Type V deep palmar motor branch ulnar neuropathy from a midpalmar ganglia and repetitive trauma: A Case Report

Jeffrey Gehret, DO†, Jeremy I. Simon, MD†, Jack Abboudi, MD††, Philip J. Koehler III, DO, MS‡, James J. Bresnahan, MD‡
† Department of Physical Medicine and Rehabilitation, Rothman Orthopaedic Institute, Philadelphia, PA
†† Department of Hand and Wrist, Rothman Orthopaedic Institute, Philadelphia, PA
‡ Department of Rehabilitation, Thomas Jefferson University Hospital, Philadelphia, PA

Case Diagnosis

Type V “Wu” or Type II “Shea” deep palmar motor branch ulnar neuropathy resulting from midpalmar ganglia cyst with concomitant history of repetitive trauma.

Case Description

A 35-year-old left hand dominant male presented with 3-month history of weakness and "loss of muscle mass" in his dominant hand. He associated this to an isolated incident of midpalmar pain he acquired from the repetitive trauma of shoveling rock one day. Examination was normal except for atrophy and weakness of the first dorsal interossei. Nerve conduction studies were normal except for conduction to the first dorsal interossei that revealed severe demyelination and axonopathy of >50% axon loss in comparison to the normal side. Electromyography corroborated this finding with increased insertional activity with 3+ fibrillation and 3+ positive sharp waves and reduced recruitment pattern. MRI of the hand confirmed 2.5cm intramuscular mass within the palmar musculature volar to the proximal aspect of the second and third metacarpals. This was consistent with deep motor branch ulnar neuropathy distal to the cubital tunnel.

Nerve Conduction Studies - Motor

Nerve Conduction Studies
Motor Summary Table

Stim Site	NR	Onset (ms)	Norm Onset (ms)	O-P Amp (mV)	Norm O-P Amp	Neg Dur (ms)	Site1	Site2	Delta-0 (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Ulnar FDI Motor												
Wrist		4.2	<3.7	8.8	>7.9	3.13	Wrist	Abd Dig Minimi	4.2	8.0		
Right Ulnar FDI Motor												
Wrist		4.2	<3.7	18.8	>7.9	4.06	Wrist	Abd Dig Minimi	4.2	8.0		

Stim Site	NR	Onset (ms)	Norm Onset (ms)	O-P Amp (mV)	Norm O-P Amp	Neg Dur (ms)	Site1	Site2	Delta-0 (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Median Motor (Abd Poll Brev)												
Wrist		3.3	<4.2	7.4	>5.9	6.56	Wrist	Abd Poll Brev	3.3	8.0		
Elbow		7.3		6.5	>5.9	6.88	Elbow	Wrist	4.0	23.0	58	>49.9
Left Ulnar Motor (Abd Dig Minimi)												
Wrist		2.8	<3.7	15.8	>7.9	4.84	Wrist	Abd Dig Minimi	2.8	8.0		
B Elbow		5.6		13.2	>7.9	5.47	B Elbow	Wrist	2.8	19.0	68	>52.0
A Elbow		7.3		14.6	>7.9	5.47	A Elbow	B Elbow	1.7	10.0	59	>49.0

