

A Case report of ulnar neuropathy at the elbow with double ulnar-to-median nerve anastomoses

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Introduction

There are various anomalous communications between the ulnar and median nerve in both forearm and hand. Nevertheless, since many anastomosis are asymptomatic, they are often undiscovered until nerve injuries occur. Marinacci anastomosis, the unification of ulnar nerve and median nerve at forearm and Riche-Cannieu anastomosis, communication between the deep branch of ulnar nerve and the recurrent branch of median nerve in the hand, are some of the examples of rare anomalies. This Case report describes electrophysiological feature of ulnar neuropathy at the elbow in patient with double ulnar-to-median nerve anastomoses.

Case presentation

A 75-year old male was referred for electrodiagnostic study (EDX) with chief complaints of paresthesia in the medial aspect of the right forearm. The symptom started 2 months ago and there was no history of trauma or neck pain. On physical examination, there was sensory loss in the right forearm along the ulnar sensory nerve distribution. Tinel sign was positive at the right cubital tunnel and strengths of all the upper extremity muscles, including right hand were intact. In the nerve conduction study, low amplitudes were shown in compound muscle action potential (CMAP) of the right ulnar nerve with abductor digiti minimi muscle recording and sensory nerve action potential (SNAP) of the right ulnar and dorsal ulnar cutaneous nerves. In needle electromyography (EMG), fibrillation potentials and positive sharp waves (F&P) and polyphasic motor unit action potentials (MUAP) with reduced recruitment patterns were noted in the right ulnar nerve innervated muscles. Findings were compatible with right ulnar neuropathy at the elbow. However, further electrophysiologic findings were suspicious of anomalous communication between the ulnar and median nerve. Amplitude of the right median CMAP was very low while amplitude of the right median SNAP was within normal limit. In needle EMG, F&P but normal MUAP were noted in the flexor pollicis longus, pronator quadratus and abductor pollicis brevis (APB) muscles. No F&P were noted in other median nerve innervated muscles and C8 myotomes. In ulnar nerve stimulation with APB recording, CMAP without initial positive deflection was obtained in both wrist and below-elbow stimulations. The possibility of median neuropathy, cervical radiculopathy or brachial plexopathy were ruled out and the patient was finally diagnosed as incomplete ulnar neuropathy at the elbow with ulnar-to-median anastomosis. Based on electrophysiologic findings, we assumed that there would be two communication branches, one in the forearm (connection to anterior interosseous nerve) and the other in the hand (connection to recurrent branch of the median nerve), respectively.

Conclusion

The presence of these anastomosis may complicate the interpretation of electrophysiological findings and Result in misdiagnosis, coexisting anterior interosseous neuropathy and median neuropathy at the wrist.

Table 1. Nerve conduction study

Motor		Stimulation site	Recording site	Latency (msec)	Amplitude (mV)	NCV (m/sec)	F wave (msec)
Side	Nerve						
Right	Median	wrist	APB	3.4	2.9*	53	28.35
	Ulnar	wrist	ADM	3.0	6.8*	53	28.24
		below elbow	ADM	6.4	6.1*	53	
		above elbow	ADM	8.3	6.0*		
	Ulnar	wrist	FDI	4.0	13.1	55	
		below elbow	FDI	7.3	12.0	53	
		above elbow	FDI	9.2	11.6		
Left	Ulnar	wrist	ADM	3.1	10.7	59	
		below elbow	ADM	6.0	10.1	56	
		above elbow	ADM	7.8	9.7		
Sensory		Stimulation site	Recording site	Latency (msec)		Amplitude (uV)	Distance (cm)
Side	Nerve			Onset	Peak		
Right	Median	wrist	III digit	2.8	3.6	24.9	14
		palm	III digit	1.6	2.2	37.5	7
	Ulnar	wrist	V digit	2.6	3.4	7.3*	14
	DUCN	forearm	4th web space	2.3	2.8	6.3	10
	*MABCN	elbow	forearm	2.1	2.6	5.3	10

APB, abductor pollicis brevis; ADM, abductor digiti minimi; FDI, first dorsal interossei; DUCN, dorsal ulnar cutaneous nerve; MABCN, medial antebrachial cutaneous nerve
Abnormal values are represented with asterisk

Table 2. Needle electromyography

Side	Muscle	Insertional activity	Spontaneous activity	Motor unit action potentials			Interference pattern
				Polyphasia	Amplitude	Duration	
Right	Pronator teres	N	-	N	N	N	Full
	Flexor carpi radialis	N	-	N	N	N	Full
	Pectoralis major (sternal head)	N	-	N	N	N	Full
	Extensor indicis proprius	N	-	N	N	N	Full
	Flexor carpi ulnaris	N	-	Polys	Large (7mV)	Long	Reduced
	First dorsal interossei	IIA	F&P(+++)	Polys	Large (8mV)	Long	Reduced
	Abductor digiti minimi	IIA	F&P(+++)	Polys	Large (7mV)	Long	Reduced
	Flexor pollicis longus	IIA	F&P(++)	N	N	N	Full
	Pronator quadratus	IIA	F&P(++)	N	N	N	Full
	Abductor pollicis brevis	IIA	F&P(+++)	N	N	N	Full

N, normal; F, fibrillation potentials; P, positive sharp waves