

Isolated neuropathy of the recurrent motor branch of the median nerve

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ABSTRACT

Unlike carpal tunnel syndrome, isolated neuropathy of the recurrent motor branch of the median nerve is a rare condition as a cause of thenar muscle wasting. A focused neurophysiological approach is mandatory to reach the proper diagnosis and start specific treatment early enough to prevent possible irreversible hand function disabilities. This is a description of 16-year-old female patient who presented with isolated thenar muscle wasting for 3 years. A focused neurophysiologic approach using abductor pollicis brevis and second lumbrical muscles for recording of median nerve motor conduction and index finger for sensory conduction proved isolated neuropathy of the recurrent motor branch of the median nerve.

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Unlike thenar muscle wasting associated with acroparesthesia in the median nerve territory, which is one of the presenting hand complaints typical for carpal tunnel syndrome, isolated thenar wasting with no sensory manifestations is a rare presentation. Without proper neurophysiological assessment, this condition may be a challenging diagnosis. Herein, we present a case of isolated neuropathy of the recurrent motor branch of the median nerve.

Case Report. A 16-year-old Saudi female was referred to our physical medicine clinic from a primary health care center with right wrist pain. Her complaint started 3 years ago when she noted difficulty in using her right hand with mild mid palm and wrist pain, mainly with effort. Neither acroparesthesia at day or night, nor hand hypoesthesia was reported. Finger triggering was not a problem all through her story. There was no evidence of change in hand color or temperature and no neck pain. There was no evidence of hand trauma or surgical intervention in her upper limb. After receiving repeated cycles of medical

treatment in the form of neurotonics and non-steroidal anti-inflammatory drugs for 3 months, she noticed hand wasting at the base of the right thumb. Since that time she went through several investigations including MRI brain and cervical spine that did not reveal any abnormality. She had neurophysiological assessment that suggested thoracic outlet syndrome as an explanation for her complaints. She is not diabetic or hypertensive and other than isolated right hand muscle wasting, she had no other medical problem. Also, no evidence of family history of a similar condition was reported. Examination revealed a patient with average build and muscle bulk, except for isolated right significant thenar muscle wasting. There was no evidence of sensory loss in any part of the hand and no evidence of muscle weakness except for wasted muscles. There was no evidence of localized hand or wrist swelling or tenderness. There were no signs of any upper limb vascular insufficiency, and neurological examination was normal. Her assessment in our neurophysiology laboratory revealed normal distal motor and sensory latency and

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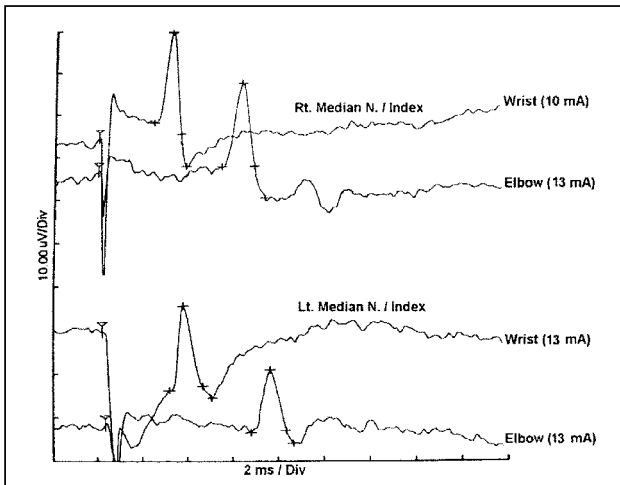


Figure 1 - Normal sensory study of both median nerves up to the elbow level.

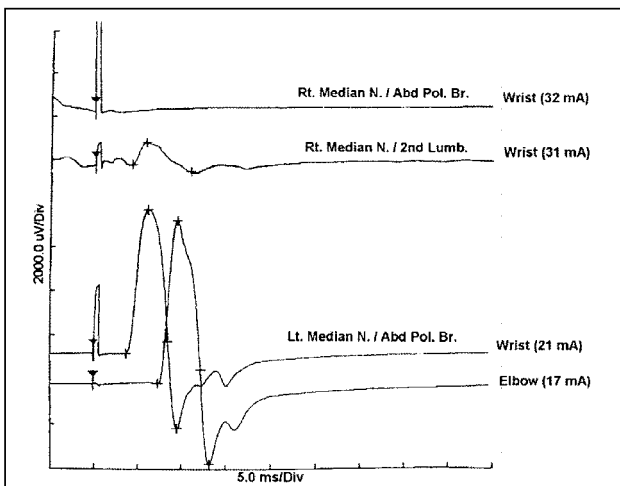


Figure 2 - No compound muscle action potential was recordable from the abductor pollicis brevis muscle, while it was recordable from the second lumbrical on the right side.

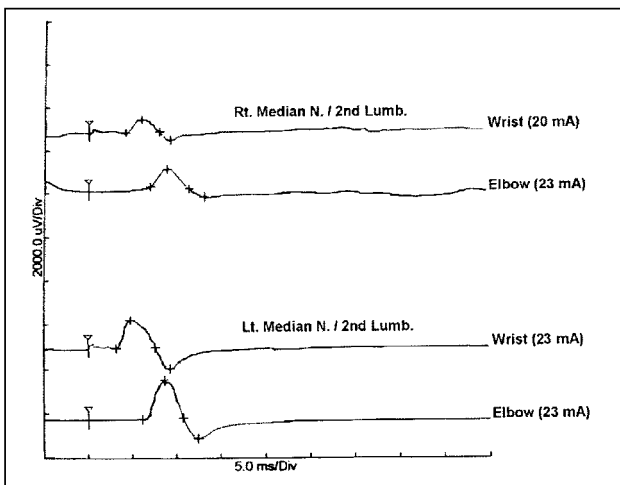


Figure 3 - Normal motor study of both median nerves up to the elbow level using the second lumbrical in recording.

