

The Utility of a Cervical Epidural Steroid Injection for the Treatment of Idiopathic Brachial Neuritis

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INTRODUCTION

Brachial neuritis, also known as Parsonage-Turner Syndrome, is an uncommon but often misdiagnosed disease. Clinical presentation of brachial neuritis is acute in nature and presents with varying degrees of severe throbbing and radiating shoulder pain unassociated with trauma followed by weeks to years of paresis and atrophy of the upper extremity and shoulder girdle [Figure 1]. The most frequently affected muscles are those innervated by nerves branching from the superior and middle trunks of the brachial plexus¹⁻⁴ [Figure 2]. Given the varying clinical presentation and lack of diagnostic criteria, the diagnosis is one of exclusion, however, proper history and physical exam allows one to include that of brachial neuritis within a differential diagnosis. There are currently no known curative treatments for brachial neuritis with the prognosis being extremely variable. Here we will present a case of an early diagnosis of idiopathic brachial neuritis treated with a cervical interlaminar epidural steroid injection (CIESI).

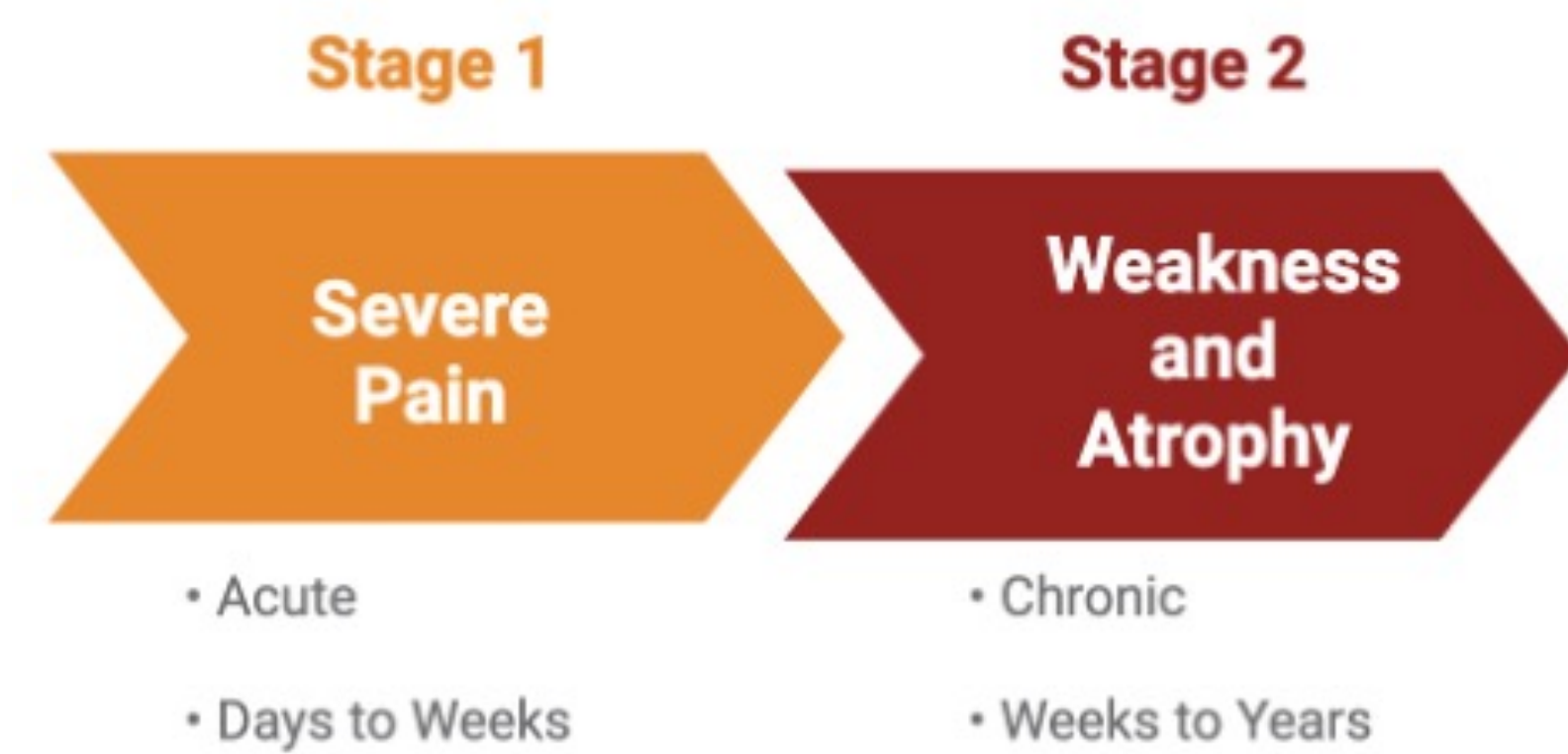


Figure 1: Brachial Neuritis Clinical Timeline

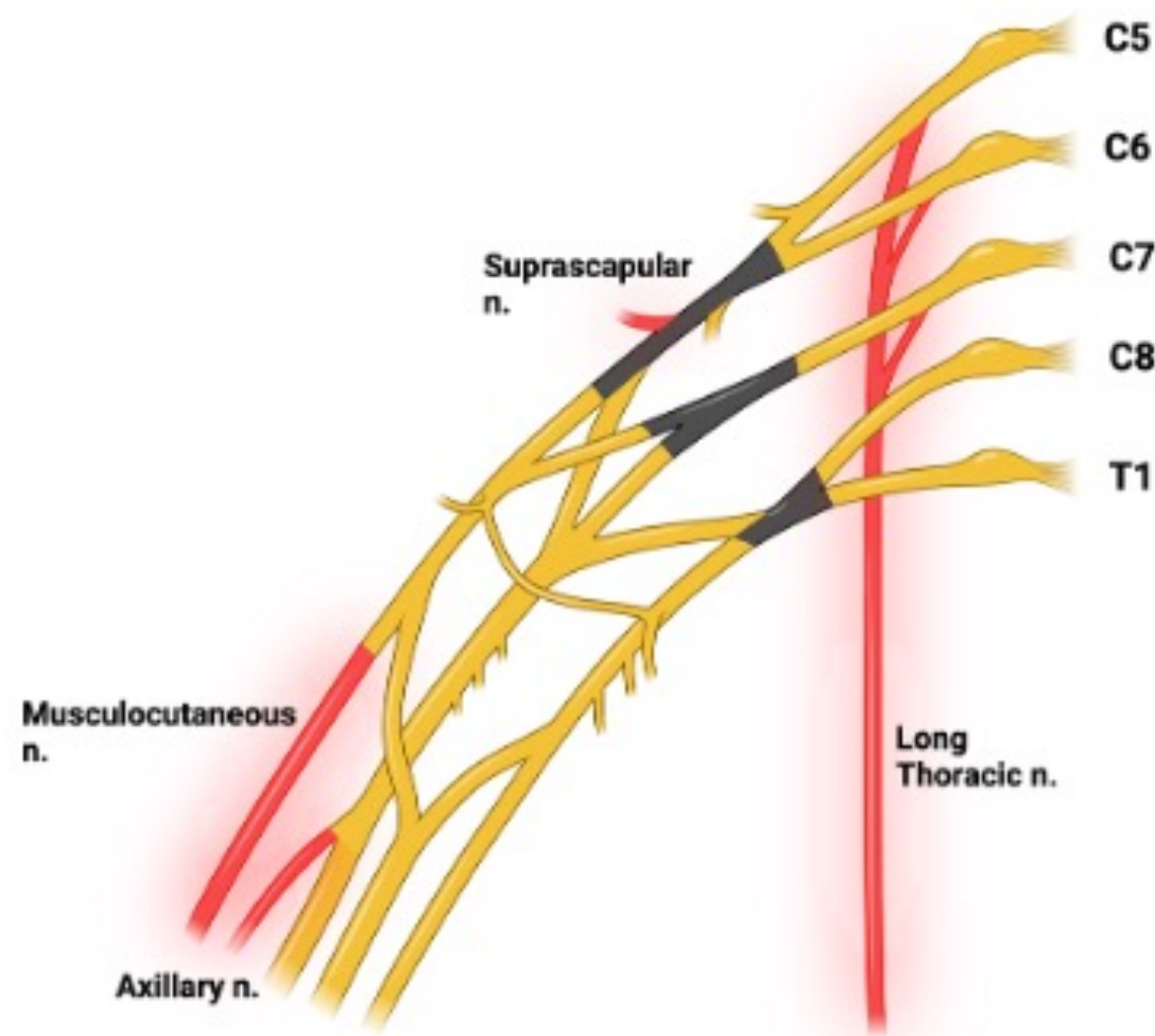


Figure 2: The Most Commonly Effected Nerves Involved in Brachial Neuritis

CASE REPORT

A 40-year-old male presented to the clinic with severe acute shoulder pain. The patient is a healthy avid runner who described his shoulder pain as spontaneously beginning before bed the previous evening. The patient described no associated trauma to the affected shoulder, no change in exercise regimen, or any recent illness or vaccination. Severe guarding of the joint was initially observed with limited to no movement of the shoulder joint. Initial inspection of the joint revealed a depressed right shoulder followed by winging of the right scapula upon flexion and protraction of the shoulder [Figure 3]. Palpation revealed extreme tenderness to the infraspinatus, teres minor, teres major, and thoracic paraspinals. Exacerbation of pain limited any active range of motion (ROM) with limited passive abduction, adduction, external and internal rotation. Sensation was intact bilaterally with normal active reflexes. Muscle strength testing revealed 4/5 strength for flexion, extension, abduction, adduction, internal and external rotation of the right shoulder with pain noted to be the limiting factor. The patient's pain was a 10/10.



Figure 3: Winging of the Right Scapula Observed Upon Physical Exam and Wall Push



Figure 4: Ecchymosis observed in the right shoulder six days following onset of symptoms.

