Neglected Bilateral Anterior Shoulder Dislocation Following Epileptic Seizure: A Case Report and Literature Review

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Summary: Anterior shoulder dislocations following an epileptic event are considered rare. An extremely rare case of a 41 year old female suffering from bilateral anterior shoulder dislocation with concomitant greater tuberosities fractures after an epileptic seizure is presented. The patient presented to the out-patient orthopaedic clinic due to persistent pain and restriction of shoulders movement, 4 weeks after an epileptic seizure. Clinical examination and radiological evaluation established the diagnosis of bilateral anterior shoulder dislocation with concomitant greater tuberosities fractures. Closed reduction was performed under general anesthesia. There are 12 such cases in the literature, including the present one. Thirty percent of these cases had a delayed diagnosis. It is of paramount importance to have a high clinical suspicion for myoskeletal injuries and especially for shoulder dislocations following an epileptic episode, even in the absence of a traumatic event.

Key words anterior shoulder dislocation, epilepsy, seizure, bilateral shoulder dislocation

INTRODUCTION
Myoskeletal injuries of the shoulder joint following epileptic seizures represent a relatively common entity. Posterior shoulder dislocation has been described as the most common [1]. However, a few anterior dislocation cases have been reported [1,2]. Bilateral anterior shoulder dislocation following epileptic seizures is extremely rare [3]. This clinical entity was first reported by Sargent in a 17 year old epileptic female in 1909 [4].

These injuries are often misdiagnosed due to lack of clinical suspicion and inappropriate radiological investigation. Treatment remains controversial, especially in neglected cases. Good functional results depend mainly upon early and accurate diagnosis, as well as restoration of joint stability [1,2].

An extremely rare case of a 41 year old female with bilateral anterior shoulder dislocation with concomitant bilateral greater tuberosity fractures following epileptic seizures is presented. Additionally, a comprehensive literature review of similar cases is provided.

CASE PRESENTATION
A 41 year old female with a Body Mass Index (BMI) of 32.1 kg/m² presented to the orthopaedic outpatient clinic complaining of persistent bilateral shoulder pain during the previous 4 weeks, following epileptic grand-mal seizures. With the exception of epilepsy, her medical history was unremarkable. The patient, against medical advice, had stopped antiepileptic therapy, consisting of per os levetiracetam 100mg/day, 3 months prior to the seizure events.
During physical examination both arms were held in abducted and externally rotated position. On initial evaluation, the patient complained of decreased bilateral shoulder function and motion. Furthermore, bilateral loss of the round contour of the deltoid muscles was observed and pain was elicited with movement. Painful restriction of active range of motion of both shoulders was evident. Additionally, paresthesia of the right hand was present on the ulnar side of the antebrachium. The left upper extremity function was normal, while neurovascular examination showed no abnormality. The Disabilities of the Arm, Shoulder and Hand (quickDASH) Score was found to be 95.5.

The patient underwent radiological investigation, and plain radiographs of both shoulders revealed bilateral anterior shoulder dislocation with concomitant sizeable greater tuberosity fractures (Figure 1). Computed Tomography showed the anterior dislocation positions of the humeral head and the greater tuberosities fractures, while electrodiagnostic evaluation revealed brachial plexus neuroapraxia at the right side (Figure 2,3).

Based on clinical and imaging findings, close reduction of both shoulders was attempted under general anesthesia with radiological assistance (fluoroscopy). Reduction using the Kocher maneuver was successful at both sides (Figure 4). The patient was vascularly intact post reduction, while the shoulders were immobilized in bilateral arm slings for 3 weeks, followed by progressive mobilization with pendulum exercises, forward flexion and abduction. Physiotherapy recovery program of muscle enforcement was continued for the next 12 weeks, while bone union of the greater tuberosities fractures was achieved within 3 months.

Subsequent follow-up at twelve months postoperatively revealed active forward flexion of 110 degrees at the right, 100 degrees at the left side and active abduction of 100 degrees bilaterally, with no recurrent dislocation. The patient’s quickDASH score at that point in time was found to be 25, while no paresthesias were present. (Figure 5)

DISCUSSION

An electronic search for bilateral anterior shoulders dislocation cases published in peer-reviewed English language journals revealed a total of 12 cases, including the present one (Table 1).

