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Posterior interosseous nerve palsy caused by a ganglion: Conservative treatment with ultrasound-guided needle aspiration

Yasuhiro Seki

Department of Orthopedic Surgery, Suwa Central Hospital, Chino, Japan

Correspondence: Yasuhiro Seki, MD, 4300 Tamagawa, Chino, Nagano 391-8503, Japan, tel.: +81 266 721 000, e-mail: yseki@suwachuo.jp

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Key words

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Abstract

Posterior interosseous nerve palsy caused by a ganglion is not common and most previous patients were treated with excisional surgery. We treated a case conservatively with needle aspiration using ultrasonography, after a nerve conduction study. A 77-year-old man presented with impaired active finger extension of the left metacarpophalangeal joints. The nerve conduction study revealed conduction block of the left radial nerve near the elbow. Ultrasonography demonstrated a hypoechoic mass anterior to the radial neck compressing the posterior interosseous nerve. Then, needle aspiration of the mass was conducted under ultrasonography. Two months later, active finger extension recovered to normal. A ganglion can be diagnosed with ultrasonography and needle aspiration can be carried out safely under ultrasonography. A nerve conduction study can assess the degree of nerve damage. The combination of ultrasonography and a nerve conduction study can facilitate conservative treatment of needle aspiration for posterior interosseous nerve palsy caused by a ganglion.

Introduction

Posterior interosseous nerve palsy caused by a ganglion is not common and was first reported by Bowen⁽¹⁾. Most previous cases were treated by excisional surgery; however, we examined the degree and location of the palsy by a nerve conduction study and treated the patient conservatively with needle aspiration of the ganglion under ultrasonography.

Case report

A 77-year-old man presented with impaired active finger extension of the left metacarpophalangeal (MCP) joints. The patient experienced left elbow pain and on the next day, he noticed impaired active extension of the left MCP joints. On the 5th day after the onset of the elbow pain, the patient was referred to our hospital. On a manual muscle test (MMT), the wrist extensor, extensor digitorum communis (EDC) and extensor pollicis longus (EPL) scored 5, 0–1 and 0–1, respectively. Neither Tinel-like sign nor sensory disturbance was found on the forearm or hand. On the 9th day after the

onset, a nerve conduction study revealed conduction block of the left radial nerve around the elbow (Tab. 1). On the 10th day after the onset, ultrasonography demonstrated an approximately 1 cm diameter hypoechoic mass anterior to the radial neck compressing the posterior interosseous nerve (Fig. 1A). Therefore, we diagnosed the patient with posterior interosseous nerve palsy caused by a ganglion and conducted needle aspiration under ultrasonography. A yellow, viscous liquid was aspirated and the mass shrank (Fig. 1B). One month after the onset, EDC and EPL recovered to MMT 3. These normalized to MMT 5 two months after the onset. Currently, 17 months after the palsy onset, neither neurological symptom nor mass is present.

Discussion

A ganglion can be diagnosed by ultrasonography and needle aspiration can be carried out safely under ultrasonography. When a ganglion is not detected by palpation, the cause of the palsy may be difficult to identify; however, ultrasonography can detect the mass, determining whether the lesion is a cyst or solid⁽²⁾. A ganglion most commonly