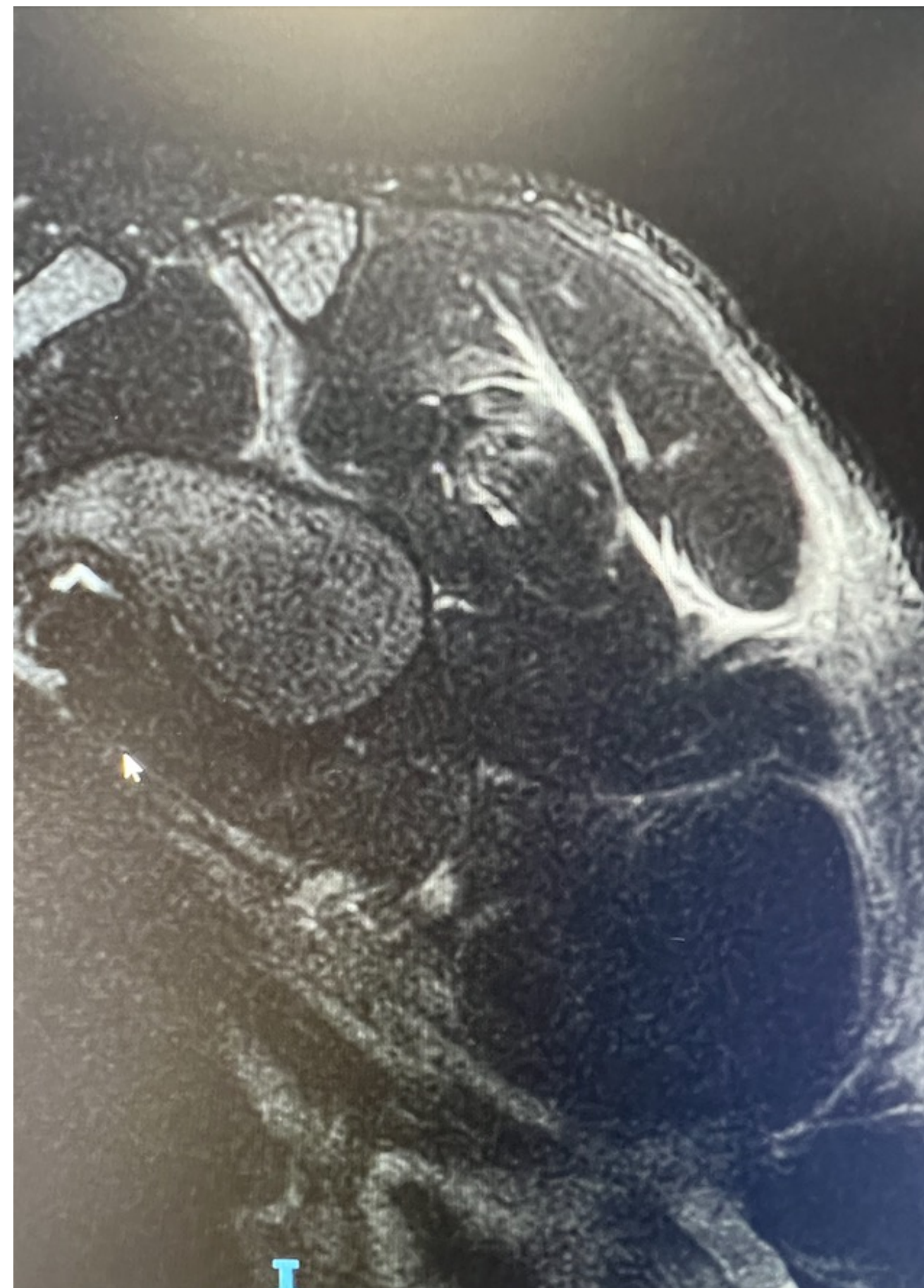


Figure 6: MRI T2 Weighted Image Showing Intramuscular Edema Within The Shoulder Girdle Musculature.

Initial Treatment and Work Up:

- Trigger point injections were given within the thoracic paraspinal musculature, infraspinatus muscle, and subscapular bursa.
- Osteopathic Manipulative Medicine was performed and aimed at decreasing swelling, analgesia, and improving range of motion.
- Medrol-dose pack was prescribed and X-ray imaging performed, which ultimately was unremarkable.

Six Days Following Onset of Symptoms:

- Pain had decreased from a 10/10 to a 4/10, however, guarding of the shoulder joint was still noted and exacerbation of pain still limited any active movement. Ecchymosis and bruising was now observed along the posterior shoulder [Figure 4]. No atrophy was observed but the right posterior shoulder girdle did show decreased bulk and tone. Pain still limited active ROM, however, passive ROM was now equal bilaterally. Strength showed no improvement with pain still noted to be a limiting factor.
- MRI of the shoulder was ordered and revealed intramuscular edema within the supraspinatus, infraspinatus, teres minor, subscapularis, and teres major [Figures 5 and 6]. The teres minor and teres major were noted to display muscle fiber disruption. Cervical MRI revealed mild degenerative changes with mild neural foraminal narrowing at C5-C6 on the right.

