

Brachial Plexopathy after Reverse Total Shoulder Arthroplasty

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Background

- Dense brachial plexopathy is a potential complication after reverser total shoulder arthroscopy
- Etiology is often hard to determine but includes surgical retraction injury, anesthetic complication or post surgical inflammatory response
- EMG workup after onset of symptoms is vital for working up the complication and establishing extent of symptoms
- Brachial plexopathy of this nature generally resolves slowly over months so EMG follow up is helpful to gauge prognosis

Case Presentation

- A 68-year-old right hand dominant female with persistent right brachial plexopathy after right reverse total shoulder arthroplasty
- The patient had 6 months of worsening right shoulder pain with decreased function due to limited shoulder movement.
- Pre-operatively, strength and sensation were normal in the entire right arm. Imaging showed severe glenohumeral osteoarthritis. Because of the pain and decreased function, she had an elective reverse total arthroplasty of the glenohumeral joint with a right interscalene brachial plexus block using ultrasound guidance for anesthesia.
- She was discharged home two days later without regaining function of her right arm, thought residual from the scalene block.
- PM&R was consulted and the patient was seen on the 6th postoperative day with nerve conduction studies revealing decreased motor amplitudes of the radial motor and sensory nerves, suggestive of posterior cord involvement with her clinical exam suggesting a more diffuse plexopathy, too soon to fully evaluate with electrodiagnosis.
- Prednisone 20mg three times a day was prescribed for inflammation and amitriptyline for neuropathic pain.

Results

Side	Muscle	Nerve	Fibs	Psw	Amp	Dur	Poly	Recrt	Effort	CRD
Right	1stDorInt	Ulnar	0	0	Nml	Nml	0	Nml	Nml	0
Right	Abd Poll Brev	Median	0	0	Nml	Nml	0	Nml	Nml	0
Right	ExtIndicis	Radial (Post Int)	2+	2+	Nml	Nml	0	Discrete	Nml	0
Right	ExtDigCom	Radial (Post Int)	3+	3+	0muaps	0muaps	0	No Motor Units	Nml	0
Right	ExtCarRad	Radial	3+	3+	0muaps	0muaps	0	No Motor Units	Nml	0
Right	FlexCarpUln	Ulnar	0	0	Nml	Nml	0	Nml	Nml	0
Right	PronatorTeres	Median	2+	2+	Nml	Nml	0	Slightly Reduced	Nml	0
Right	Biceps	Musculocut	3+	3+	0muaps	0muaps	0	No Motor Units	Nml	0
Right	Triceps	Radial	1+	1+	Nml	Nml	0	Reduced	Nml	0
Right	Deltoid	Axillary	2+	2+	0muaps	0muaps	0	No Motor Units	Nml	0
Right	Infraspinatus	SupraScap	2+	2+	0muaps	0muaps	0	No Motor Units	Nml	0

Stim Site	NR	Onset (ms)	Peak (ms)	P-T Amp (µV)	Delta-0 (ms)	Dist (cm)	Vel (m/s)
Left Median Mid Palm Index Anti Sensory (Index) 21.7°C							
Wrist		2.6	3.4	47.7	1.3	7.0	54
Mid Palm		1.3	2.0	47.9	1.3	7.0	54
Right Median Mid Palm Index Anti Sensory (Index) 21.6°C							
Wrist		2.8	3.6	14.0	1.5	7.0	47
Mid Palm		1.3	1.8	17.1	1.3	7.0	54
Right Radial Anti Sensory (Base Thumb) 21.8°C							
Wrist	NR					0.0	
Left Ulnar Anti Sensory (Little Finger) 21.8°C							
Wrist		2.9	3.6	33.0	2.9	14.0	48
Right Ulnar Anti Sensory (Little Finger) 21.7°C							
Wrist		2.8	3.9	11.1	2.8	14.0	50

EMG (figure 1) and nerve conduction study (figure 2) consistent with brachial plexopathy involving some sensory but mostly motor nerves from the posterior cord and axillary neve.

Discussion

- Twenty-five days after surgery there was some clinical improvement in the wrist and finger flexors, but not the extensors.
- A repeat electrodiagnostic study revealed widespread sensory changes and motor primarily affecting muscles innervated by the posterior cord and axillary nerve. There were also positive needle EMG findings, consistent with brachial plexopathy.
- The effects of a focal anesthetic block should wear off in 24 hours, so this case reflects either an adverse effect to anesthesia, a nerve traction injury from surgery, or a post-surgical inflammatory response in the nerves which may respond to steroids or immunomodulators peri-operatively.
- Brachial plexopathy associated with surgery usually resolves over many months with PM&R follow up recommended for assessment of progress

Conclusion

- There is no definitive way to determine the etiology of a brachial plexopathy, but this case demonstrates the importance of a timely physiatry consultation and electrodiagnosis to help determine the prognosis, assist with patient management, and to include education regarding nerve problems.

References

- Nathan P. Staff, JaNean Engelstad, Christopher J. Klein, Kimberly K. Amrami, Robert J. Spinner, Peter J. Dyck, Mark A. Warner, Mary E. Warner, P. James B. Dyck, Post-surgical inflammatory neuropathy, *Brain*, Volume 133, Issue 10, October 2010, Pages 2866–2880, <https://doi.org/10.1093/brain/awq252>
- Robinson LR. Traumatic injury to peripheral nerves. *Muscle Nerve*. 2000 Jun;23(6):863-73. doi: 10.1002/(sici)1097-4598(200006)23:6<863::aid-mus4>3.0.co;2-0. PMID: 10842261.