Fracture Dislocation of the Glenoid Fossa With Open Physis: A Case Report

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Background: Scapular fractures are uncommon injuries that account for 1% of all fractures. Ten percent of these lesions involve the glenoid fossa and intraarticular displacement is rare, not exceeding 10% of the cases. The classification of intraarticular glenoid fractures was described by Ideberg on the basis of his findings in 100 patients with this type of injury. His classification, however, does not include a dislocation of the glenoid fossa without displacement of the humeral head.

Methods: We report the case of a fracture dislocation of the glenoid fossa without displacement of the humeral head in a patient with open physis. Our surgical approach and results after 6 years of follow-up.

Results: Six years postoperatively the patient has minimal occasional discomfort and a full range of motion and strength, even in external rotation. Shoulder stability is also normal. Her Constant score is 97. The fracture is actually healed clinically and radiographically with no evidence of post traumatic articular degenerative disease or avascular changes.

Conclusions: The fracture/dislocation of the glenoid fossa is an uncommon injury that can be effectively treated by open reduction and internal fixation. A posterior surgical approach was useful to achieve anatomic reduction and strong fixation in this case presentation.

Key Words: shoulder, Fracture/Dislocation, internal fixation

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Scapular fractures are uncommon injuries that account for 1% of all fractures. Ten percent of these lesions involve the glenoid fossa, and intraarticular displacement is rare, not exceeding 10% of the cases.[1]

The classification of intraarticular glenoid fractures was described by Ideberg on the basis of his findings in 100 patients with this type of injury.[2] His classification, however, does not include a dislocation of the glenoid fossa without displacement of the humeral head.

We report the case of a fracture dislocation of the glenoid fossa without displacement of the humeral head, our surgical approach, and functional and radiologic outcomes after 6 years of follow-up.

CASE REPORT

In May 1996, a 14-year-old girl presented to the emergency room with pain and functional impairment of her right shoulder after rolling over it during a fall while skiing. Physical examination showed a swollen yet undeformed shoulder. Active range of motion was practically absent, and there were no signs of vascular or neurologic damage. The patient did not sustain any other injuries.

Shoulder x-rays showed an angulated fracture of the lateral border of the scapula, which extended into the glenoid anatomic neck. The inferior $^3/_4$ of the glenoid surface was completely displaced toward the anterior (Fig. 1). The upper part of the glenoid and the coracoid process were not involved.

The CT scan showed a glenoid fossa fracture dislocation with full anterior displacement and the humeral

FIGURE 1. Shoulder x-ray showing a fracture dislocation of the glenoid fossa.

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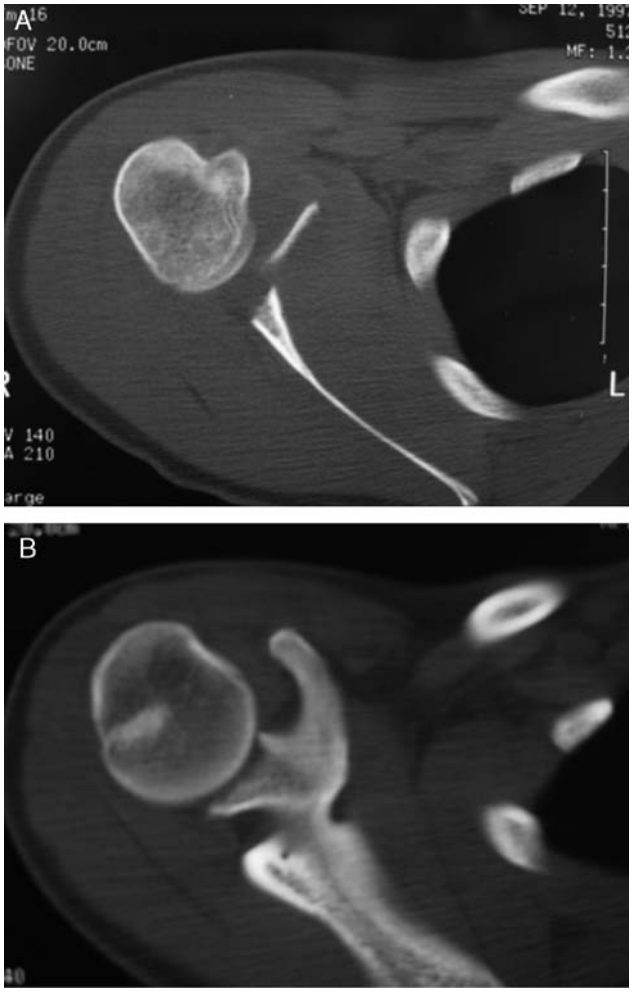

FIGURE 2. A and B, Shoulder CT scan showing a fracture with complete anterior dislocation of the glenoid fossa. The humeral head sits in its normal position.

head sitting in its normal position but making contact with the glenoid anatomic neck (Figs. 2A, B, 3).

