ECRONICON OPEN ACCESS

EC ORTHOPAEDICS
Mini Review

Oral Steroid Use for Subclavius Induced Acute Brachial Plexopathy Following Midshaft Clavicle Fracture Surgery: A Case Report

Akshar P Thakkar[1,2,3], Michael D Scheidt[4], Shaheen Jadidi[5], Thomas Nayak[6], Michael B Ellman[7], Debdut Biswas[1,2], Aaron A Bare[1,2] and Sanjeev Bhatia[1,2]*

[1]*Hip and Knee Joint Preservation Center, Department of Orthopaedics, Northwestern Medicine, Warrenville, IL, USA*

[2]*Department of Orthopaedic Surgery, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA*

[3]*Department of Medical Education, Lake Erie College of Osteopathic Medicine, Erie, PA, USA*

[4]*Department of Orthopaedic Surgery and Rehabilitation, Loyola University Medical Center, Maywood, IL, USA*

[5]*Department of Orthopaedic Surgery, Endeavor Health, Naperville, IL, USA*

[6]*Department of Orthopaedic Surgery, University of Cincinnati College of Medicine, Cincinnati, OH, USA*

[7]*Department of Orthopedic Surgery, Panorama Orthopedics and Spine Center, Denver, CO, USA*

***Corresponding Author:** Sanjeev Bhatia, Hip and Knee Joint Preservation Center, Department of Orthopaedics, Northwestern Medicine, Warrenville and Department of Orthopaedic Surgery, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA.

Received: January 18, 2026; **Published:** February 27, 2026

Abstract

A 53-year-old male presented with a high-energy acute mid-shaft fracture of the left clavicle that was surgically treated with open reduction internal fixation (ORIF) 11 days after the initial injury. The day following the procedure, the patient presented with symptoms concerning for acute plexopathy, which was treated successfully with a Medrol Dosepak (methylprednisolone). The brachial plexopathy resolved 6.5 weeks after treatment. The development of brachial plexopathy is a rare postoperative complication of clavicle ORIF, and definitive treatment guidelines do not exist. To the best of our knowledge, this is the first case report to describe the role of oral corticosteroids in the management of this unusual complication. Surgeons should consider the role of oral corticosteroids during the initial observation period of these devastating injuries.

Keywords: *Clavicle; ORIF; Plexopathy; Steroids; Methylprednisolone; Nerve Injury*

Introduction

Clavicle fractures account for 2.6 - 5% of all adult fractures and 44% of shoulder girdle injuries in the United States [1]. Although rare, brachial plexopathy is a known complication following clavicle fractures [2-4]. A review of 21 cases of brachial plexopathy following clavicle fracture fixation indicated that abnormal scarring of the plexus to the undersurface of the clavicle was a primary contributor. Neurolysis was performed on patients with significant improvement noted within 3 - 12 months post-treatment [5].

Corticosteroids are known to modulate the immune response and reduce inflammation. However, there is limited literature on their role as conservative treatments for acute brachial plexopathy following clavicle fracture surgery prior to returning to the operating room. This paucity of data is unusual, given the well-documented benefits of corticosteroids in managing conditions like lumbar radiculopathy [6].

This case report describes a patient's successful recovery from brachial plexopathy following clavicular ORIF with corticosteroid use.

Case Report

A 53-year-old left-hand-dominant male presented to the orthopaedic clinic with left anterior shoulder pain. After a high-energy fall five days prior while riding a dirt bike, he landed directly on his left shoulder. His pain worsened with arm movement, but he denied any radicular pain or previous shoulder injury. Despite the use of ice and NSAIDs, his symptoms showed minimal improvement.

Physical examination revealed mild swelling and ecchymosis at the injury site, but no skin tenting. Tenderness was present around the left clavicle, and he exhibited 5/5 motor strength and intact sensation throughout the left upper extremity. The left arm was warm and well-perfused, with a 2+ radial pulse. Radiographs demonstrated an acute, comminuted, midshaft oblique clavicle fracture with >100% displacement and shortening (Figure 1 and 2).

