

Case Report

A Rare Cause of Compression Neuropathy of Upper Limbs – Ganglionic Cysts 上肢壓迫性神經病變的罕見病因——腱鞘囊腫

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ABSTRACT

We report a 51-year-old Chinese male with a ganglion in the Guyon canal causing ulnar nerve palsy and a 54-year-old Chinese male with a ganglion in the elbow causing posterior interosseous nerve (PIN) palsy. Exploration and excision of the ganglions were performed. Both patients made a good recovery.

中文摘要

本文報告一名51歲中國籍男子因患有腕尺管囊腫導致尺神經壓迫症和一名54歲中國籍男子因手肘患有腱鞘囊腫而導致骨間後神經壓迫症。我們分別為這兩名病人進行腱鞘囊腫探查術及切除術，他們術後康復情況良好。

Introduction

Ganglions occur commonly in the wrist and hand,^{1,2} other sites of involvement in the upper limb include elbow and shoulder^{3,4} but these rarely cause compression neuropathy. Ulnar nerve compression by ganglions in the Guyon canal and posterior interosseous nerve compression by ganglions have been reported^{5,6} but extremely rarely. Presentation, diagnosis, treatment and prognosis are discussed.

Case Report

Case 1

A 51-year-old male gardener presented with gradually progressive weakness and wasting of the left hand muscles, and some numbness over the left ring and little finger for 1 year. There was no history of trauma and the patient previously enjoyed good health.

On examination, there was clawing deformity of the left hand. No obvious wrist mass was palpable. The ulnar and radial pulses were normal. There was weakness and wasting of the interossei and hypothenar muscles. The flexor carpi ulnaris, the flexor digitorum profundus of the ring finger and the little finger were normal. The Froment's test was positive. The light touch and pin-prick sensation over the left ring finger and little finger were

diminished. The sensation over the dorsal ulnar aspect of the left hand was normal. Tinel's test over the Guyon canal and the cubital tunnel was equivocal. Elbow flexion test was equivocal. The other neurologic and systemic examinations were unremarkable. Compression of the ulnar nerve at the wrist was suspected. An electrodiagnostic study revealed impaired ulnar nerve conduction at the wrist level.

Operative exploration of the area was performed under general anaesthesia. Intra-operatively, a 2 cm multi-lobulated ganglion arising from the Guyon canal was found and (Figure 1) it compressed the superficial and deep branch of the ulnar nerve in the Guyon canal. There was no intraneural ganglionic extension. There was mild adhesion of the ganglion to the neural sheath. Pathological study confirmed that the lesion was a ganglionic cyst. Complete excision and release of the Guyon canal were performed. There was no adhesion around the ulnar nerve and neurolysis was not performed.

The numbness over ulnar two digits subsided 2 weeks after the operation. There were residual wasting of the hypothenar and interossei muscles and claw hand deformity. The patient could resume his occupation and function well. There was no sign of recurrence of the ganglion. The follow up period was 6 months after the operation.

Case 2

A 54-year-old male chef presented with right elbow pain for 4 months. The patient gradually could not extend his right fingers. There was no history of injury.

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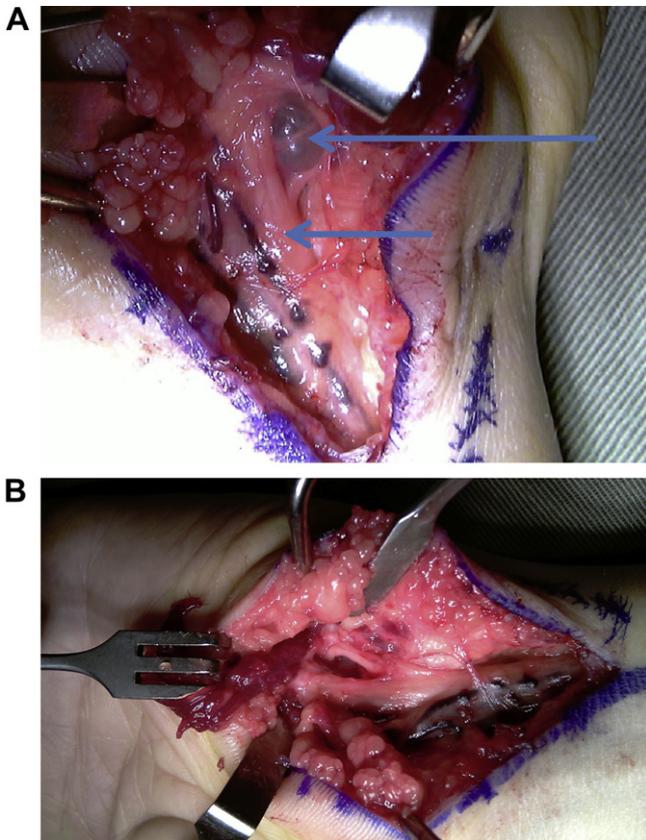


Figure 1. (A) The intraoperative photograph showing the ganglion (long arrow) in the Guyon canal compressing the ulnar nerve (short arrow); (B) photograph showing the ulnar nerve after the ganglion is excised.

