

## **A new case of opposite-direction bilateral shoulder fracture–dislocation (Case Study and Review)**

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**Abstract:** Simultaneous dislocation of both shoulders in opposite directions is extremely rare. This case report documents the third published case, which occurred in a 57 year-old male patient during a seizure due to medicinal self-poisoning. We will also review epidemiological, pathophysiological, clinical and paraclinical data surrounding this pathology and then explore the treatment options.

**Keywords:** Fracture, bilateral dislocation, anterior, posterior, shoulder, joint reduction, ORIF, bone graft, prosthesis, Constant score

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### **INTRODUCTION**

Bilateral shoulder fracture–dislocations are extremely rare. Only two cases of shoulders dislocating in opposite directions have been described in published articles. We will describe a new case of opposite-direction bilateral shoulder fracture–dislocation in a 57 year-old patient following a seizure.

### **CASE REPORT**

A 57 year-old male patient who was being treated with anti-psychotics for severe mixed anxiety–depressive disorder was admitted to the emergency ward in a comatose state, following generalized seizures that caused the patient to fall down stairs. The patient was hospitalised in intensive care with intubation. A complete clinical examination found bruising at the deltopectoral triangle of the right shoulder with oedema. Standard XR revealed an anterior fracture–dislocation of the right shoulder (figure 1). The patient underwent emergency reduction through a deltopectoral approach

with ORIF of the proximal humeral using a locking plate. A comminuted fracture of the anterior edge of the glenoid was detected intra-operatively, but it could not be fixed. A coracoid bone graft (Latarjet procedure) was carried out during the same surgical procedure (figure 2). The operated shoulder was immobilised with the elbow at the body.

The patient was extubated 3 days later. At this point, the left shoulder was found to have a limited range of motion, as it was locked in adduction and internal rotation. Standard XR revealed posterior fracture–dislocation of the left shoulder, which was missed when the patient was admitted. Shoulder CT scan showed that the humeral head had significantly collapsed (less than 50% of volume remaining) but that the glenoid appeared normal (figure 3). This led us to conclude that hemiarthroplasty was indicated for this shoulder. The procedure was performed using the deltopectoral approach (figure 4).



**Fig-1:** Anteroposterior XR of the right shoulder reveals an anterior fracture–dislocation



**Fig-2:** ORIF of the proximal humerus by a locking plate associated to a coracoid bone graft



**Fig-3:** Radiograph and CT scan of the left shoulder reveal posterior fracture–dislocation. The humeral head is significantly collapsed



**Fig-4: Radiograph of the hemiarthroplasty performed in the left shoulder**

The postoperative course was marked by secondary displacement of the coracoid bone graft in the right shoulder when the patient fell again. Surgical revision was performed to add another anterior bone block using iliac crest autograft.

Six months after the procedures, the patient was satisfied with the outcome. The two shoulders were stable and pain-free. The left shoulder had very good range of motion. External rotation was limited in the right shoulder. The Constant score was 65/100 on the right side and 80/100 on the left side.

#### DISCUSSION

Bilateral shoulder fracture–dislocation is a rare finding. It was first described by Myenter *et al.* in 1902 [1]. In 1984, Brown *et al.* [2] found 90 published cases of bilateral dislocation. The most common aetiology was violent muscle contractions due to electric or epileptic causes (49%). In the case described here, the epileptic seizure was triggered by deliberate medicinal self-poisoning.

From an anatomy and pathology point of view, bilateral anterior dislocations occur slightly less often, with 30 or so cases found by Sharma *et al.* [3] in 2005, versus 35 cases of bilateral posterior dislocations found by Brackstone *et al.* [4] as of 2001. To our knowledge, opposite-direction bilateral fracture–dislocations are much rarer, with only two published cases: Tom *et al.* [5] in the American Journal of Emergency Medicine in 1985, and Hamza *et al.* [6] in Archives of Orthopaedics and Trauma Surgery in 2005. Our patient is the third

reported case of opposite-direction bilateral shoulder fracture–dislocation.