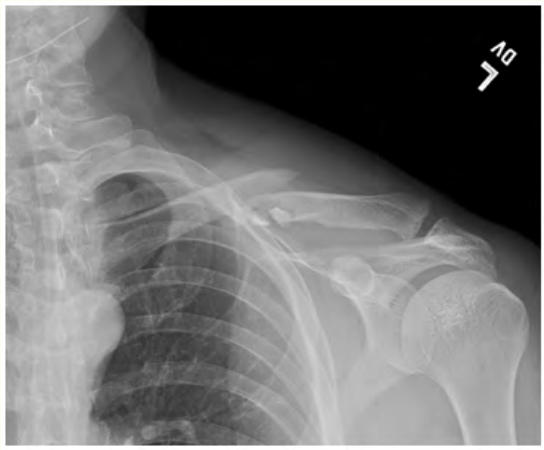

Figure 1: *Preoperative upright anteroposterior (AP) radiograph of the left clavicle.*

Figure 2: *Preoperative upright anteroposterior cephalic angulation (Zanca view) radiograph of the left clavicle.*

After discussing treatment options, the patient elected to undergo left clavicle ORIF, which was performed 11 days post-injury. On the morning of the surgery, the patient had slightly increased swelling around the fracture site but no additional abnormalities were observed. The patient was positioned supine, general anesthesia was induced, and local anesthesia was administered for postoperative analgesia.

Intraoperative findings included early callus formation, a comminuted butterfly fragment, and significant bone loss at the fracture site. An 8-hole Acumed clavicle plate was used for anatomic reduction, employing hybrid fixation with both nonlocking and locking screws (Figure 3 and 4). No neurovascular injuries were noted, and the wound was closed with a running 4-0 Monocryl suture. The patient was placed in an abduction sling.

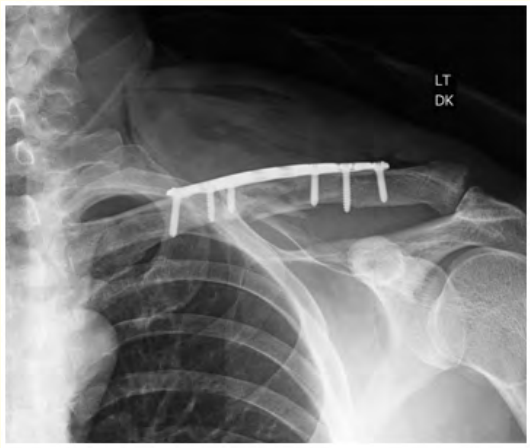

Figure 3: *Postoperative upright anteroposterior (AP) radiograph of the left clavicle.*

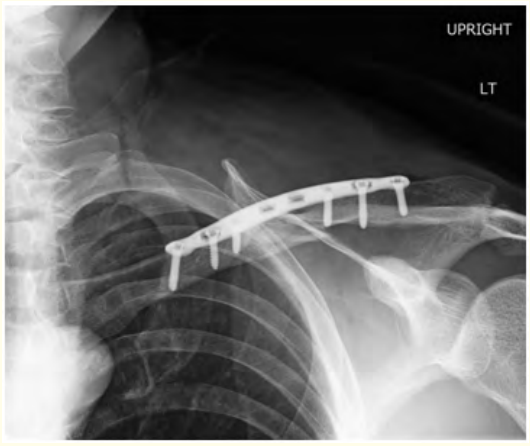

Figure 4: *Postoperative upright anteroposterior cephalic angulation (Zanca view) radiograph of the left clavicle.*

In the PACU, the patient reported mild numbness in the ulnar nerve distribution on the left side, but motor function remained intact. As the sensory deficit appeared to be isolated, the patient was discharged with close observation.

The day after surgery, the patient experienced complete numbness in his left hand, with absent two-point discrimination in both the ulnar and median nerve distributions. Diminished sensation to light touch was also noted along the medial antebrachial cutaneous nerve. Motor examination showed 3/5 strength in finger flexion and thumb opposition. An urgent CT angiogram of the left clavicle was performed to rule out a subclavian vessel aneurysm, which revealed an excessively swollen subclavius muscle (Figure 5 and 6).