Physical examination showed no deformity of the right elbow. The right elbow was tender over the lateral aspect. No obvious mass or swelling was palpable. The range of motion was full. There was finger drop. The thumb and fingers metacarpophalangeal joint extension power were grade 2 out of 5. The wrist extension power was grade 5. Tenodesis effect of the thumb and fingers was intact. Tinel’s test was positive over the site of the elbow tenderness. The sensation of the right upper limb was normal. Spurling’s test was negative. The deep tendon reflex of the upper limb was unremarkable.

Magnetic resonance imaging (MRI) (Figure 2) revealed a cystic lesion, which was T1 hypointense and T2 hyperintense. It was anterior to right proximal radius, deep to the brachioradialis muscle and the brachialis muscle, and abutting the supinator muscle.

Exploration of the area through the Thompson’s approach revealed a cystic mass arising from the radialcapitellar joint capsule. It was near the supinator and compressing the posterior interosseous nerve (PIN) (Figure 3). There was no intraneural extension of the ganglion. Complete excision of the mass with partial capsulotomy and repair of the radialcapitellar joint was performed. Neurolysis was not performed.

Histological study showed a ganglion. A post-operative follow-up of the patient 2 weeks after operation showed improved power of finger extension.

Discussion

Only one case of ulnar nerve compression in the Guyon canal by a ganglion and one case of posterior interosseous nerve

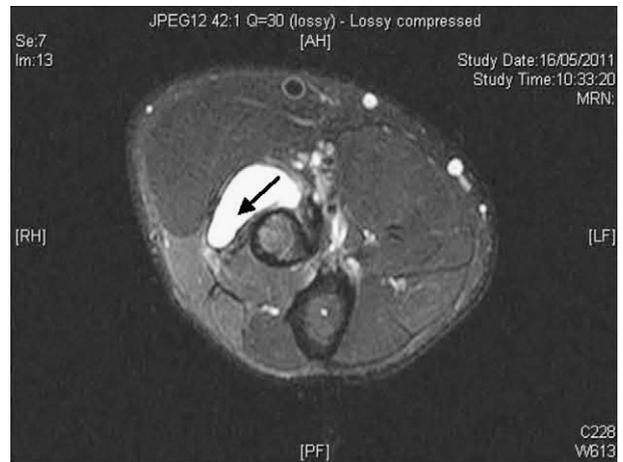


Figure 2. The MRI (T2 signal) showed a hyperintense cystic lesion (arrow) over the radial head region, adjacent to the neurovascular bundle.

compression by a ganglion were described in 20 years of literature review.^{5,6} Clinical assessment, electro-diagnostic study (nerve conduction test) and radiological examination (MRI) are very useful in guiding the treatment.

Ganglionic cyst is very common in the upper limb. At present, there is no established theory accounting for its formation. It is believed that repetitive stretching of the capsule leads to cystic formation in the synovial-capsule interface and fibroblasts are stimulated to produce hyaluronic acid and hence mucin production.⁷ This may explain the etiology of the ganglions in our cases because their occupations involved repetitive wrist and elbow movement.

There is a wide variety of clinical presentation of ganglions. Ganglions can range from non-palpable deep seated lesions, asymptomatic swellings, painful masses,⁸ and nerve palsy caused by ganglionic compression. In our cases, the ganglions were not clinically palpable. Upon physical examination, nerve palsies were found; the exact causes of the palsies were not certain in the first instance.