Prompt diagnosis of this clinical entity is of utmost importance, but it can be a clinical challenge depending on the physician’s index of suspicion, since the symmetrical shoulder appearance usually appears normal [5-8]. In many cases patients have non-specific symptoms, such as pain and motion-range restriction. The absence of a traumatic event may lead to misdiagnosis, since the symptoms are attributed to muscle strains or tendinopathies [9,10]. Ballasteros et al in 2013 showed that in 15% of patients with non-traumatic bilateral anterior shoulder dislocation, diagnosis was established after a 3 week period following the causative event [3]. In the reported case, the patient presented 4 weeks after the epileptic seizures due to persistent symptomatology. It is of note that 4 out of 12 cases (33.3%), described in the current literature
(cases 3, 7, 10 and 11 in Table 1) had a delayed firm diagnosis. In those cases the time between the epileptic event and diagnosis ranged from 3 weeks to 9 months [8-10]. History of antiepileptic therapy, clinical findings of painful restriction of shoulder movement followed by plain radiographs of the glenohumeral joint are of paramount importance for early recognition of such cases [3, 8, 11]. There are cases in which the shoulder dislocation may be associated with an initial epileptic event (cases 3, 4 in Table 1). Buhler et al reported that the rate of recurrence of shoulder instability precipitated by seizure is higher in anterior shoulder dislocations than in the posterior ones [12].

The mechanism of bilateral posterior dislocation following seizures is well known. However, the mechanism of bilateral anterior shoulder dislocation in such cases is less predictable [3]. O’Connor-Read et al suggested that the mechanism of dislocation may be trauma as a result of falling to the floor after the collapse rather than the muscle contractions [13]. However, the present patient did not experience any traumatic injury or fall. Therefore, it is assumed that the dislocations resulted from a forceful muscle contraction during the epileptic seizures. The arm position during the epilep-

Fig. 2. Computer tomography evaluation of the right shoulder. Transverse views and 3-d reconstruction.

Fig. 3. Computer Tomography evaluation of the left shoulder. Transverse views and 3-d reconstruction.
tic episode may also be important in addition to muscle contraction, however, this information is not available in most cases, including the present one.

Anterior dislocations of the shoulder joint have been associated, especially in patients over the age of 40 years, with concomitant greater tuberosity fractures in more than 15% of the cases [3]. The reported case represents only the second in the existing literature of concomitant bilateral tuberosity fractures along with bilateral anterior shoulder dislocation due to epileptic seizures. Segal et al in 1979 had described a similar case, treated with closed reduction under general anesthesia. The patient had a 30-degree lack of external rotation, while no recurrence had occurred [14]. The present patient was also treated with close reduction under general anesthesia. She exhibits at the 12-month follow-up active forward flexion of 110 degrees at the right, 100 degrees at the left side, active abduction of 100 degrees bilaterally and satisfactory bone union.

Besides epileptic seizures, bilateral anterior shoulder dislocation has also been described in traumatic events. Falls or direct impact of the shoulders, especially in young males, have been associated with this clinical entity [15]. Brown et al described three ways in which forces directed simultaneously may result in bilateral dislocation: simultaneous traction on the arms in flexion, simultaneous deceleration forces and a fall with the shoulders fixed in extension, abduction and internal rotation [9]. Furthermore, seizure activity secondary to electric shock, diabetic hypoglycaemia, poisoning, stroke or myasthenia gravis may lead to bilateral glunohumeral dislocations, as a result of pre-

![Fig. 4. Post-reduction anterior-posterior x-ray views. A: right side, B: left side.](image)

![Fig. 5. X-ray views at final follow-up, showing satisfactory bone union. (R: right side, L: left side)](image)
dominate action of the more powerful muscles of shoulder [9, 16].

Treatment of shoulder dislocation in epileptic patients, especially in neglected cases, remains controversial. The initial management of bilateral presentation is the same as for unilateral injury. In most cases of early established diagnosis, close reduction under anesthesia has high successful rates [3]. Many reduction techniques have been described through the years, with little agreement regarding the most safe and effective one [17]. In the present patient the Kocher maneuver was used, as it has a reported success rate ranging between 81% and 100% [17]. In patients with delayed diagnosis open reduction is often necessary, since the danger of iatrogenic fracture or neurovascular damage is high [6, 17]. In the cases of bilateral anterior shoulder dislocation where diagnosis was delayed due to epileptic seizures (cases 3, 7, 10 and 11 in table 1), open reduction was performed in 4 shoulders and closed reduction in the remaining 4.

This report highlights the significance of a high clinical suspicion index for myoskeletal injuries, and especially shoulder dislocations, following an epileptic event. The absence of trauma should not discourage the physician from including this clinical entity at the top of the differential diagnosis list. Detailed physical examination and proper radiological evaluation with plain radiographs, followed by appropriate treatment may prevent delayed diagnosis and subsequent destructive complications of the shoulder joint.