From a pathophysiology point of view, the direction of the dislocation is determined by the arm's position relative to the trunk: anterior dislocation occurs when the arm is abducted and externally rotated [7]; posterior dislocation occurs when the arm is adducted and internally rotated [8]. In our patient, the shoulders dislocated in opposite directions because each arm was in one of these positions. On the right side, anterior fracture–dislocation occurred when the patient tried to prevent himself from falling by catching hold of the handrail on the stairs with his right hand (abduction with external rotation). The epileptic seizure was responsible for the posterior fracture–dislocation on the left side.

From a clinical point of view, the diagnosis of shoulder fracture–dislocation is not always obvious, especially in comatose, polytrauma patients. Posterior dislocations are more difficult to detect [9]. It is estimated that 75% of posterior dislocations are diagnosed an average of 1 year after the injury event [10]. Because of our patient's initial level of consciousness, the diagnosis of posterior fracture–dislocation of the left shoulder was made 3 days after admission. This early diagnosis meant that we did not have to operate on a contracted shoulder.

Radiological examination is the primary means to confirm the diagnosis. But standard A/P XR can be inadequate, particularly in posterior dislocations where

the Velpeau and Bloom–Obata views are required [11]. Standard XR do not always allow for optimal analysis of the glenoid of the scapula, tuberosities and humeral head. For this reason, several authors recommend systematically performing CT scanning with 3D reconstruction [12]. In our patient, CT scan of the right shoulder could not be performed right away because of the seriousness of his condition upon admission. A CT scan of the left shoulder with reconstruction was performed secondarily.

In terms of treatment options, this injury can be managed with various techniques depending on the patient's age, amount of joint damage and diagnostic delay [13,14,15]. If more than 20% of the humeral head volume is damaged, Blasier [16], Gerber [17] and Verma [18] recommend reduction, internal fixation and reconstruction with a bone graft. Transfer of the subscapularis tendon into the defect area using the procedure described by McLaughlin [19] in 1952, and modified by Neer and Hughes [20], is appropriate in cases of posterior instability. Prosthetic joint replacement is recommended by most authors if more than 50% of the articular surface is damaged [21, 22]. In younger patients, hemiarthroplasty and total shoulder arthroplasty are the last recourse. If high-quality bone is present, a humeral head resurfacing implant is the best alternative. Very good results have been reported with this implant in various studies [23, 24, 25]. In our patient, we decided to perform a conservative surgical treatment (ORIF with bone graft) on the right side because the patient was relatively young and the articular surfaces were intact. On the left side, significant collapse of the humeral head forced us to use a hemiarthroplasty implant.

Simultaneous treatment of both shoulders during the same procedure is recommended when the patient's condition allows it. Gerber *et al.* [26] reported that patients operated in a bilateral manner had better functional recovery and very few complications. This observation also holds for bilateral shoulder fracture–dislocation treated by prosthesis [27,28]. Because our patient was admitted in critical condition, two-stage surgery was mandatory, even if the left shoulder's posterior fracture–dislocation had been detected initially.

In terms of outcomes, various authors [15, 28, 29] have described encouraging observations with very satisfactory functional recovery, independent of the treatment selected; however none of these studies directly compared various treatment options. Begin *et al.* [29] reported that a 46 year-old patient with posterior bilateral fracture–dislocation who was treated conservatively by humeral head reconstruction and bone grafting had an average Constant score of 86/100 after 3 years. Alta *et al.* [15] evaluated two patients (38 and 41 years old) with similar injury and treatment circumstances. At the last follow-up, the scores were 90

and 94, respectively. In two patients (64 and 76 years old) treated with bilateral hemiarthroplasty by Allende *et al.* [28], the Constant scores were 66.5 and 74.5, respectively, after 1 year. In our 57 year-old patient who was treated conservatively on the right side and radically on the left side, the average Constant score was 70/100 at the 6-month follow-up.

## CONCLUSION

Simultaneous dislocation of both shoulders in opposite directions is an extremely rare injury that is difficult to assess on standard XRs. A CT scan should be requested systematically. Surgical treatment options range from conservative procedures to prosthetic replacement. Deciding between these two techniques is not always obvious. For this reason, preoperative planning that takes into account the patient's general condition, age, joint damage and diagnostic delay is essential.

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