nerve conduction velocity of both ulnar nerves with no evidence of segmental neuropathy. F wave ulnaris were also normal in both upper limbs. Median nerve assessment revealed normal distal sensory latency and sensory conduction velocity (**Figure 1**). Motor study of the median nerve using the abductor pollicis brevis muscle for active electrode revealed absent compound muscle action potential (CMAP) in the right side, while it was recordable when the active electrode was moved into the second lumbrical muscle (**Figure 2**). Then, motor nerve conduction of both median nerves was carried out using the second lumbrical in recording. This revealed normal distal motor latency and nerve conduction velocity for both median nerves (**Figure 3**). Coaxial needle electromyography of the right abductor pollicis brevis muscle revealed no evidence of electrical activity during rest or during trials of voluntary activity. Based on these clinical and neurophysiologic findings, she was diagnosed as having isolated neuropathy of the recurrent motor branch of the median nerve. She was sent for hand and wrist MRI, which was normal with no localized pathology to explain this rare presentation.

Discussion. Isolated thenar muscle wasting without any sensory complaint or wasting in other muscle groups is a rare condition. Only a few scattered cases were reported in the literature. The course and anatomy of the recurrent motor branch of the median nerve supplying this muscle group are important determinants of the possibility for this selective compression. Usually, this nerve emerges from the volar aspect of the median nerve just distal to the flexor retinaculum. With a slight recurrent curve laterally, it runs around the distal border of the retinaculum to lie superficial to the flexor pollicis brevis, usually supplying it, and either continuing superficial to it or traversing it, giving a branch to the abductor pollicis brevis. Then, it enters the medial edge of the muscle and passes deep to it to supply the opponens pollicis, entering its medial edge. Its terminal part occasionally gives a branch to the first dorsal interosseous, which may be its sole nerve supply.¹ In a large proportion of the population, the flexor pollicis brevis and opponens pollicis muscles are wholly or partly innervated by the deep branch of the ulnar nerve, and the abductor pollicis brevis is the one most constantly innervated by the median nerve.² The normal position for the motor branch of the median nerve is the extra-ligamentous recurrent course described above, and occurs in approximately one-half of cases. The next most common variation of the motor median nerve is the sub-ligamentous branching in which the recurrent median branch

divides from the median nerve beneath the flexor retinaculum. This sub-ligamentous variation occurs in one third of cases. The third most common course for the motor branch of the median nerve is trans-ligamentous. In this variation, the motor branch of the median nerve divides from the common median nerve beneath the flexor retinaculum, and in its course to the thenar muscles pierces the flexor retinaculum 2-6 mm from its distal border. This variation occurs in 20% of cases, and in this case, a thickened facial band may constrict the nerve, producing isolated entrapment of the motor branch.³ Thenar muscle wasting is most commonly seen in patients with advanced or long standing carpal tunnel syndrome. This is usually preceded by acroparesthesia in the median nerve territory for a long time. Rarely, thenar muscle wasting appears earlier than a few months from the sensory complaint. Scattered case reports described simultaneous selective compression of the recurrent motor branch of the median nerve supplying thenar muscles with carpal tunnel syndrome causing early and significant thenar wasting. Still, in this case, sensory manifestations preceded muscle wasting and was the presenting complaint.⁴ Thenar muscle wasting can also occur as part of C8 and T1 cervical radiculopathy, but this is usually associated with brachialgia and wasting of other muscles sharing the same myotome, such as hypothenars, interossei, and lumbricals.

Despite more commonly presenting with a complex of vascular and neurogenic manifestations, thoracic outlet syndrome may rarely present with isolated hand muscle wasting that is usually affecting the hypothenar group supplied by the lower cord of the brachial plexus. Clinical examination using special provocative tests with characteristic history and possible x-ray findings of cervical rib may all point to, or exclude this condition.

Unlike careful clinical examination, which can give only a powerful subjective evidence for selective neuropathy of the recurrent motor branch of the median nerve, neurophysiological assessment by nerve conduction and electromyography stands alone as the only noninvasive objective proof for this rare condition whatever its etiology. In our patient, neurophysiological assessment revealed normal sensory and motor studies for the ulnar nerve, excluding any diffuse or segmental neuropathy. Also, no clinical or neurophysiological evidence was detected for thoracic outlet syndromes. A sensory study of the median nerve was also normal, with no evidence of any demyelinating or axonal sensory neuropathy. Motor nerve conduction of the median nerve failed to give motor response while recording

from abductor pollicis brevis muscle, while response could be detected when the active electrode was moved into the second lumbrical muscle motor point. Using the second lumbrical for recording revealed normal distal latency and motor nerve conduction velocity of the of median nerve. The coaxial needle electromyography failed to reveal any electrical activity from the abductor pollicis brevis muscle, pointing to muscle fibrosis.

Palmar ganglion was reported as the etiology for most of the published cases.⁵⁻⁷ Other reported etiologies included anomalous thenar muscle⁸ and schwannoma of the median nerve.⁹ Ganglion is known to have variable course with some cases resolving spontaneously.¹⁰ Having a negative MRI result may be explained by the long history of the complaint for 3 years. This period may be enough for the etiological pathology if palmar ganglion arising from any of intercarpal joints to resolve spontaneously with no residual signs of its occurrence at some time. A properly structured approach for such a patient could save hand function with earlier intervention to revert local pathology.

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