Nerve Conduction Studies - Sensory

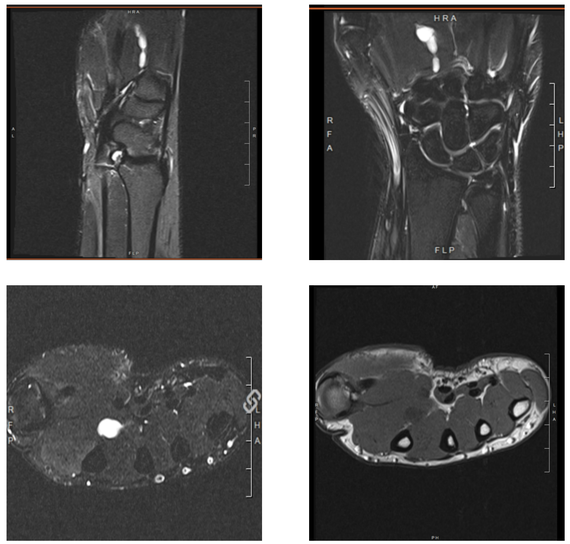
Sensory Summary Table

Stim Site	NR	Peak (ms)	Norm Peak (ms)	P-T Amp (μV)	Norm P-T Amp	Site1	Site2	Delta-0 (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left DorsCutan Sensory (Dorsum 5th MC)											
Wrist		2.2	<2.9	6.9	>5.0	Wrist	Dorsum 5th MC	1.5	10.0	67	
Left Med Antebrach Cut Sensory (Forearm)											
Elbow		2.3	<2.9	5.6	>6.0	Elbow	Forearm	1.9	14.0	74	
Left Median D2 Sensory (2nd Digit)											
Wrist		3.0	<4.0	57.9	>19.0	Wrist	2nd Digit	2.3	14.0	61	
Left Ulnar Sensory (5th Digit)											
Wrist		3.0	<4.0	44.2	>8.0	Wrist	5th Digit	2.3	14.0	61	

Electrodiagnostic Findings - Electromyography

Side	Muscle	Nerve	Root	Ins Act	Fibs	Psw	CRDs	Amp	Dur	Poly	Recrt	Effort	Comment
Left	Triceps	Radial	C6-7-8	Nml	Nml	Nml	Abs	Nml	Nml	None	Nml	Max	
Left	PronatorTeres	Median	C6-7	Nml	Nml	Nml	Abs	Nml	Nml	None	Nml	Max	
Left	1stDorInt	Ulnar	C8-T1	Incr	3+	3+	Abs	Nml	Nml	None	Red	Max	
Left	Abd Poll Brev	Median	C8-T1	Nml	Nml	Nml	Abs	Nml	Nml	None	Nml	Max	
Left	ABD Dig Min	Ulnar	C8-T1	Nml	Nml	Nml	Abs	Nml	Nml	None	Nml	Max	
Left	FlexCarpiUln	Ulnar	C8,T1	Nml	Nml	Nml	Abs	Nml	Nml	None	Nml	Max	

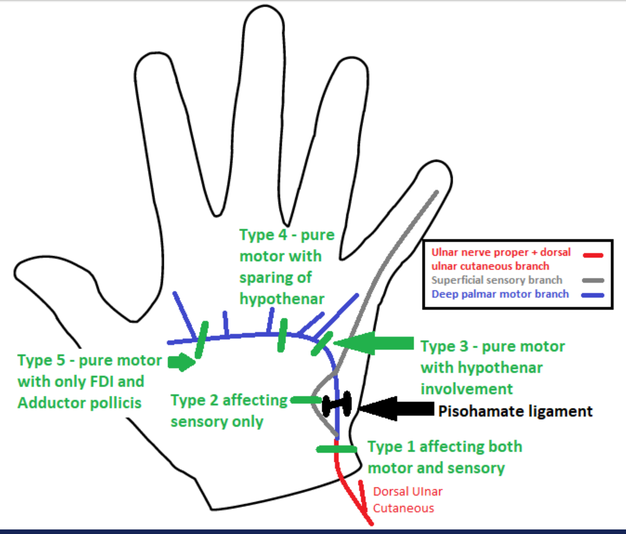
MRI of the Left hand - Sagittal (T2), Coronal (T2), Axial (T2,T1) View



Discussion

Ulnar neuropathy at the wrist (UNW) is the second most common nerve entrapment at the wrist following carpal tunnel syndrome. Despite this, its occurrence is rare and is usually caused by ganglia or other intrinsic pathology around Guyon’s canal. Shea et al characterized UNW based on whether the entrapments effects motor, sensory branches or a combination of them both. Although less commonly known, Wu et all extrapolated on this classification and divided pure motor lesions of the deep palmar branch into 3 locations. In this case we discuss a Type V lesion which is the most distal lesion affecting only the first dorsal interossei and adductor pollicis muscles. The cause of the entrapment was a midpalmar ganglia which has only been reported in the literature in 5 case reports and to our knowledge never with concomitant history of repetitive trauma. Overall, this case is not only rare but illustrates the diagnostic challenge of UNW and how multiple modalities may be necessary in order to characterize the area of entrapment.

Wu classification of Ulnar Neuropathy at the Wrist



Conclusion

The Wu classification of UNW extrapolates on the Shea classification for UNW. Specifically, Type II Shea entrapments of the deep motor branch of the ulnar nerve are divided into what Wu characterizes as Type III, IV, V which are based on location of entrapment.