Simultaneous Bilateral Anterior Shoulder Fracture Dislocation Following a Seizure: A Case Report

LCDR Luke F. Bremner, MC USN*; CDR Matthew T. Provencher, MC USN†; LCDR Lucas S. McDonald, MC USN‡; CDR Christopher B. Dewing, MC USN†

ABSTRACT  Simultaneous, bilateral, anterior dislocations of the glenohumeral joint are rare, most attributable to major trauma. Seizure disorders and electrocution are a common cause of glenohumeral and fracture dislocations although these are most commonly posterior injuries. We present an interesting case report of diagnosis and treatment of an active duty sailor with bilateral anterior shoulder fracture dislocations following a seizure.

INTRODUCTION  Although unilateral dislocations of the shoulder are the most frequently encountered dislocation seen in orthopedics, the bilateral variant is rare. When present, bilateral glenohumeral dislocations more commonly occur in the posterior direction, usually secondary to violent muscle contraction in patients experiencing seizures or electric shock. Simultaneous bilateral anterior dislocations are extremely rare, with the majority attributable to trauma. A review of the literature by Sharma et al.1 yielded only approximately 30 cases with even fewer cases of fracture dislocations. We report the case of a 28-year-old active duty sailor with bilateral anterior shoulder fracture dislocations sustained during a first-time seizure episode.

CLINICAL CASE  A 28-year-old active duty U.S. Navy male with a past medical history significant only for hypertension presented to the emergency department following a first-time, witnessed, tonic-clonic seizure while aboard his ship. The seizure was attributed to an excessive dose of oral tramadol hydrochloride combined with nortriptyline; a known reported cause of seizures. During evaluation in the emergency department, he reported no recollection of the episode and denied any prior history of similar events. Internal medicine was consulted for evaluation of his seizure. During their examination, the patient complained of fatigue and diffuse cramping pain in his neck, upper back, shoulders, and arms. Radiographic evaluation included a computed tomography (CT) scan of his head and cervical spine, both were normal. At the time of admission, no shoulder images were obtained. The patient was admitted to the internal medicine service for seizure workup.

By hospital day 2, the patient’s pain had localized to his shoulders bilaterally. In light of his continued symptoms, bilateral shoulder radiographs were obtained, showing bilateral anterior-inferior glenohumeral fracture dislocations (Figs. 1–4).

Orthopedics was consulted for evaluation and treatment. The patient was neurovasculary intact, including normal axillary nerve sensation, with both shoulders fixed in extension, abduction, and external rotation. In light of the time elapsed since the injury, and given the fixed bilateral anterior shoulder dislocations not amenable to gentle closed reduction, the patient was brought urgently to the main operating room for conscious sedation and closed reduction. Successful closed reductions were performed bilaterally utilizing a technique of longitudinal traction, external rotation, abduction, and extension, combined with anterior pressure on the shoulder. Fluoroscopic imaging confirmed reduction and stability through a functional arc of motion. The patient was initially placed into sling and swathe immobilization bilaterally.

Post reduction, the patient was readmitted to the inpatient ward and reported near resolution of his previous discomfort. Anteroposterior radiographs confirmed maintenance of reduction. However, during positioning for the axillary lateral view of the left shoulder, a recurrent dislocation occurred with an immediate worsening of pain reported by the patient. This was confirmed on the subsequent axillary view. The patient was returned to the operating room for closed reduction of the left shoulder by the same technique and immobilization in the most stable position of internal rotation using a swat to maintain reduction. Plain radiographs were obtained before application of immobilization ensuring reduction. Subsequent CT imaging of both shoulders further characterize the fractures, showing bilateral displaced and comminuted greater tuberosity fractures, with the presence of large Hill–Sachs injuries, left greater than right (Figs. 5 and 6).

