

CARPAL TUNNEL SYNDROME IN TWO CASES OF ALL ULNAR HAND: A WORD FOR NERVE'S ULTRASOUND

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To the editor,

Anatomic communications between the ulnar and median nerves have been described in the hand, known as a Riche-Cannieu anastomosis. A particular and rare form of such an anastomosis is the "all ulnar hand", when all the intrinsic muscles are innervated only by the ulnar nerve without any proximal connections between the ulnar and median nerves at the forearm¹. All ulnar hand concomitant with the presence of carpal tunnel syndrome (CTS) may pose challenges in daily practice leading to misdiagnosis and inappropriate medical or surgical procedures. Herein, we present two cases of all ulnar hand with coexisting CTS and discuss the pertinent difficulties and the role of ultrasonography (US) in the diagnosis algorithm.

Case 1

A 53-year-old woman was referred for electrophysiological examination with a pre-diagnosis of CTS. She had been suffering pain, weakness and tingling sensations in her hands for several years. In the physical examination, there was evident atrophy (Figure 1) and weakness only on the right side. She had bilateral hypoesthesia in the first three fingers. Special tests for CTS (Tinel's sign and Phalen's maneuver) were positive on both sides. Nerve conduction studies revealed bilateral severe CTS and all ulnar hand anomaly on the left side (Table I). Intramuscular recordings using needle electrodes from the thenar and lumbrical muscles could not be achieved with stimulation of the median nerve at the wrist level; however stimulation of the ulnar nerve yielded normal compound muscle action potentials (CMAP), indicating all ulnar

hand. There was no evidence of denervation. Thereafter, in order to visualize the median nerves, we have performed US evaluations. Median nerves cross sectional areas at the entrance of the carpal tunnel were 22.5 mm² on the right side and 26.1 mm² on the left side. Accordingly, the diagnosis of bilateral CTS was confirmed². Since conservative treatment applied in another center had failed to improve her complaints, the patient was appointed for surgery.

Case 2

A 48-year-old man was referred with a likely diagnosis of CTS. He declared that he suffered pain and paresthesias in the left hand. On physical examination, there was no weakness, atrophy or hypoesthesia. Tinel's sign and Phalen's maneuver were negative on both sides. Nerve conduction studies revealed mild CTS and all ulnar hand anomaly on the left side (Table I). The patient was followed conservatively with nonsteroidal antiinflammatory drugs and a static wrist splint in the neutral position.



Figure 1. Palmar view of the patient's hands demonstrating significant thenar atrophy on the right side

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Table I. Nerve conduction study findings of the patients' left hands

	Recording site	Stimulation	Amplitude	Latency (msec)	Velocity (m/sec)
Case 1					
<i>Motor</i> Median	APB	Wrist	–		
		Elbow	–		
	I. Lumbrical	Wrist	–		
		Elbow	–		
Ulnar	ADM	Wrist	7.4 mV	2.8	
		Elbow	7.2 mV	6.05	63.1
Ulnar	APB	Wrist	13.7 mV		3.2
		Elbow	11.9 mV	6.55	62.7
	I. Lumbrical	Wrist	7.9 mV		3.0
<i>Sensory</i> Median	D2	Wrist	6.9 μ V	6.2	26.7
Ulnar	D5	Wrist			
Case 2					
<i>Motor</i> Median	APB	Wrist		–	
		Elbow		–	
	I. Lumbrical	Wrist		–	
		Elbow		–	
Ulnar	ADM	Wrist	12.8 mV	2.4	
		Elbow	12.0 mV	7.5	54.9
Ulnar	APB	Wrist	12.0 mV	4.2	
		Elbow	11.3 mV	9.2	55.7
<i>Sensory</i> Median	D2	Wrist	10.0 μ V	2.3	54.3
Ulnar	D5	Wrist	15.0 μ V	2.2	54.5

APB, abductor pollicis brevis; ADM, abductor digiti minimi; D2, second digit; D5, fifth digit

Riche-Cannieu anastomosis is an anatomic, only motor connection between the deep branch of the ulnar nerve and the recurrent branch of the median nerve in the palm³. In this anatomic variation, the typically median nerve innervated muscles can receive either partially or, rarely, totally motor innervation from the ulnar nerve so called as “all ulnar hand”⁴. Interestingly, the scenario may further be challenged in clinical practice if CTS is also present. To our best knowledge, there are only a few reports where CTS and all ulnar hand variation coexist⁵. In such patients, technical difficulties may be encountered during median nerve conduction studies at first; and second, the findings of physical examination and electrophysiological tests may be disproportionate due to the preservation of the thenar muscles innervated by the deep branches of the ulnar

nerve. Similarly, in our first patient there was no weakness or atrophy in the thenar muscles despite overt CTS.

During clinical and electrodiagnostic evaluations of patients with CTS, clinicians should be aware of these types of anomalous innervations. Moreover, like its use in idiopathic CTS for demonstrating the possible underlying etiologies, US -a convenient as well as inexpensive, noninvasive, repeatable technique- may be a useful adjunct in such cases⁶.

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