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Guyon's canal syndrome due to intraneural lipoma of the ulnar nerve: A case report

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Abstract
Intraneural lipomas are rare benign tumors that grow inside peripheral nerves and can cause compression symptoms. When they occur in Guyon's canal, they may lead to ulnar neuropathy, similar to more common conditions like cubital tunnel syndrome. A 56-year-old woman presented with a painless swelling in her right hand and numbness in the ring and little fingers. MRI showed a well-defined fatty mass extending from the distal forearm through Guyon's canal into the palm and thenar region, consistent with an intraneural lipoma of the ulnar nerve. The lesion was completely removed under regional anesthesia while preserving nerve fascicles. Histology confirmed a spindle cell lipoma. At 8 months after surgery, the patient had full recovery of hand strength and sensation, with no recurrence. Intraneural lipoma of the ulnar nerve is a rare cause of compression at the wrist. MRI is key for diagnosis, and complete surgical removal usually leads to excellent recovery.

Keywords: Intraneural lipoma, guyon's canal syndrome, ulnar nerve compression, hand tumor, hand lipoma

Introduction
Lipomatous tumors affecting peripheral nerves are rare, with intraneural lipomas representing a minority subset. Unlike extraneural lipomas, intraneural variants originate within the epineurium and may cause nerve compres-sion, particularly when occurring in confined anatomical spaces like Guyon's canal. These lesions can lead to ulnar neuropathy, mimicking more common causes such as cubital tunnel syndrome or space-occupying lesions like ganglion cysts [1].
We report a rare case of intraneural lipoma of the ulnar nerve extending through Guyon's canal, mid palmar space and thenar region, presenting with ulnar compressive neuropathy symptoms, and review the surgical approach and outcome.

Clinical Case
A 56-year-old right-handed woman presented with a 2–3 year history of a painless, slowly enlarging subcutaneous mass in the right hand. She reported progressive paresthesias in the ring and little fingers. There was no history of trauma, systemic disease, or prior surgery.

Physical examination
A palpable, non-tender, soft mass was noted over the thenar and hypothenar eminences, extending proximally along the ulnar border of the distal forearm. Mild motor weakness (MRC grade 4/5) was present in the abductor digiti minimi; the adductor pollicis was unaffected. Hyposthesia and paresthesias were reported during percussion in the 4th and 5th digit.

Diagnostic Imaging:
An MRI of the right wrist and distal forearm revealed: "A large, well-defined, fat-density lesion located in the thenar and hypothenar regions, extending between the flexor tendons and along the ulnar aspect of the subcutaneous forearm. The lesion showed hyperintensity on T_1 and T_2, signal suppression on fat-saturated sequences, and no contrast enhan-cement, consistent with a fat-containing lesion, most likely a lipoma. No calcifications or adjacent inflammatory changes were noted." (Fig. X) Electroneuro-myography (EMG/NCS) was not performed, as the clinical and imaging findings were deemed sufficient for diagnosis and surgical planning. (Fig. 1)

Surgical technique

The patient underwent surgical excision under regional anesthesia and tourniquet control. A volar longitudinal incision was made along the ulnar side of the wrist and distal forearm (Fig. 2). Blunt and sharp dissection exposed the adipose tumour enveloped by ulnar nerve fascicles. the lipoma had the shape of a u and extended through the mid palmar space into the tenar region. Due to being encapsulated and therefore being a continuous mass, we were able to remove it en bloc without extending the incisions (Fig. 3). Intraneural dissection was performed to preserve fascicles and divide the tumour, and full decompression of the nerve was performed along its course through Guyon's canal (Fig.4).

Histopathological findings

Spindle cell lipoma was identified, with a thin capsule.

Follow up: At the 8-month follow-up, the patient reported complete resolution of paresthesias and full recovery of intrinsic hand function. Motor strength of the abductor digiti minimi had returned to normal (MRC grade 5/5), and no residual muscle weakness or sensory deficit was observed. There was no evidence of local recurrence or postoperative complications.

Discussion

Intraneural lipomas are rare benign soft-tissue tumors that originate within the epineurium and consist of mature adipose tissue. They typically present as slow-growing, painless masses and may remain asymptomatic for years. However, when they reach sufficient size or develop within anatomically confined regions such as Guyon's canal, they can produce compressive neuropathic symptoms [2].

Lipomatous lesions associated with peripheral nerves are classified according to their relationship with the nerve: extraneural lipomas, which arise adjacent to the nerve and compress it externally, and intraneural lipomas, which are encapsulated within the epineurium. The majority of intraneural lipomas are described in the median nerve, whereas involvement of the ulnar, radial, posterior interosseous, or sciatic nerves is distinctly uncommon [3].

Magnetic resonance imaging (MRI) plays a central role in the diagnosis and surgical planning of these lesions [2]. Intraneural lipomas appear as well-defined, homogeneously hyperintense masses on T_1- and T_2-weighted sequences, with complete signal suppression on fat-saturated images and no post-contrast enhancement. These imaging characteristics are diagnostic of a fat-containing lesion and, in most cases, obviate the need for preoperative biopsy [2].