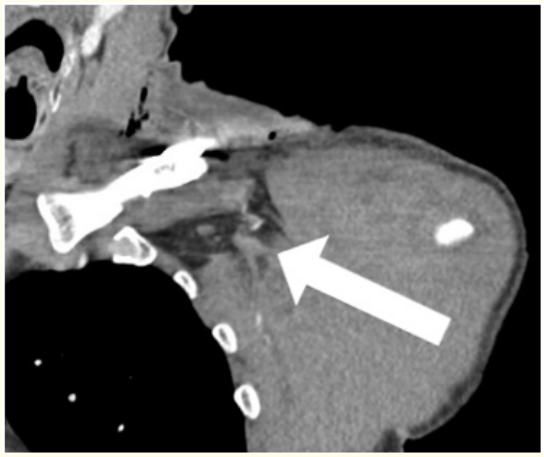

Figure 5: *Axial view of CT angiography of the left upper chest and proximal left upper extremity revealing diffuse enlargement and increased signal intensity of the subclavius muscle, presumably related to intramuscular hemorrhage (white arrow).*

Figure 6: *Sagittal view of CT angiography of the left upper again showing diffuse enlargement and increased signal intensity of the subclavius muscle, presumably related to intramuscular hemorrhage (white arrow).*

The patient's symptoms were theorized to result from a collapse of the costoclavicular space, leading to increased pressure on the exiting brachial plexus. Therefore, the surgeon prescribed a Medrol Dosepak (methylprednisolone) as an initial conservative treatment.

Five days postoperatively, the patient reported significant improvement in sensation in the median and medial antebrachial cutaneous nerve distributions of his left forearm. Motor function also showed signs of improvement, with slightly enhanced ability to flex the index finger and oppose the thumb, possibly indicating better function of the anterior interosseous nerve and median nerve. However, numbness persisted primarily on the ulnar side of his hand.

At 2.5 weeks postoperatively, the patient began to notice improved sensation to light touch on the ulnar side of his left hand, alongside continued improvements in the median and medial antebrachial cutaneous nerve distributions. Concurrently, motor function progressed, with finger flexion and thumb opposition strengths improving to 4/5.

At 4.5 weeks postoperatively, only mild paresthesia remained on the ulnar side of his hand, with median and medial antebrachial cutaneous nerve sensation returning to baseline. Motor function in his left hand recovered to 5/5 strength. By 6.5-weeks, the patient reported full resolution of symptoms, with intact and symmetric light touch sensation across all nerve distributions and complete recovery of motor function.

At 10 weeks, the patient exhibited full strength in the left upper extremity, with mild peri-incisional numbness. Radiographs taken at the 10-week visit demonstrated good callus formation at the fracture site, with evidence of bone remodeling (Figure 7 and 8). Two years post-surgery, the patient returned to full activity, including dirt biking, hiking, and skiing, achieving an ASES Shoulder Score of 100.

Figure 7: *10-week postoperative, upright anteroposterior (AP) radiograph of the left clavicle.*

Figure 8: *10-week postoperative, upright anteroposterior cephalic angulation (Zanca view) radiograph of the left clavicle.*

Discussion

The brachial plexus is divided into supraclavicular and infraclavicular branches. The infraclavicular branch includes the medial cord, which gives rise to the ulnar nerve. The symptoms reported by the patient were consistent with brachial plexopathy affecting the medial cord. The acute swelling of the subclavius muscle and subsequent collapse of the costoclavicular space likely increased the pressure on the plexus.

Brachial plexopathy can occur after clavicular factors due to several factors, including age, fracture displacement, and hypertrophic callous formation [7]. Although ORIF generally results in favorable outcomes, there remains a risk of neurovascular injuries due to the proximity of these structures [8]. The most common vascular injuries following clavicular ORIF are pseudoaneurysms, and the most common neurologic complications involve brachial plexopathy. Many neurovascular injuries can be avoided by a combination of pre-operative planning and strategic surgical technique [2]. Intraoperative neuromonitoring is one way to assess neural decompression and minimize the risk of brachial plexopathy and in the event of a delayed ORIF [3].