Nine Days Following Onset of Symptoms:

- A cervical interlaminar epidural steroid injection with a right paramedian approach was performed at the levels of T1-T2. The patient was locally anesthetized with Xylocaine 1% 9ml and Sodium Bicarbonate 1 ml with 10mg of dexamethasone then injected into the epidural space. Under fluoroscopy guidance the patient did not show an ideal approach at the C7-T1 level, therefore, the injection was given at the T1-T2 level with the thought of cranial spread allowing the steroid to reach the desired C5, C6, and C7 spinal levels. Via the use of contrast, however, it was observed that the spread may have made it to C7, but not as cranially as C5 [figure 7].
- Following the cervical epidural steroid injection, the patient reported an immediate improvement of a resting pain scale from a 4/10 to a 0/10. The patient regained full active ROM with moderate pain observed at both 90 degrees of flexion and abduction. Prior to injection the patient had 0 degrees of pain free active ROM. Strength improved to a 5/5 in all ranges of motion of the shoulder joint and the patient was able to resume their exercise regimen and begin strength rehabilitation.



Figure 7: Contrast Confirmation of Needle Placement T1/T2 Epidural Space.

REFERENCES



SCAN ME!

“Immediate pain relief following cervical epidural steroid injection”

DISCUSSION

- Detailed and thorough H&P is essential to ruling out potential pathology and to successfully making the diagnosis of Brachial Neuritis.
- By not properly diagnosing brachial neuritis one may undergo unnecessary and invasive procedures.

Differential Diagnosis'

- Cervical radiculopathy, rotator cuff strain, mononeuropathy, thoracic outlet syndrome, and idiopathic hypertrophic brachial neuritis⁵.

Etiology

- Can sometimes be preceded by a viral infection or vaccination, but often patient history may reveal neither¹.
- Alfen, et. al* reviewed 246 cases of brachial neuritis with viral infection preceding 50 of those cases and vaccination making up another 5 of those cases⁴.
- Recent increase in reported cases due to COVID19 infection and vaccination.
 - Systematic review analyzed 32 post-vaccination and 34 post-infection with SARS-CoV-2 who experienced brachial neuritis⁶. Another report noted 42 specific cases following vaccination⁷.
- Proposed to be an associated autoimmune mediated process⁷⁻⁹.
- Strenuous exercise has also been associated as an antecedent event to developing brachial neuritis^{4,10}.

Diagnostic Evaluation

- MRI appears to be of clinical significance in the diagnosis of brachial neuritis.
- An early detectable sign of denervation of musculature is high signal intensity on T2 weighted images due to diffuse edema within the effected musculature¹¹⁻¹⁴.
- In the subacute and chronic phase, intramuscular T1 weighted images will be remarkable due to fatty infiltration from the development of atrophy^{13,15,16}.
- MRI of the brachial plexus may show a thickened and hyperintense trunk^{4,7,17}.
- Electrodiagnostic will show characteristic findings of axonal damage^{10,15}.
- EMG after 4 weeks will reveal positive sharp waves and fibrillations acutely^{18,19}.

Prognosis

- Early diagnosis is helpful in guiding a multidisciplinary treatment approach and reassurance to the patient that they have a relatively good prognosis, although recovery may take up to several years.
- Systematic review, recovery at 1 year was 36%, 75% at 2 years, and 89% at 3 years¹⁰.

Current Treatment Modalities

- There are currently no known treatments for brachial neuritis with the standard of care consisting of analgesics, corticosteroids, and muscle relaxers which typically provide minimal benefit in most cases.
 - However, Cochrane review showed no significant evidence to support any form of treatment described above²⁰.

Proposed Treatment

- Interlaminar Cervical Epidural Steroid injection.
- “Shotgun” approach to flood epidural space to reach all effected nerves.
- With the superior and middle trunk most commonly effected¹⁻⁴ the goal is to reach the C5, C6, and C7 spinal root with medication.
- Following CIESI rehabilitation of the effected musculature becomes important to restrengthen and restore function of the effected musculature.

CONCLUSION

- This case underscores the value of early recognition along with proper history and physical examination for the diagnosis of brachial neuritis and the utility of CIESI as a treatment option, thus preventing long term pathological sequelae. To our knowledge this is the first known reported case to have successfully treated brachial neuritis. Further trials are recommended to further evaluate the use of CIESI for the treatment of brachial neuritis.