

Proximal Entrapment Neuropathy of the Median Nerve above the Elbow—Case Report

Daijiro Morimoto^{1,2}, Toyohiko Isu¹, Kyongsong Kim³,
Atsushi Sugawara⁴, Masanori Isobe¹ and Akio Morita²

¹Department of Neurosurgery, Kushiro Rosai Hospital

²Department of Neurosurgery, Nippon Medical School

³Department of Neurosurgery, Nippon Medical School Chiba Hokusoh Hospital

⁴Department of Neurosurgery, Iwate Medical University

We report an extremely rare case of proximal entrapment neuropathy of the median nerve above the elbow in a 44-year-old man who presented with paresthesia with median nerve distribution. Tinel's sign was located in the upper arm medial to the biceps and 5 cm proximal to the elbow. The patient underwent microsurgery under local anesthesia. The fascia covering the brachial- and the biceps brachii muscle entrapped median nerve. After operation, he reported symptom improvement. Lesions above the elbow should be considered as possible causative factors of entrapment neuropathy of the median nerve. (J Nippon Med Sch 2015; 82: 287–289)

Key words: median nerve, entrapment neuropathy, operation

Introduction

Proximal entrapment neuropathy of the median nerve around the elbow is uncommon; it usually occurs below the elbow due to compression by the pronator teres and the lacertus fibrosus bicipitis muscles. We report the successful surgical treatment of a patient with proximal entrapment neuropathy of the median nerve above the elbow. Although there are a few reports of lesions above the elbow, ours may be the first documentation of such an entity.

Case Report

A 44-year-old man presented with a 2-month history of paresthesia of the lower arm along the thumb and the index and middle fingers of the left hand, including the thenar region. Cervical magnetic resonance imaging (MRI) and myelo-computed tomography (CT) studies revealed no abnormalities. Neurological examination disclosed no clear motor weakness. Spurling's test was negative. Both Tinel's sign and the Phalen test were negative for carpal tunnel syndrome, as were both the pronator compression test and Spinner's provocation test

for pronator syndrome. However, there was Tinel's sign in the upper arm medial to the biceps and 5 cm proximal to the elbow (**Fig. 1**). Gentle tapping at this point evoked pain radiating into the forearm, the thumb, and the index and middle fingers of the left hand. X-ray, MRI, and angiographic studies around the left elbow did not return abnormal findings. Motor and sensory conduction velocities of the median nerve demonstrated neither prolonged distal latency nor a reduction in the amplitude from the carpal tunnel to above the elbow.



Fig. 1 Photograph showing the site of Tinel's sign and the operative skin incision
Tinel's sign was located in the upper arm medial to the biceps and 5 cm proximal to the elbow. The arrow indicates the site of Tinel's sign.

Correspondence to Daijiro Morimoto, MD, PhD, Department of Neurosurgery, Nippon Medical School, 1-1-5 Sendagi, Bunkyo-ku, Tokyo 113-8603, Japan

E-mail: dai_sampo@yahoo.co.jp

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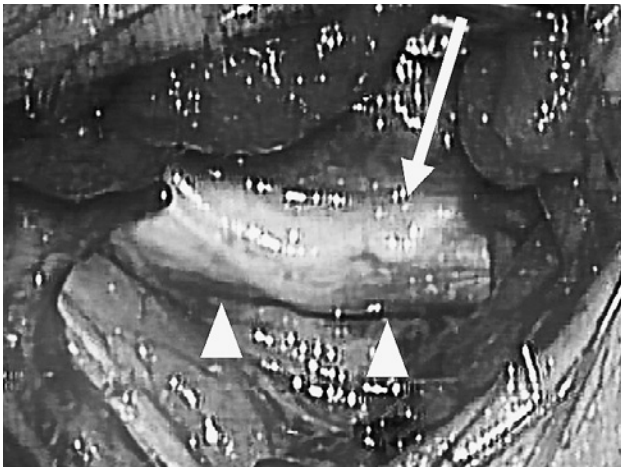


Fig. 2 Photograph showing the median nerve after dissection of the fascia covering the brachial- and the biceps brachii muscle

The exposed median nerve was associated with constriction and impression just beneath the point of Tinel's sign. The arrowhead indicates the median nerve. The arrow indicates constriction and impression.

