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CASE REPORT

Guyon Canal Syndrome Due to Schwannomas of Zone 3 Ulnar Nerve without Neurologic Symptoms: A Case Report

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Abstract

We report a mass without neurologic findings and moderate pain in a 33-year-old male's wrist at the 3rd zone of the ulnar nerve due to schwannoma that was excised successfully, and the patient was free of symptoms. We further discuss the prevalence and management of this lesion.

Level of evidence: V

Keywords: 3rd zone of the ulnar nerve, Guyon canal syndrome, Schwannomas

Introduction

Compressive neuropathy of the ulnar nerve can be observed at all of the segments of the ulnar nerve; however, compressive neuropathy in the wrist is a rare condition named Guyon's canal syndrome. This syndrome presented with motor-sensory symptoms based on which part of the ulnar nerve in the wrist was involved. The ulnar nerve's compression resulted in paresthesia or numbness (or both in the small or the ring finger (or both). In cases with severe ulnar nerve neuropathy, ulnar nerve motor dysfunction leads to weakness, clawing deformity, interossei and hypothenar atrophy, as well as hand clumsiness. In rare conditions, Guyon's canal syndrome can be presented without neurologic symptoms, and the mass lesion is the only complaint of the patient. There are some primary causes, such as space-occupying lesions, including ganglion cyst, lipoma, pseudoaneurysm, thrombosis, and in rare cases, schwannoma (neurilemmoma). Some traumatic conditions may also induce neuropathies, including hamate hook fracture or nonunion, acute or repetitive trauma, and anomalous muscle. We report a rare occurrence with schwannoma in the Guyon canal presented with mass lesions without a neurologic finding.

Case report

A 33-year-old male presented to our clinic with a chief complaint of a mass lesion in his wrist from childhood that was enlarged several months ago. The mass was not painful by itself; however, the pain was started during contact with objects. He had a sedentary occupation and negative family history of any disease. Moreover, he was not a smoker and had no history of trauma to the wrist.

Neither hypothenar nor intrinsic muscle atrophy nor clawing deformity of fingers were observed in P/E. All motor and sensory examination of the median and ulnar nerve, including Wartenberg's sign and Froment's sign, was normal. Tinnel's sign was weakly painful only on the mass; however, it was negative in the medial side of the elbow and median nerve at the wrist. No hyperpigmentation or café-au-lait spots were noted in other parts of the body. A 1*1-cm solid mass was observed in the ulnar side of the wrist that was partially mobile and had no cystic consistency and no pulsation [Figure 1B].

The Electromyography and nerve conduction velocity tests were conducted, and the results were normal. The wrist AP and lateral views were also normal [Figure

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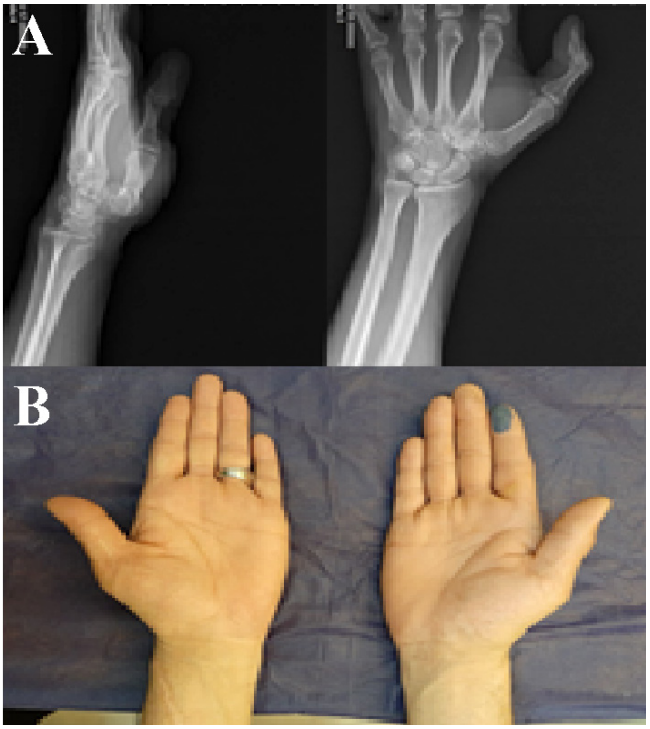

Figure 1. A. hand X-ray showing no bony lesion or pathologies B. As seen in the left-hand photography, there is a lamping mass on the ulnar side of the wrist.

1A]. The MRI showed a well-demarcated low-density and high-intensity mass in T1 and T2, respectively, with a 16*16*11mm dimension in the Guyon canal at the level of the hamate hook in favor of ulnar nerve sheet tumor [Figure 2]. However, it did not clarify the position of mass in the nerve. Under the regional brachial block, a 5-cm longitudinal incision was made directly on the mass of the volar side of the wrist. The mass was identified at the Guyon canal on the 3rd zone (sensory branch) encapsulated in the nerve sheet with the involvement of only two fascicles. It was excised

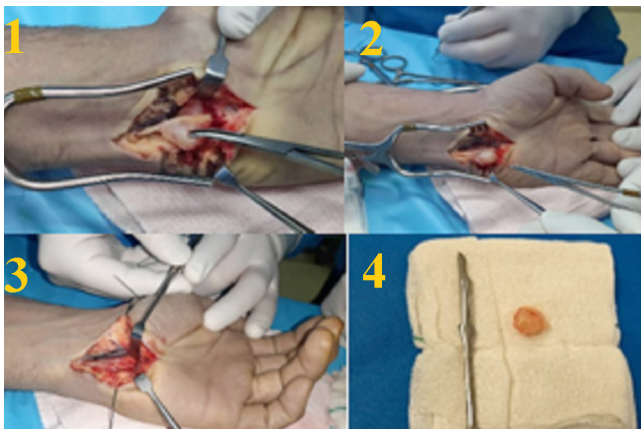

Figure 3. The surgical process.

