occur within the common peroneal nerve but have been described in most nerves in the appendicular skeleton that innervate the synovial joints (1). They observe a common progression pattern: egressing from a capsular rent in the joint, dissecting along an articular branch, and propagating to a parent nerve along the path of least resistance (2).

Intraneural ganglia of the foot and ankle are extremely rare, with approximately 20 reports published. The dorsal innervation of the foot, as demonstrated in cadaveric studies (3), is provided by the lateral dorsal cutaneous branch of the sural nerve (LDCN), superficial peroneal nerve, and deep peroneal nerve (DPN). Intraneural ganglia have previously been reported in all 3 of these terminal branches (4–15) but have never been reported arising from the articulation of the cuboid, fourth, and fifth metatarsal bases. We present the unique occurrence of 2 concurrent intraneural ganglia arising from this joint complex and extending in different directions along the LDCN and DPN. The diagnosis and management were guided by the preoperative identification of a common joint complex origin for these cysts on high-resolution magnetic resonance imaging (MRI).

Case Report

A 49-year-old female presented with a recurrent, lobulated mass on the lateral border of the left foot (Fig. 1) that had been noted to fluctuate in size for 2 years. She had sensory deficit on the dorso-lateral surface of the foot but no motor deficit. The patient had previously been treated at an outside institution for a dorsal foot ganglion. The initial presentation was of a mass in the fourth dorsal



Fig. 1. Lobulated mass on the dorsolateral aspect of the left foot, running parallel to the fifth metatarsal, along the course of the lateral dorsal cutaneous branch of the sural nerve.

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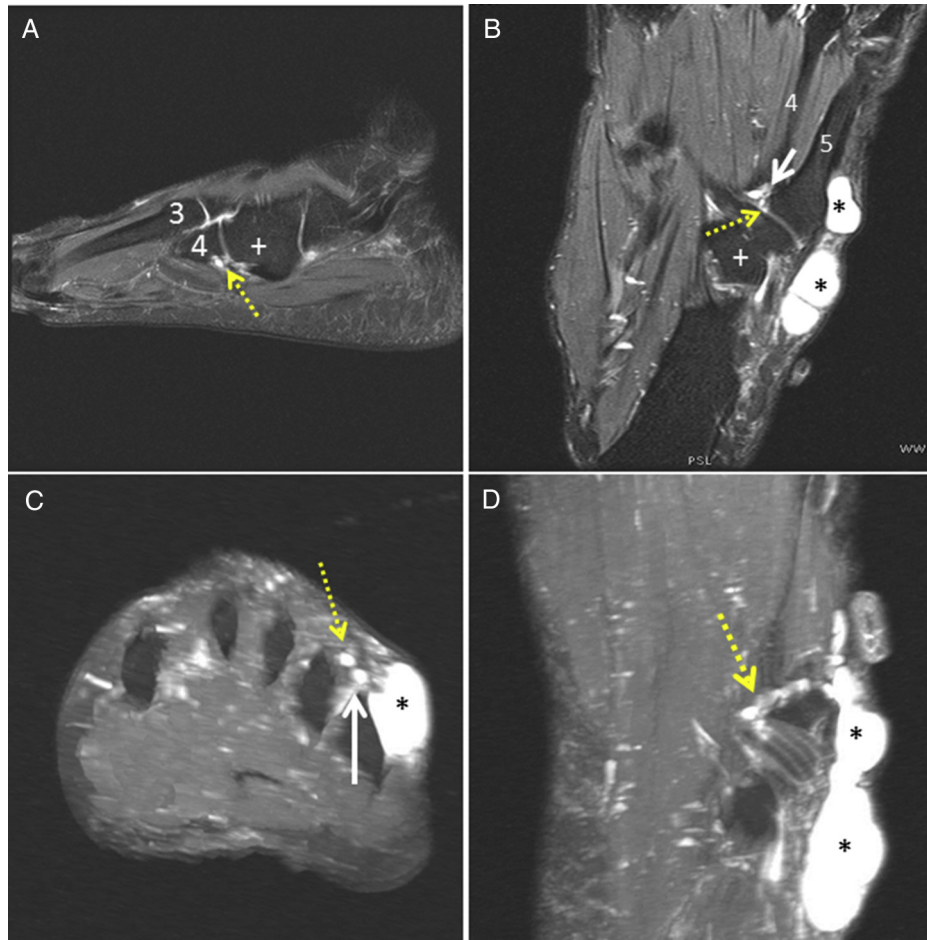


