

A unique presentation of C5 nerve root avulsion with development of adhesive capsulitis

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Introduction

Cervical radiculopathy refers to a syndrome of pain and/or sensorimotor deficits due to compression of a cervical nerve root. Co-existing cervical and shoulder pathology may present challenges to clinicians treating unilateral upper limb pain. Estimated prevalence of shoulder pain is 10.8%-55.2%(1), while cervical radiculopathy is estimated between 1.14%-1.31%(2). It is important to maintain a broad differential in cases of shoulder pain/weakness, including radiculopathy, nerve root avulsion, and brachial plexopathy.

Patients with weakness and limited range of motion (ROM) must also be evaluated for sequelae of radiculopathy. Discussed is a unique case of secondary adhesive capsulitis from weakness attributed to traumatic C5 nerve root avulsion.

Case Report

- 41-year-old female, presented to spine clinic for cervical radiculopathy
- Hx high speed MVC with polytrauma
 - Clinical presentation:
 - Left deltoid and biceps weakness
 - Numbness/tingling throughout Left arm
 - Physical exam
 - Active and passive ROM with shoulder forward flexion and abduction limited to 20 degrees
 - 1/5 strength in Left deltoid, 2/5 strength in biceps brachii
 - Work up
 - Cervical MRI with no stenosis (Fig 1), however with Left scalene edema (Fig 2)
 - EMG: acute denervation in Left deltoid and biceps. Decreased motor unit recruitment in C5-6 distribution indicative of neuropathic pathology (Fig 3)