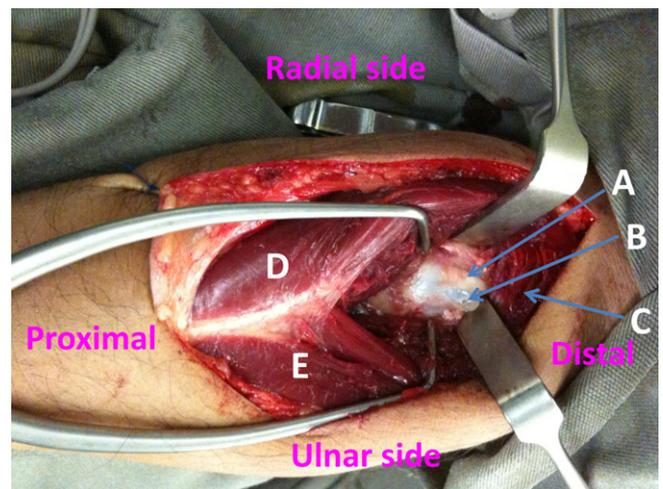


Figure 3. Intraoperative photo, through the posterior approach, exposed the ganglion arising from the radialcapitellar joint, compressing the (A) posterior interosseous nerve; (B) ganglion; (C) supinator; (D) extensor carpi radialis; and (E) extensor digitorum communis.

In the case of ganglion causing compressive neuropathy, clinical examination may only show nerve palsy, while further investigation is required before operation.

A good clinical examination and nerve conduction study could determine the level of impaired conduction of nerves, so as to locate of the site of ganglionic compression neuropathy. The most common cause of Guyon's canal syndrome was idiopathic and most idiopathic Guyon's canal syndrome cases were associated with carpal tunnel syndrome (CTS).⁵ If there were no symptoms and signs of CTS, a space occupying lesion in the Guyon's canal should be considered (e.g., ganglion, neurilemmoma, repetitive trauma neuropathies, ulnar artery thromboses, anomalous muscle bellies or fibrous bands, fractures or dislocations of the ulnar side of the wrist, rheumatoid tenosynovitis, osteoarthritis of the radio-ulnar and carpal joints, hemangiomas, lipofibromas, giant cell tumors, accessory carpal ossicle, bipartite hamate).

Among the above differential diagnoses for nerve palsy with a vague or non-palpable mass, ganglion is the most common tumour of the hand and wrist region. Another common cause is neurilemmoma. An imaging study such as MRI can be helpful to make the pre-operative diagnosis and to delineate its extent. Neurilemmoma appears as a T1 isointense lesion and T2 hyperintense lesion where there is no plane between the lesion and the nerve as they are continuous, whereas ganglion appears as T1 hypointense lesion and T2 hyperintense lesion.⁹ Pre-operative differentiation between a ganglionic cyst and neurilemmoma is useful, because a ganglionic cyst requires complete removal of the cyst, whereas neurilemmoma requires microsurgical dissection of the lesion from the nerve fascicles.¹⁰ However, we were not aware of the ganglion compressive neuropathy at the Guyon's canal preoperatively in our case so that no MRI study was performed.

In our second case, physical examination had ruled out other causes of finger drop, e.g., tendon rupture. Clinical signs of PIN palsy and associated tenderness over the lateral aspect of the elbow suggested that the level of pathology was at the elbow level. MRI study revealed the cause and the site of compression; anatomical relationship of the ganglion to surrounding structures and negative intra-neural extension of the lesion¹¹ preoperatively. There was an absence of MRI features of intraneural extension of ganglion including tail sign, balloon sign, tubular appearance and signet ring sign. These can guide us on the choice of surgical approaches, facilitate complete excision of the ganglion, and minimize the risk of injury to surrounding structures (e.g., the posterior interosseous nerve in this case). Ultrasonography may also be helpful in detecting ganglions as a cause of PIN palsy.¹²

In every case of nerve palsy without obvious mass, we suggest an approach of detailed history and physical examination. The type of nerve palsy and level of compression should be able to be delineated. Nerve conduction tests can supplement more information. After that, the cause of compression (ganglion in our cases) can be delineated with further imaging techniques. An imaging study can guide the surgical dissection and provide anatomical details about the lesion. MRI is a good option but is not always available in every case. Ultrasonography is another useful means to detect space occupying lesions and intrinsic nerve abnormalities such as neurilemmoma.¹²

Indications of operative excision of ganglionic cysts include pain, cosmetic and compression neuropathy. The majority of ganglion excisions are simple and the recurrence rate is low provided that the cyst is completely removed as well as the capsular attachment.⁸

In conclusion, nerve palsy caused by ganglionic cysts is extremely rare. A good clinical assessment and investigation guide offers a good chance of recovery of the nerve palsy and minimizes complications after excision of the ganglion. We recommend having adequate investigations (either nerve conduction study or MRI or both) for ganglions causing nerve palsy before surgical intervention if feasible.

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