Fig. 2. (A) Sagittal T₂-weighted fast spin echo magnetic resonance image with fat suppression showing the origin (yellow dashed arrow) of the more dorsomedial cyst from the articulation of the cuboid (plus sign) and fourth metatarsal base. (B) Long-axis, T₂-weighted fast spin echo image with fat suppression showing the separate cyst origins from the intermetatarsal space (white arrow) and articulation of the cuboid (plus sign) and fourth metatarsal (yellow dashed arrow). Also shown is the origin of the lateral dorsal cutaneous branch of the sural nerve (LDCN) intraneural cyst (asterisks) from the fourth intermetatarsal space (yellow dashed arrow). (C) Short-axis maximum intensity projection from the same image set showing the dorsomedial deep peroneal intraneural cyst (yellow dashed arrow) arising from the articulation of the cuboid (not seen on this image) and fourth metatarsal and the more lateral LDCN cyst (asterisk) arising from the fourth intermetatarsal space (white arrow). (D) Long-axis maximum intensity projection from the same image set as in Fig. B showing the deep peroneal nerve intraneural cyst from the dorsal fourth metatarsal/cuboid joint; note its oblique course (yellow dashed arrow). The larger LDCN intraneural cyst was more laterally located (asterisks).

web space, between the fourth and fifth metatarsals. Compression by footwear caused pain. The first operation to excise it was immediately followed by paresthesias over the dorsal aspects of the third, fourth, and fifth digits. Several weeks later, she had developed a clinically obvious recurrence at the same location. After 3 months of persistent symptoms, she underwent a second operation. The cyst

was traced down to the fifth extensor tendon and removed en bloc, with a portion of the tendon. No joint connection was identified at either operation. Several months later, the patient noted a new cyst along the lateral border of her foot with associated paresthesia. The patient was subsequently referred to our institution after 2 years of symptoms—the initial assessment and procedure were performed in

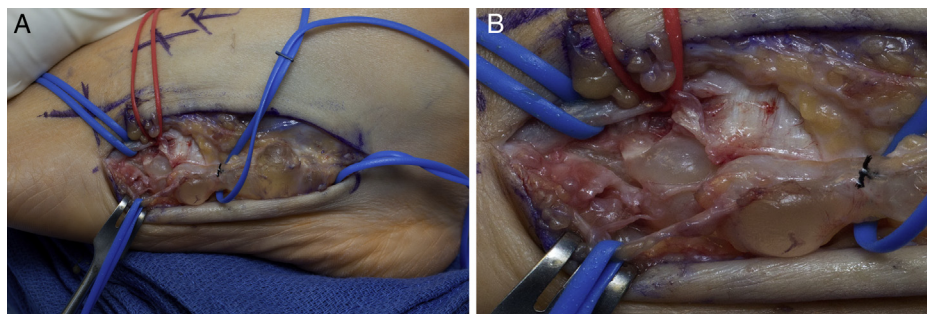


Fig. 3. A straight incision was made over lateral border of the left foot. (A) Vessel loops around the lateral dorsal cutaneous branch of the sural nerve cyst (bottom middle blue loop) and intact nerve proximally (bottom right blue loop) and distally (bottom left blue loop). A separate cystic nerve—the lateral terminal branch of the deep peroneal nerve—is visible (top left blue loop), traveling in an oblique course. (B) Magnified view showing the articular branch (red vessel loop) of the deep peroneal nerve to the fourth metatarsal–cuboid articulation, as well as the recurrent LDCN branch below it.

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