Imaging



Fig 1: Absent spondylosis

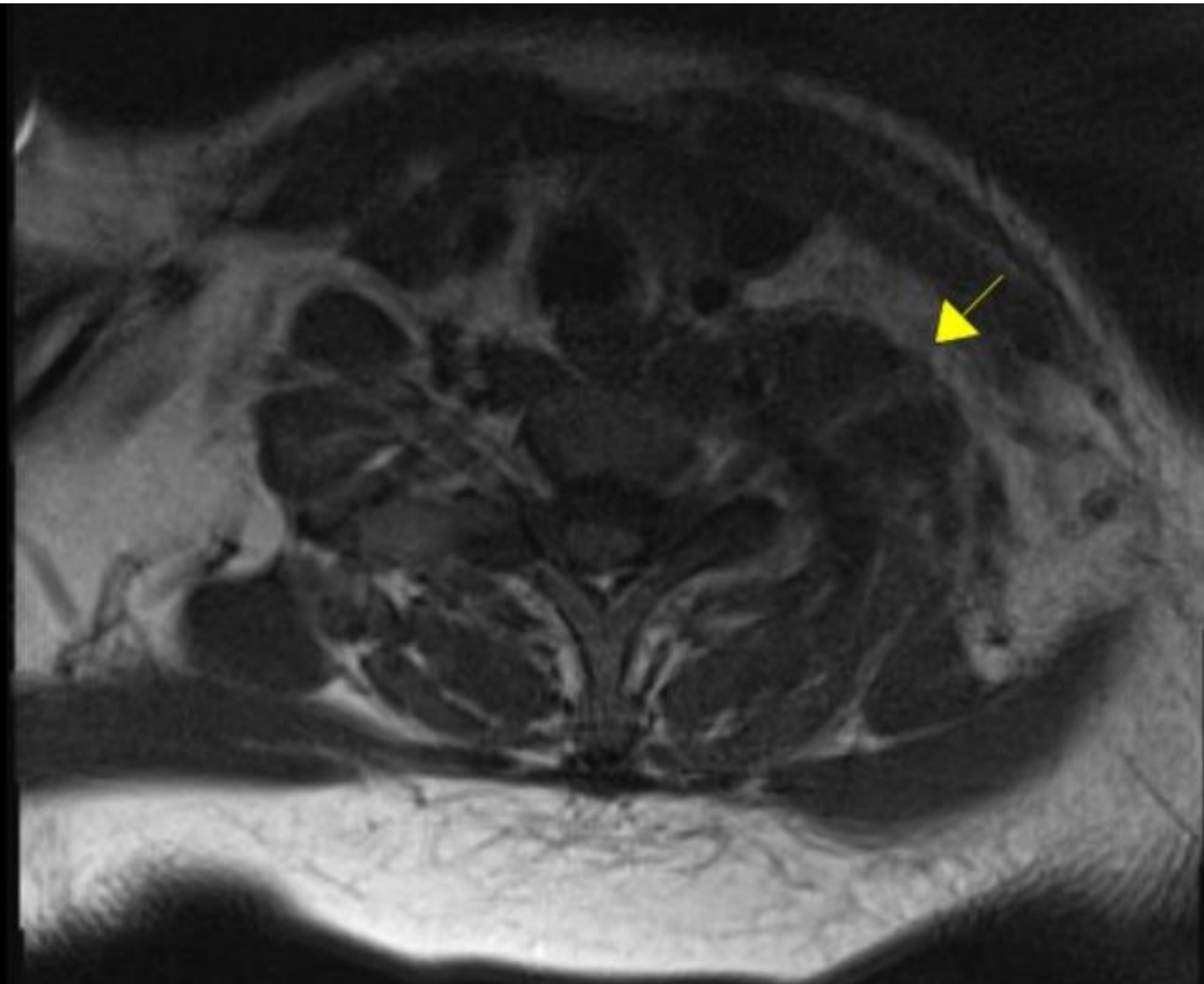


Fig 2: Scalene edema

Nerve Conduction Studies

Anti Sensory Summary Table

Stim Site	NR	Peak (ms)	O-P Amp (µV)	Neg Dur (ms)	Site1	Site2	Delta-P (ms)	Dist (cm)
Left OSU Carpal Tunnel 2 Anti Sensory (Rec Site) 31.4 °C								
Median Thumb		2.6	42.5	1.09	Median Thumb	Rec Site	2.6	10.0
Radial Thumb		2.8	8.2	1.48	Radial Thumb	Rec Site	2.8	10.0
Median Wrist Digit 3		3.2	53.3	2.81	Median Wrist Digit 3	Rec Site	3.2	14.0
Median Palm Digit 3		2.0	58	1.17	Median Palm Digit 3	Rec Site	2.0	7.0
Ulnar Wrist Digit 5		3.0	34.2	1.09	Ulnar Wrist Digit 5	Rec Site	3.0	14.0

Motor Summary Table

Stim Site	NR	Onset (ms)	Norm Onset (ms)	O-P Amp (mV)	Norm O-P Amp	Site1	Site2	Delta-0 (ms)	Dist (cm)	Vel (m/s)	Norm Vel (m/s)
Left Ulnar Motor (Abd Dig Minimi) 31.4 °C											
Wrist		2.7	<4.0	9.0	>3	B Elbow	Wrist	2.9	17.5	60	>44
B Elbow		5.6		1.8		A Elbow	B Elbow	1.9	10.0	53	>44
A Elbow		7.5		6.3							

EMG

Side	Muscle	Nerve	Root	Fibs	Psw	MUP Amp	Dur	Poly	Recrt	Comment
Left	Deltoid	Axillary	C5-6	3+	3+	Decr	Nml	0	Reduced#	
Left	Biceps	Musculocut	C5-6	4+	4+	Decr	Nml	0	Reduced#	
Left	Pronator Teres	Median	C6-7	Nml	Nml	Nml	Nml	0	Nml	
Left	Triceps	Radial	C6-7-8	Nml	Nml	Nml	Nml	0	Nml	
Left	1stDorInt	Ulnar	C8-T1	Nml	Nml	Nml	Nml	0	Nml	

Fig 3: EMG and NCV

Discussion

Though this case did not demonstrate typical cervical MRI findings of nerve root avulsion such as nerve root enhancement or cord hematoma, it did show edema of left scalene muscles which is common in C5 nerve root injury. Brachial plexus roots course anteriorly between the anterior and middle scalenes.(2) Therefore, edema of the scalenes may be the only finding for a post ganglionic nerve root injury.(3)

C5 nerve injuries can also lead to significant functional limitations. Since C5 innervates muscles whose actions are involved in all shoulder ROM, weakness in this distribution carries a risk for secondary adhesive capsulitis. This may muddle the clinical picture, as a patient presenting with limited ROM with associated global shoulder weakness may be initially diagnosed with primary adhesive capsulitis, limiting further workup. In this case, the addition of weakness with elbow flexion and paresthesias in the C5 distribution prompted further cervical imaging and EMG.

C5 nerve root avulsion	Adhesive capsulitis
Initially presents as: severe pain/paresthesias at the lower neck, shoulder, anterior arm and forearm	Initially presents as: severe shoulder pain
Muscle weakness involving biceps, deltoid, pectoralis major, teres major, teres minor, supraspinatus, leading to decreased strength with shoulder abduction, internal and external rotation	Eventual progression to stiffness and global loss of range of motion of shoulder

In the setting of a primary traumatic C5 nerve root avulsion, patients should continue with physical therapy (including gentle ROM exercises) and pain management strategies as there may be limited improvement with surgical management.(5)

Those with primary adhesive capsulitis benefit from NSAIDs and oral corticosteroids with potential progression to intraarticular corticosteroid injections. Proper identification of the primary diagnosis is important as this further drives diagnostic studies, treatment and patient counseling.

Conclusion

- Patient continued with physical therapy and occupational therapy, with focus on upper extremity strength and range of motion
- 1 month follow up: active ROM of left shoulder forward flexion improved to 40 degrees. Active shoulder abduction remained stable at 20 degrees.

References
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