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**TABLE 1.**
Cases of bilateral anterior shoulder dislocation described in the literature. Demographics, time between epileptic event and diagnosis, treatment and epileptic therapy of the patients is presented. NR: not reported

| Author | Year | Age | Gender | Time of the Diagnosis | Fracture | Treatment | Epileptic therapy |
|--------|------|-----|--------|-----------------------|----------|-----------|------------------|
| 1. Sargent [4] | 1909 | 17 | Female | Acute | NR | NR | NR |
| 2a. Segal [14] | 1979 | 32 | Male | Acute | No | Close Reduction | Yes |
| 2b. Segal [14] | 1979 | 32 | Male | Acute | Bilateral greater tuberosities | Close reduction | NR |
| 3. Brown [9] | 1984 | 31 | Male | Delayed (6 weeks) | No | Open Reduction | No |
| 4. Sadhra [5] | 1984 | 32 | Female | Acute | Greater tuberosity (right) | Close Reduction | No |
| 5. Sciammarella [6] | 1986 | 30 | Female | Acute | No | NR | Yes |
| 6. Ribbons [7] | 1989 | 38 | Male | Acute | NR | NR | NR |
| 7. Lasanianos et al [8] | 2008 | 25 | Male | Delayed (3 weeks) | Greater tuberosity (left) | Close reduction-Internal fixation | Yes |
| 8. Modifi et al [16] | 2010 | 30 | Male | Acute | No | Close reduction | Yes |
| 9. Şanel et al [11] | 2015 | 21 | Male | Acute | No | Close reduction | Yes |
| 10. Ahmad et al [10] | 2017 | 20 | Male | Delayed (36 weeks) | No | Open reduction | Yes |
| 11. Raptis et al (present case) | 2018 | 41 | Female | Delayed (4 weeks) | Bilateral greater tuberosities | Close reduction | No (had stopped against medical advice) |
REFERENCES

1. Pushpakumara J, Sivathiran S, Roshan L, and Gunatilake S. Bilateral posterior fracture-dislocation of the shoulders following epileptic seizures: a case report and review of the literature. BMC Res Notes 2015; 8:704.

2. Dunlop CC. Bilateral anterior shoulder dislocation-a case report and review of the literature. Acta Orthop Belg 2002; 68(2):168-170.

3. Ballesteros R, Benavente P, Bonsfills N, Chacón M, and García-Lázaro FJ. Bilateral anterior dislocation of the shoulder: review of seventy cases and proposal of a new etiological-mechanical classification. J Emerg Med 2013; 44(1):269-279.

4. P. W. G. Sargent. Case of Bilateral Dislocation of Shoulder with Marked Muscular Wasting. Proc R Soc Med 1909; 2(Neurol Sect):37.

5. Sadhra K. Unusual dislocations associated with epileptic fits. Br Med J (Clin Res Ed) 1984; 288(6418): 681-682.

6. Sciammarella JC Jr. Bilateral shoulder dislocations. Ann Emerg Med 1986; 15(6):763.

7. Ribbans WJ. Bilateral anterior dislocation of the shoulder following a grand-mal convolution. Br J Clin Pract 1989; 43(5):181-182.

8. Lasanianos N and Mouzopoulos G. An undiagnosed bilateral anterior shoulder dislocation after a seizure: a case report. Cases J 2008; 1:342.

9. Brown RJ. Bilateral dislocation of the shoulders. Injury 1984; 15(4):267-273.

10. Ahmad K, Ayaz SB, Khalil HB, and Matee S. Bilateral spontaneous anterior shoulder dislocation: A missed orthopedic injury mistaken as proximal neuropathy. Chin J Traumatol 2017; 20(6):370-372.

11. Şanel S, Şencan S, Öğütder A, and Solakoğlu C. Bilateral, locked, recurrent anterior shoulder dislocation: case report. Ekleme Hastalik Cerrahisi 2015; 26(1):52-55.

12. Bühler M and Gerber C. Shoulder instability related to epileptic seizures. J Shoulder Elbow Surg 2002; 11(4):339-344.

13. O’Connor-Read L, Bloch B, and Brownlow H. A missed orthopaedic injury following a seizure: a case report. J Med Case Rep 2007; 1:20.

14. Segal D, Yablon IG, Lynch JJ, and Jones RP. Acute bilateral anterior dislocation of the shoulders. Clin Orthop Relat Res 1979; 69(2):21-22.

15. Walla A, Gnandi-Piou F, Egbohou P, Assogba K, and Quacoe M. Bilateral Divergent Shoulder’s Fracture Dislocation Case in an Ischemic Stroke Patient. J Orthop Case Rep 2017; 7(3):13-16.

16. Mofidi M, Kianmehr N, Farsi D, Yazdanpanah R, Majidinezhad S et al. An unusual case of bilateral anterior shoulder and mandible dislocations. Am J Emerg Med 2010; 28(6):745.e1-2.

17. Youm T, Takemoto R, and Park BK. Acute management of shoulder dislocations. J Am Acad Orthop Surg 2014; 22(12):761-771.