Given the recurrent left shoulder instability and associated engaging Hill–Sachs lesion, the patient was brought electively to the operating room several days later for open reduction and internal fixation of the left side.
A modified transverse U-type incision was utilized to access the shoulder joint, reflecting the posterior deltoid before entering the joint capsule. The greater tuberosity fracture was in two large, yet comminuted pieces representing the footprints of the supraspinatus and infraspinatus tendons with a Hill–Sachs lesion that composed 35% of the posterior humeral head and engaged the glenoid resulting in dislocation with physiologic motion. The supraspinatus and infraspinatus rotator cuff tendons were avulsed off the bone fragments and were incompetent. Because of the large Hill–Sachs and impact injuries, a combination of frozen allograft humeral head, cancellous allograft chips, osteoinductive putty, and autograft cancellous bone was utilized for restoration of bone stock and subsequent rotator cuff repair (Figs. 7–9). The shoulder was then examined through a range of motion under fluoroscopy confirming reduction and anatomic osseous restoration (Fig. 10). The deltoid was repaired to the acromion through bone tunnels, and a layered closure was performed.

Postoperatively, sling immobilization was employed for 6 weeks with immediate restricted passive motion transitioning to with active-assisted exercises at 6 weeks, formal strengthening at 12 weeks, and return to full activity at 6 months following radiographic and clinical healing (Fig. 11). He later required an arthroscopic subacromial bursectomy, with a mini open hardware removal for prominent screws causing impingement symptoms. The contralateral right shoulder was treated nonoperatively because he maintained a stable, concentric, and well-functioning shoulder following a comprehensive physical therapy program. At 18 months postinjury,
both shoulders showed full flexion, abduction, abducted external rotation, and abducted internal rotation without instability findings.

DISCUSSION
Simultaneous bilateral anterior shoulder dislocations are a rare entity, with fracture dislocations even more uncommon.\textsuperscript{1–4} The simultaneous bilateral posterior variant, first described over 100 years ago, is more commonly described. A comprehensive search of the literature produces few cases of simultaneous bilateral anterior fracture dislocations caused by a seizure.\textsuperscript{4–6} The unique aspects of this case are the simultaneous anterior dislocations, causing bilateral greater tuberosity fractures (left greater than right), with one side...
requiring operative intervention for a displaced greater tuberosity and multiple recurrent dislocations. The cause of his seizure activity was attributed to the combination of tramadol hydrochloride and nortriptyline, lowering the seizure threshold, a known side effect of this medication. Since his initial hospitalization, he has experienced no additional seizure activity and has been seizure-free since this initial episode at age 28.

Typically, in the setting of a seizure, the weak external rotators are overwhelmed by the internal rotators, causing an exaggerated adduction and internal rotation, resulting in posterior dislocation. Anterior dislocations are more commonly the result of trauma, with positioning of the shoulder in extension, abduction, and external rotation during a fall. The resultant impingement of the greater tuberosity on the acromion causes the dislocation. They are typically unilateral as one extremity usually takes the brunt of the force. It is in only about 15% of anterior dislocations that a displaced fracture of the tuberosity occurs. A displaced greater tuberosity fracture almost certainly represents an incompetent rotator cuff, and long-term instability and disability can ensue. This patient had instability because of the fracture pattern and injuries, necessitating an open reduction and fixation with allograft augmentation to provide stability. An increased risk of fracture with glenohumeral dislocations is noted to occur in the setting of advanced age, first time dislocations, and high-energy mechanisms. The combination of these factors makes bilateral anterior shoulder fracture dislocations rare. In this case of a young patient with a low energy mechanism, the severity of the greater tuberosity fracture is quite impressive. It is not known why some dislocations occur anteriorly during seizure activity, since the majority of shoulder dislocations associated with seizures are posterior, though, may be due to the position of the shoulders during the seizure.

Whether the dislocation occurs anterior or posterior, the same initial management principles apply—early reduction and immobilization. Early fixation of this patient’s left shoulder was performed in the setting of recurrent instability showing early failure of nonoperative management.

REFERENCES

FIGURE 11. Coronal slice of the left shoulder CT showing a healed osteochondral allograft fixation.