The main differential diagnosis is fibrolipomatous hamartoma (FLH), also known as lipofibromatous hamartoma, which is characterized by an infiltrative proliferation of fibrofatty tissue interspersed among and in continuity with nerve fascicles. On MRI, FLH exhibits the typical "spaghetti-like" or "coaxial-cable" appearance, in contrast to the well-circumscribed fatty mass of an intraneural lipoma, which is clearly separated from the nerve fascicles [2]. Accurate distinction between these entities is essential, as intraneural lipomas are amenable to complete surgical excision, whereas FLH often requires only decompression to preserve nerve function.

In the majority of reported cases, intraneural lipomas can be enucleated without injury to nerve fibers, owing to their encapsulated nature and lack of infiltrative behavior. Early surgical intervention is recommended when compressive symptoms are present, as prompt decompression generally results in favorable neurological recovery [4].

In our case, the lesion's extensive yet encapsulated configuration allowed en bloc removal with careful microsurgical dissection of the involved fascicles, resulting in full functional recovery and no recurrence at 8 months.

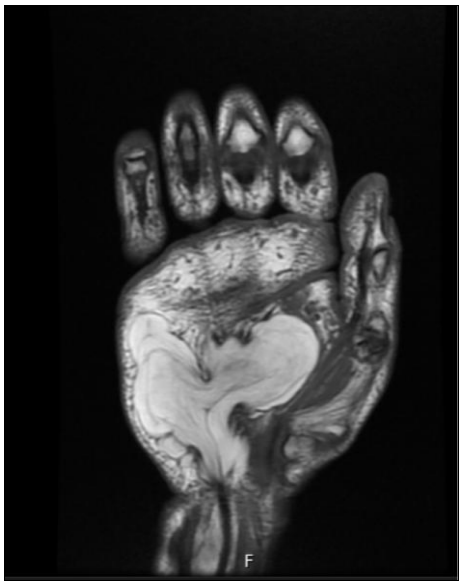

Fig 1: MRI of the hand (T_1)

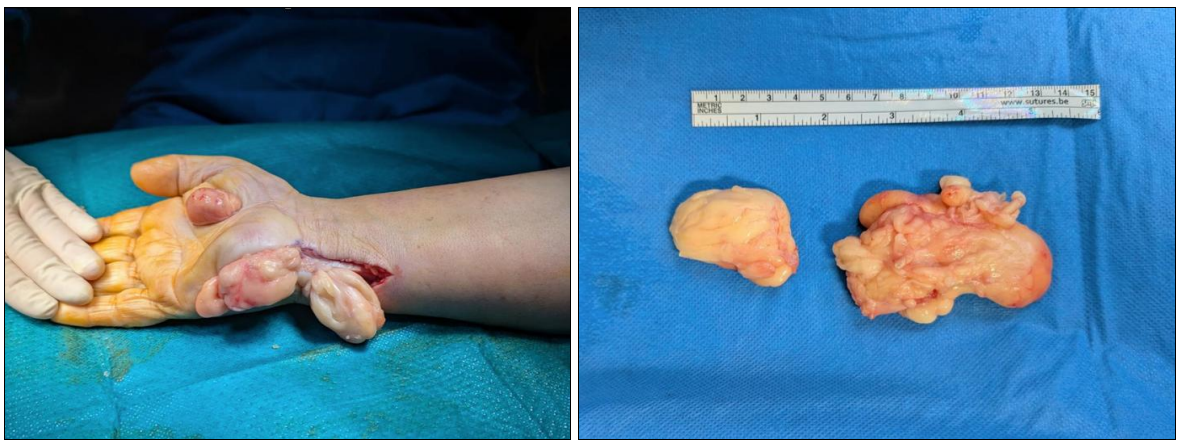

Fig 2 and 3: Lipoma of the right hand.

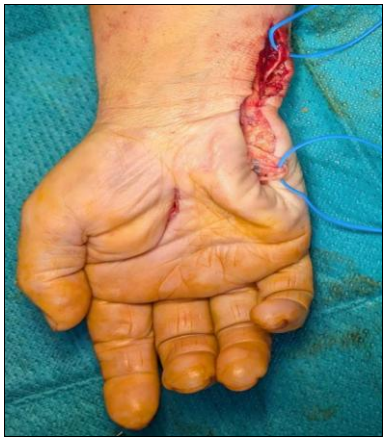

Fig 4: Ulnar nerve fascicles and Guyon's canal release

Conclusion

Intraneural lipomas of the ulnar nerve are exceptionally rare causes of compressive neuropathy at the wrist. MRI enables accurate preoperative characterization and distinction from other lipomatous nerve lesions. Complete microsurgical excision is both feasible and curative in most cases, leading to excellent neurological outcomes when performed with meticulous preservation of nerve fascicles. Early recognition and surgical management are key to preventing irreversible nerve damage and ensuring optimal recovery.

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