



Ulnar nerve deep branch compression by a ganglion: A review of nine cases[☆]

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ABSTRACT

Background and aim: Ulnar nerve compression is common at the elbow, but less common at the wrist. The purposes of this study were to report a series of nine patients with pure ulnar nerve deep branch compression by a ganglion and to evaluate the outcome following a surgical treatment.

Methods: A retrospective study was conducted with nine patients from 2000 to 2011. The patients included four male and five female patients. The mean duration of symptoms before surgery was 16 months (range, 5–32 months). Different degrees of muscular atrophy and weakness of the interossei and adductor pollicis muscles were present without sensory loss in the hand. Ganglion excision and decompression of Guyon's canal were performed in all patients. We evaluated postoperative results of this uncommon nerve lesion based on the modified Bishop's scoring system.

Results: The ganglion compressing the deep branch originated from the pisohamate joint in eight cases and from the midpalmar space in one case. At the mean follow-up of 23 months (range, 17–31 months), strength improvement of the grip and tip pinch was achieved in all patients. In comparison, grip strength improved from a mean of 63% of the unaffected side preoperatively to 88% of the unaffected side postoperatively. Tip pinch strength improved from a mean of 61% to 87%. According to the modified Bishop's scoring system, six patients (67%) obtained excellent results, two (22%) had good results, and only one (11%) had a fair result.

Conclusions: A ganglion causing ulnar nerve deep branch compression is rare. Early surgical treatment can result in satisfactory functional recovery.

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Introduction

Ulnar nerve compression is common at the elbow, but less common at the wrist [1]. Guyon's canal is a well-known region of the wrist where the ulnar nerve is vulnerable to compression [2]. Compression within Guyon's canal may produce a spectrum of clinical symptoms including motor and (or) sensory morbidities. However, isolated motor loss of ulnar innervated muscles in the hand is rare [3].

Anatomical studies have shown that the ulnar nerve at the wrist passes through a fibroosseous tunnel known as Guyon's canal [4].

In the distal part of Guyon's canal, an anatomical structure that may cause ulnar nerve entrapment is the pisohamate hiatus. Pisohamate hiatus, which lies between the pisohamate ligament and the fibrous arch at the origin of the hypothenar muscles, is the site where the deep branch of the ulnar nerve is likely to be compressed in the wrist (Figs. 1 and 2) [5].

The aetiology of deep branch compression includes wrist tumours, fracture, or dislocations of the carpal bones and of the distal radius and ulna, anatomical variations, occupational neuritis, or overuse injuries [6–9]. Being a rare cause, previous literatures have reported that a ganglion in the midpalmar [10,11] or arising from the pisohamate joint [12] can lead to deep branch entrapment. However, these are all single case reports, and thus the prognosis cannot be systematically analysed and evaluated.

The purpose of this retrospective study was to report a series of nine patients with pure deep branch entrapment by a ganglion and to evaluate the results following surgical treatment.

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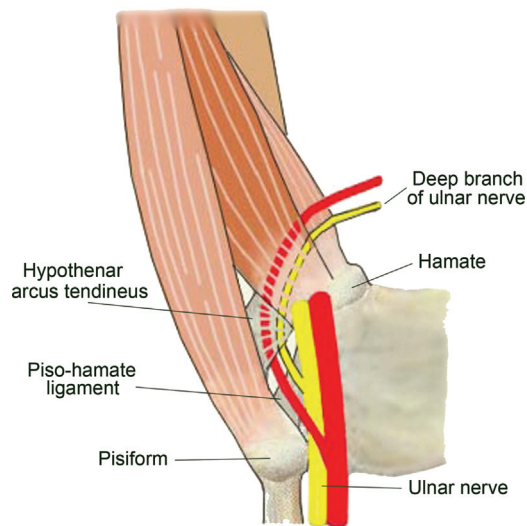


Fig. 1. The deep branch originates from the ulnar nerve, courses beneath the hypothenar arcus tendineus and over the pisohamate ligament, and enters pisohamate hiatus.

Patients and methods

The study was approved by the institutional review boards of the participating hospitals. Informed consent and Health Insurance Portability and Accountability Act consent were obtained from each patient.

A retrospective study was conducted with nine patients from 2000 to 2011. The patients included in the study were selected from all 11 patients with ulnar nerve deep branch entrapment by a ganglion in our hand surgery center. Of these, two patients lost to follow-up have been excluded.

The patients included four male and five female patients. The mean age at the time of surgery was 38 years (range, 34–62 years). The dominant extremity was affected in six (67%) of nine patients (Table 1). There was no wrist trauma, exposure to toxins, leprosy history, and family history. Four patients had undergone previously conservative treatment, but the symptoms including hand wasting and weakness aggravated gradually.

The mean duration of symptoms before surgery was 16 months (range, 5–32 months). All patients presented with gradually progressive weakness and wasting of the hand without pain, paresthesia, or numbness. On physical examination, there was tenderness to palpation at the radial aspect of the pisiform in eight cases and in the midpalmar space in one case. Although the undefined fullness was appreciated by examiners in five cases, a

Table 1

Patient demographics and surgical details.

Case	Age (years)	Gender	Side	DSBS (months)	Site of ganglion
1	57	M	R	18	DGC
2	37	F	R	8	DGC
3	42	M	L	23	DGC
4	50	F	R	5	DGC
5	35	M	R	10	DGC
6	37	F	L	32	DGC
7	30	F	L	22	DGC
8	49	M	R	16	DGC
9	33	M	R	14	Midpalmar
Mean	41			16	

DSBS, duration of symptoms before surgery; DGC, distal Guyon's canal.

mass was not palpable in all cases. Different degrees of muscular atrophy and weakness of the interossei and adductor pollicis muscles were present, but no atrophy and weakness of hypothenar muscles were noted (Fig. 3). No sensory loss was found in all digits. Froment's sign was positive. Tinel's sign was not elicited along the course of the ulnar nerve. Electrophysiological examination was performed in six patients. Ulnar nerve sensory conduction was normal, but ulnar nerve motor conduction to the first dorsal interosseous showed a very low amplitude delay, which suggested an ulnar nerve deep branch lesion. The results of the rest of the systemic examination were normal.

Surgical decompression of Guyon's canal was suggested for these patients. All operations were performed by the same surgical team. All patients gave consent for purposes of this study before surgery.

Operative technique

The operation was performed under axillary block with the aid of tourniquet control and loupe magnification. An S-shaped incision was made over Guyon's canal. The distal extension of palmar carpal ligament and distal portion of the palmaris brevis muscle were transected, and both the deep motor and superficial

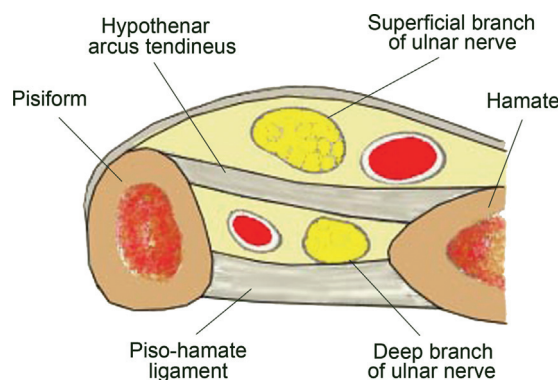


Fig. 2. Section of the pisohamate hiatus.



Fig. 3. Atrophy of the first dorsal interosseous muscle.

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