Because conservative therapy for one year had failed to improve his symptoms, he underwent external neurolysis using microsurgical procedures under local anesthesia. We did not use a proximal tourniquet to obtain a bloodless operative field. A longitudinal skin incision measuring approximately 5 cm was made over the point of Tinel's sign above the elbow. After dissection of the fascia covering the brachial and the biceps brachii muscles and further dissection of the soft tissue to exteriorize the median nerve, he reported symptom improvement. The median nerve exposed in the operative field harbored constriction and impression on the median nerve just beneath the point of Tinel's sign (Fig. 2). There were no abnormal organic lesions surrounding the tissue around the median nerve. Extension and flexion of the elbow did not induce symptoms.

The course after the operation was uneventful, and his symptoms disappeared completely within two weeks. There has been no symptom recurrence in the course of four years after the operation.

Discussion

Proximal entrapment neuropathies of the median nerve around the elbow usually occur below the elbow due to compression by the pronator teres and the lacertus fibrosus bicipitis muscles; their occurrence above the elbow is extremely rare. According to Gessini et al.⁶, these neuro-

pathies accounted for 0.4% of all median nerve lesions, i.e. 1 of 238 instances of entrapment associated with the ligament of Struthers, a fibrous band from the supracondylar process to the medial epicondyle. In 1–4% of the general population, the supracondylar process is found as a bony spur located at the antero-medial aspect of the humerus approximately 7 cm proximal to the medial epicondyle. The ligament of Struthers and the supracondylar process form a tunnel through which the median nerve and the brachial artery pass; their compression has been reported^{14–16}. Other reported lesions above the elbow were due to trauma⁹, external mechanical compression by a crutch, or sleep palsy^{9,13}, anatomic anomalies^{6,12,18}, humerus fracture¹⁷, arteriovenous shunt in uremic patients^{2,4}, iatrogenic complications associated with brachial artery cardiac catheterization⁸, idiopathic venous¹⁰ and ruptured brachial artery aneurysms¹, and hematoma due to anticoagulant therapy¹¹. In our patient, neither preoperative imaging studies nor intraoperative findings detected such organic lesions. During surgery, the patient reported symptom relief after dissection of the fascia covering the brachial and biceps brachii muscles. We posit that the median nerve may have been compressed locally by the fascia. Alternatively, hypertension in the compartment, which consists of the medial aspect of the biceps brachii muscle, the anterior aspect of the brachialis muscle, and the fascia, and which covers the bundle enclosing the median nerve and the brachial artery, may have produced compression of the median nerve in the proximal portion of the antero-cubital fossa.

Electrophysical, nerve conduction, and electromyographic studies are the gold standard for the diagnosis of carpal tunnel syndrome⁵. However, these studies do not always return abnormal findings in the presence of proximal entrapment neuropathies^{3,7}. In the early stages of compression, when nerve alterations are mild and reversible, abnormalities identified with these electrophysical studies may be absent or inconclusive. In our patient, the motor and sensory conduction velocities of the median nerve were normal; therefore, Tinel's sign at the entrapment site was the only key for the diagnosis. It may be necessary to detect Tinel's sign along the median nerve of the upper arm for carpal tunnel syndrome and median nerve neuropathy of the forearm.

We performed localized circumferential extra neurolysis around Tinel's point with the patient under local anesthesia. There are 2 advantages to performing this operation under local anesthesia. First, symptom improvement can be confirmed by the patient in real time during

the operation. The absence of a tourniquet, which is often used to obtain a bloodless operative field, contributes to this advantage. Second, during and after decompression of the median nerve, we can confirm the persistence or absence of dynamic elements of elbow movement inducing the symptoms. Consequently, it may be possible to treat such entrapment neuropathy of the median nerve by minimally invasive surgery. If pathologic lesions that cannot be treated under local anesthesia are found, the treatment strategy can be changed to surgery under general anesthesia.

Atypical entrapment neuropathies induced by the anonymous fascia like this case have not been reported, but these might present at the other portion of median nerve or the other nerves of the upper extremity. Therefore, these entities should be deserved the close attention in the evaluation of the paresthesia of the upper extremity. The accumulation of cases and the further studies are necessary to identify the frequency, the diagnosis and the treatment for these entities.

Conclusion

When no carpal tunnel syndrome, pronator syndrome, or forearm lesions are found in patients reporting pain in the upper extremities, neuropathies of the median nerve above the elbow should be considered. In our patient, the identification of Tinel's sign was of particular importance for the diagnosis and for the development of a treatment strategy. If there is a possibility of entrapment neuropathy of the median nerve above the elbow and symptoms fail to respond to conservative treatment, surgery under local anesthesia may represent effective therapy.

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Conflict of Interest: The authors declare no conflict of interest.

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