When neurological complications occur, steroids may create a favorable environment for recovery. Systemic glucocorticoids are commonly prescribed for acute lumbosacral radiculopathy in the outpatient setting to provide partial pain relief and reduce swelling around the nerve roots in select patients. In contrast, data describing treatment strategies for brachial plexopathy is lacking, although full recovery is generally thought to ensue within 6 months if it does occur [10]. As such, most brachial plexopathies are treated conservatively, with surgical intervention targeting decompression of the brachial plexus if there is no documented improvement within 3 months [11]. In the setting of nerve compression, newer data suggests a need to reduce insult to the brachial plexus as quickly as possible, as delaying surgical treatment for more than just 2 months can decrease the chance for functional improvement of the affected nerves [12]. Although surgical intervention is definitive, one survey found that half of patients that required surgery for a brachial plexus injury remained considerably disabled and were not able to return to work [13].

Conclusion

To the best of our knowledge, this is the first case to describe the role of oral corticosteroids in the management of acute postsurgical brachial plexopathy following clavicle fracture and suggests that oral steroids may have a role in treating these devastating injuries. Additionally, the speed with which our patient recovered from his plexopathy was much faster than that previously reported in the literature [5]. Based on the postoperative CT scan, the patient was noted to have an excessively enlarged subclavius muscle perioperatively which may have collapsed the costoclavicular space after clavicular reduction. We hypothesized that oral steroids administered immediately on POD1 greatly reduced compressive insult to the medial cord by decreasing postoperative swelling, thereby speeding up brachial plexopathy recovery.

Consent

The patient was informed that the data concerning the case would be submitted for publication, and he provided consent.

Thank You Notes

The authors would like to thank Dr. Michael Carbon and Mrs. Dorothy Carbon for their financial support. We also thank Dr. David Mochel, Mr. Matthew Watson, Mr. Steven Dinse, and the Northwestern Medicine Regional Medical Group West Region team for their encouragement and support.

Bibliography

1. Jeray KJ. "Acute midshaft clavicular fracture". *The Journal of the American Academy of Orthopaedic Surgeons* 15.4 (2007): 239-248.
2. Clitherow HD and Bain GI. "Major neurovascular complications of clavicle fracture surgery". *Shoulder and Elbow* 7.1 (2015): 3-12.
3. Ashman BD., *et al*. "Intraoperative neuromonitoring for brachial plexus neurolysis during delayed fixation of a clavicular fracture presenting as thoracic outlet syndrome: a case report". *JBJS Case Connector* 8.4 (2018): e85.
4. Demondion X., *et al*. "Thoracic outlet: anatomic correlation with MR imaging". *American Journal of Roentgenology* 175.2 (2000): 417-422.
5. Jeyaseelan L., *et al*. "Iatropathic brachial plexus injury: a complication of delayed fixation of clavicle fractures". *Bone and Joint Journal* 95-B.1 (2013): 106-110.
6. Ko S., *et al*. "The effectiveness of oral corticosteroids for management of lumbar radiating pain: randomized, controlled trial study". *Clinics in Orthopedic Surgery* 8.3 (2016): 262-267.
7. Saito T., *et al*. "Brachial plexus palsy after clavicle fracture: 3 cases". *Journal of Shoulder and Elbow Surgery* 29.2 (2020): e60-e65.
8. McKee RC., *et al*. "Operative versus nonoperative care of displaced midshaft clavicular fractures: a meta-analysis of randomized clinical trials". *Journal of Bone and Joint Surgery. American Volume* 94.8 (2012): 675-684.
9. Chou R., *et al*. "Systemic pharmacologic therapies for low back pain: a systematic review for an American college of physicians clinical practice guideline". *Annals of Internal Medicine* 166.7 (2017): 480-492.
10. Midha R. "Epidemiology of brachial plexus injuries in a multitrauma population". *Neurosurgery* 40.6 (1997): 1182-1188 discussion 1188-1189.
11. Bertelli JA and Ghizoni MF. "Results and current approach for brachial plexus reconstruction". *Journal of Brachial Plexus and Peripheral Nerve Injury* 6.1 (2011): 2.
12. Jivan S., *et al*. "The influence of pre-surgical delay on functional outcome after reconstruction of brachial plexus injuries". *Journal of Plastic, Reconstructive and Aesthetic Surgery* 62.4 (2009): 472-479.
13. Kretschmer T., *et al*. "Patient satisfaction and disability after brachial plexus surgery". *Neurosurgery* 65.4 (2009): A189-A196.

Volume 17 Issue 3 March 2026