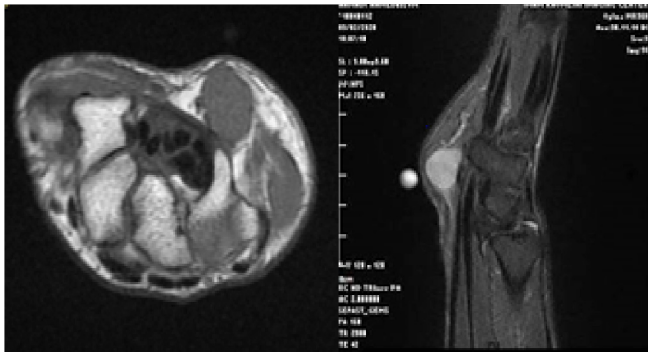

Figure 2. A hyper-signal mass presented in the Magnetic Resonance Imaging.

carefully without damage to the nerve; however, some thinning of involved nerve fascicles remained. The sample was sent for the pathological examination that was made schwannomas with spindle cells [Figure 3]. A short arm volar splint was applied for two weeks after surgery, the suture removed after two weeks, and the patient was free of mass and other symptoms at two-months follow-up.

Discussion

Guyon canal syndrome is a rare ulnar neuropathy that hurts the ulnar nerve's distal portion as it moves through a thin direction at the wrist. The ulnar nerve originates from C8-T1 and is a terminal branch of the brachial plexus. The ulnar nerve reaches the hand via the Guyon canal to provide motor and sensory innervation to the digits. Guyon's canal can be damaged with a compressive injury. The anatomic boundaries of the Guyon canal include (1):

-Roof: volar carpal ligament
-Floor: transverse carpal ligament

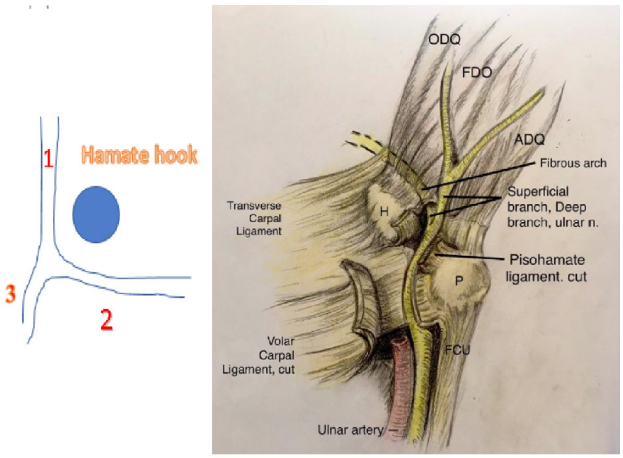

Figure 4. The ulnar nerve courses through the Guyon canal between the volar carpal ligament and the transverse carpal ligament. ADQ, Abductor digiti quinti; FCU, flexor carpi ulnaris; FDQ, flexor digiti quinti; H, hamate; ODQ, opponens digiti quinti; P, pisiform.

-Ulnar side: pisiform, Pisohamate ligament, abductor digiti minimi

-Radial side: the hook of the hamate (1)

The most etiology of Guyon canal syndrome is a ganglion cyst, the hook of hamate fracture/displacement, tumors, repetitive trauma, aberrant muscle, excess fat tissue within the canal, ulnar artery thrombosis, and aneurysm.

Guyon canal is about 4 cm in length and also contains four borders. The roof consists of the volar carpal ligament, and the floor of the canal includes the transverse carpal ligament. The radial border is made of the hook of the hamate, and the medial border is composed of pisiform bone along with the Pisohamate ligament. Ulnar nerve and artery run from this canal, and the mixing motor, as well as the sensory branches of the ulnar nerve, enter the canal. As it travels through it, the nerve splits into superficial sensory and deep motor branches (2).

Each part of the ulnar nerve's involvement produces its unique symptoms based on specific innervation or its part. The ulnar nerve in this canal has three parts, including:

Zone 1: proximal to the motor/sensory bifurcation (a mix of motor and sensory deficits)

Zone 2: along the course of the deep motor branch (pure motor loss)

Zone 3: along with its superficial sensory branch (pure sensory changes) (3) [Figure 4].

After visiting the patient with Guyon canal syndrome, the exact neurologic examination of the ulnar and median nerve's sensory and motor function should be performed carefully. The CT scan, MRI, sonography, and laboratory tests should be evaluated, and the exact pathology that produced this syndrome must be clarified (4).

One of the rare pathologies in the Guyon canal is schwannomas. Schwannomas are mostly benign and homogeneous tumors consisting only of Schwann cells. The tumor is from the nerve sheath; however, it may either push the nerve aside or up against a bony structure (thereby, possibly causing damage). Schwannomas are often slow-growing tumors. For reasons not yet understood, schwannomas are mostly benign and less than 1% of them become malignant degenerating into a form of cancer known as neurofibrosarcoma. These masses are generally contained within a capsule; therefore, surgical removal is often successful (5).

Schwannomas can be contributed to neurofibromatosis type 2, which may be due to a loss-of-function mutation in the protein merlin; however, in some conditions, multiple schwannomas appearing as a schanomatos is not neurofibromatosis type 2 (4). They are universally S-100 positive, which is a marker for the cells of neural crest cell origin. There is a dearth of research about this tumor in the Guyon canal, especially in the 3rd zone (6). In our case, schwannomas were involved only in the 3rd zone, and we did not have a neurologic deficit in the examination after excision. After two and six months of surgery, the patient was normal and without pain, weakness, or recurrence.

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