Median Neuropathy Above the Elbow After Total Shoulder Arthroplasty

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Introduction

- Incidence of peripheral nerve injury (PNI) after reverse total shoulder arthroplasty (rTSA) and TSA ranges from 1 to 4%[1]
- Proximal median neuropathy is rarely described[1–4]
- Median nerve insult may occur during glenoid exposure and humeral implantation, possibly due to external rotation and extension of the shoulder, or arm lengthening

Patient presentation

- Two patients presented to our pain management clinic status post rTSA and ultrasound guided, single shot interscalene block with numbness, paresthesias and weakness in the median nerve distribution of the operative limb, thenar eminence atrophy and elbow flexion and hand intrinsic weakness.
- Electrodiagnostic testing demonstrated incomplete median neuropathy proximal to the elbow.
- MRI in one case demonstrated loss of definition of the median nerve fascicles and nerve hyperintensity in the mid to distal arm, while the other case had a normal MRI and ultrasound.
- The consulting neurosurgeon recommended conservative management in one case, and exploration and possible median nerve decompression at the shoulder in the other for ongoing symptoms. This was not pursued at the time of this abstract.

Electrodiagnostic result

Sensory Nerve Results

	Latency (Peak)		Neg Peak - Start Amp		Segment	Distance	Comment
Site	(ms)	Norm	uV	Norm		(mm)	
Left Lateral Antebrachial Cutaneous Sensory							
Lat Biceps-Lat Forearm	2.0	< 2.5	7	> 6	Lat Biceps-Lat Forearm	100	
Right Lateral Antebrachial Cutaneous Sensory							
Lat Biceps-Lat Forearm	2.2	< 2.5	8	> 6	Lat Biceps-Lat Forearm	100	
Left Medial Antebrachial Cutaneous Sensory							
Elbow-Med Forearm	2.3	< 2.6	6	> 3	Elbow-Med Forearm	100	
Right Medial Antebrachial Cutaneous Sensory							
Elbow-Med Forearm	2.1	< 2.6	5	> 3	Elbow-Med Forearm	100	
Left Median Sensory							
Wrist-Dig III	3.4	< 4.0	30	> 10	Wrist-Dig III	140	
Right Median Sensory							
Mid Palm-Dig III	2.2	-	10	> 10	Mid Palm-Dig III	70	
Wrist-Dig III	4.1	< 4.0	10	-	Wrist-Dig III	140	
Right Radial Sensory							
Forearm-Wrist	2.3	< 2.8	32	> 11	Forearm-Wrist	100	
Left Ulnar Sensory							
Wrist-Dig V	3.2	< 4.0	21	> 7	Wrist-Dig V	140	
Right Ulnar Sensory							
Wrist-Dig V	3.3	< 4.0	20	> 7	Wrist-Dig V	140	

NCS+
Motor Nerve Results

	Latency		Amplitude		Segment	Distance	CV		Comment
Site	(ms)	Norm	(mV)	Norm		(mm)	(m/s)	Norm	
Left Median (APB) Motor									
Wrist	3.6	< 4.4	10.5	> 3.8	Wrist-APB	80			
Right Median (APB) Motor									
Wrist	3.8	< 4.4	3.8	> 3.8	Wrist-APB	80			
Elbow	7.6	-	3.5	-	Elbow-Wrist	195	51	> 51	
Right Radial (EIP) Motor									
Forearm	1.93	< 2.5	1.80	> 1.70					
Left Ulnar (ADM) Motor									
Wrist	2.8	< 3.7	7.5	> 6.3					
Right Ulnar (ADM) Motor									
Wrist	3.0	< 3.7	6.9	> 6.3					
Bel Elbow	6.2	-	6.9	-	Bel Elbow-Wrist	200	63	> 50	
Abv Elbow	8.0	-	6.1	-	Abv Elbow-Bel Elbow	100	56	> 48	

EMG+

Side	Muscle	Nerve	Root	Ins Act	Fibs	Psw	Amp	Dur	Poly	Recrt	Comment
Right	FPL	Median, Anterior Int	C7-C8	Nml	3+	3+	Nml	Nml	0	Reduced	
Right	FDI	Ulnar	C8-T1	Nml	Nml	Nml	Nml	Nml	0	Nml	
Right	APB	Median	C8-T1	Nml	3+	3+	Nml	Sl. Incr	1+	Reduced	
Right	FDS	Median	C7-C8	Nml	2+	2+	Nml	Sl. Incr	2+	Reduced	Sl. reduced
Right	EIP	Post Interosseous, R.	C7-C8	Nml	Nml	Nml	Nml	Nml	0	Nml	
Right	Pronator Teres	Median	C6-C7	Nml	2+	2+	Nml	Sl. Incr	2+	Reduced	Sl. reduced
Right	Biceps	Musculocut	C5-C6	Nml	Nml	Nml	Nml	Nml	0	Nml	
Right	Triceps	Radial	C6-C8	Nml	Nml	Nml	Nml	Nml	0	Nml	
Right	Deltoid	Axillary	C5-C6	Nml	Nml	Nml	Nml	Nml	0	Nml	

Patient with comminuted humerus fracture, six weeks post op

Discussion

- Differential diagnosis of PNI after rTSA[1,2,5]
  - Surgical dissection
  - Arm traction
  - Retractor compression
  - Cement extrusion
  - Post operative hematoma
  - Arm lengthening
  - Peripheral nerve block
- A thorough history and physical should be performed and electrodiagnostic examination and advanced imaging considered.
- In more severe injuries such as axonotmesis or neurotmesis without significant recovery on serial physical or electrodiagnostic examination, referral for surgical intervention should be considered as well.

Conclusion

- While rarely described, in patients with median nerve distribution sensory or motor complaints after shoulder arthroplasty, consider proximal median neuropathy

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