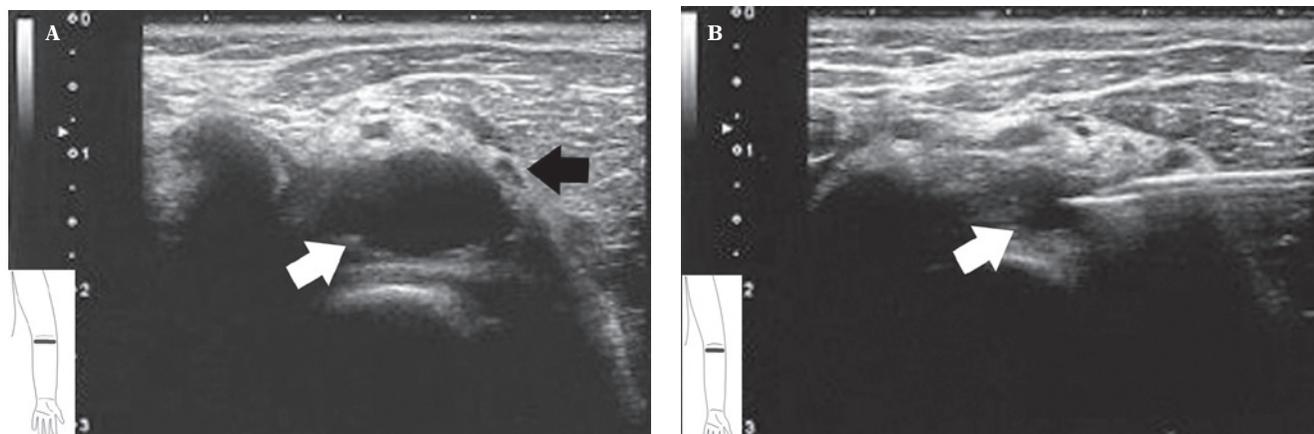


Fig. 1. **A.** Ultrasonography showing the posterior interosseous nerve (black arrow) compressed by a ganglion (white arrow). **B.** Needle (arrow) aspirating a ganglion, avoiding the nerve. Ultrasonography was performed with Toshiba Aplio 300 using a linear PLT probe with a frequency of 18 MHz

occurs around the dorsal wrist and needle aspiration can be performed easily even without ultrasonography, whereas needle aspiration is uncommon for the anterior elbow because nerves and arteries run anterior to the elbow. However, ultrasonography makes it much safer to guide the needle in the anterior elbow. With ultrasonography, we can also confirm nerves (median, anterior interosseous, radial, posterior interosseous) and arteries as well as avoid them. MRI can also clearly identify a ganglion; however, during needle aspiration, a doctor cannot utilize MRI. We can visualize the ganglion, nerves, arteries and the needle by ultrasonography while we conduct needle aspiration. This encourages doctors to perform needle aspiration even for complicated, high-risk areas including the anterior elbow, although recurrence may occur. Recent articles have reported that the success rate of needle aspiration can be elevated to 61.1 or 81% by adding triamcinolone acetonide injection^(3,4). For the current case, no injection was needed, because the first aspiration was successful. However, if recurrence occurs, triamcinolone acetonide injection may be a favorable additional conservative treatment.

A nerve conduction study can investigate the nerve damage. This is helpful to select the treatment. When nerve damage by compression is severe, the compression should

be fully resolved. On the other hand, when the damage is mild, the compressed nerve has the ability to recover; therefore, recurrent compression is permissible to a certain extent. Needle electromyography also provides the degree of nerve damage. However, because pain accompanies needle electromyography, we did not perform it for this patient. The current case showed nerve conduction block in a nerve conduction study. The definition of conduction block is controversial. The European Federation of Neurological Societies/Peripheral Nerve Society defined electrophysiological criteria for conduction block⁽⁵⁾. According to the criteria, the current case is classified as 'probable' motor conduction block. Conduction block is also classified in neurapraxia in Seddon's classification⁽⁶⁾ and the neurapraxia is the mildest nerve injury of the three types. The article reported that recovery from nerve injury of neurapraxia is rapid. It usually begins after two to three weeks and ends within six to eight weeks. Therefore, we considered the potential for nerve recovery in the current case as promising.

Ultrasonography is useful to diagnose and aspirate a ganglion. A nerve conduction study can reveal the degree of nerve damage. Therefore, the combination of ultrasonography and a nerve conduction study can provide vital

	Right (normal)	Left (ipsilateral)
CMAP amplitude – forearm (mV)	3.0	1.7
CMAP amplitude – arm (mV)	2.6	0.2
CMAP area – forearm (mVs)	13.9	16.5
CMAP area – arm (mVs)	14.1	1.8
MNCV – between arm & forearm (m/s)	48.6	40.8
Motor distal latency (ms)	2.5	3.0
CMAP amplitude reduction between forearm & arm (%)	14	88
CMAP area reduction between forearm & arm (%)	-2	89

Tab. 1. Nerve Conduction Study (Radial nerve)

information on posterior interosseous nerve palsy due to a ganglion. When the nerve damage is severe, complete surgical decompression of the nerve may be necessary. Conversely, when it is mild, needle aspiration is the treatment of choice.

Conclusion

Ultrasonography can be used to identify a ganglion easily and make needle aspiration safer in any high-risk areas. A nerve conduction study can clarify the degree of nerve

damage. The combination of ultrasonography and a nerve conduction study makes conservative treatment possible for posterior interosseous nerve palsy caused by a ganglion.

Conflict of interest

The author does not report any financial or personal connections with other persons or organizations, which might negatively affect the contents of this publication and/or claim copyright to this publication.

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