An open reduction was carried out through a posterior approach. We detached the posterior part of the deltoid, and through the interval between the infraspinatus and teres minor the posterior capsule was accessed. Under direct vision, we were able to see the anteriorly displaced glenoid fossa and the attached labrum through the space between the humeral head and the anatomic neck. The fossa was easily reduced by pulling it back into place with an intraarticular hook. The lateral scapular border was reduced and the fragment fixed with a 4-hole dynamic compression plate with 3 cortical screws and 1 posterior cannulated screw, achieving anatomic reduction and solid fixation of the fragments. We did not find any associated labral or tendon tears. No soft tissue was fixed, except for the suture of the capsular incision.

The shoulder was immobilized in a brace during 1 month after which a progressive rehabilitation was begun.

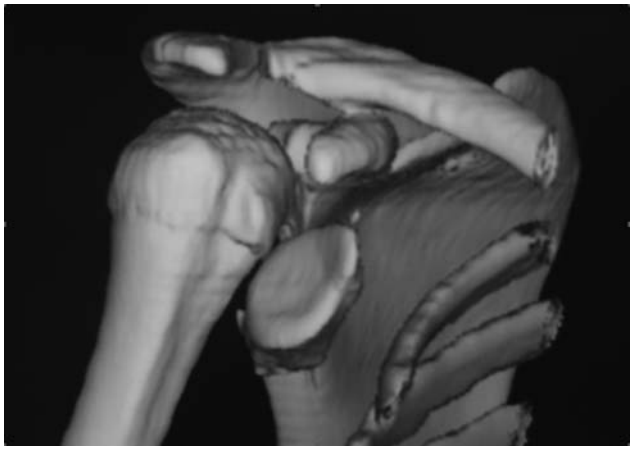

FIGURE 3. Shoulder CT, 3-D reconstruction showing the glenoid fossa fracture dislocation with full anterior and inferior displacement, and the humeral head sitting in its normal position.

An active range of motion was allowed at 8 weeks and strengthening exercises at 12 weeks after surgery.

Six years postoperatively, the patient has minimal occasional discomfort and a full range of motion and strength, even in external rotation. Shoulder stability is also normal. Her Constant score is 97.

The fracture is actually healed clinically with radiographically no evidence of post traumatic articular degenerative disease or avascular changes (Fig. 4).

DISCUSSION

Glenoid fracture dislocations are uncommon injuries.[3] Ideberg classifies glenoid fractures in 5 types.[2] The actual classification does not assess the displacement of the glenoid fossa from the glenoid neck. For this reason, a

FIGURE 4. Shoulder AP view showing an anatomic reduction and solid internal fixation of the fragments after 6 years of follow-up. There is no evidence of osteonecrosis or degenerative disease of the gleno-humeral joint.

fracture dislocation of the glenoid fossa seems more accurate to describe this lesion.

In this case report, the humeral head normally should follow the articular surface of the glenoid. In our patient, the humeral head kept in close relation with the growth plate of the glenoid neck, so the displacement was only of 1 articular surface.

We describe a case in which the main finding was a fracture dislocation of the glenoid fossa without displacement of the humeral head. We have not found this type of injury in the available literature. Ideberg's type II transverse glenoid fracture with an inferiorly displaced fragment would be the closest pattern to our case. However in our patient, the fracture was oblique, and the glenoid fragment was displaced anteriorly.

We named this pattern of injury a fracture dislocation of the glenoid fossa.

The glenoid forms from 2 ossification centers: the ossification center at the base of the coracoid and a second, horseshoe-shaped center. The base of the coracoid process begins ossifying in the tenth year, forms a portion of the glenoid, and unites with the body at about the age of 15. The second center arises from the inferior portion of the glenoid and forms the three-fourths of the glenoid cavity.[4] The multiple ossification centers about the scapula can be confused with fractures.[5] At the age of our patient, the ossification of these centers was not completed. The fact that the glenoid neck epiphyseal plate was not closed could explain the location of the fracture which could be better defined as a growth plate lesion of the adolescent.

There are 2 mechanisms that could explain a glenoid fossa dislocation without displacement of the humeral head. The first one is that the humeral head banged the center of the glenoid fossa creating a cleavage at the growth plate, which allowed for the displacement of the fragment anteriorly owing to the large amount of energy received from the fall, the angle of impact, and the laxity of the anterior capsule usually found in young girls. The second mechanism could be that both, the humeral head and the glenoid, were dislocated anteriorly in the accident like a big bony Bankart, but that the humeral head was reduced spontaneously during the fall leaving the glenoid fragment dislocated.

Regarding the treatment, although operative indications are controversial and more than 90% of all scapular fractures are treated by nonoperative methods, there is no discussion on the indication for surgery in this case.[1] According to Idebergs classification, the operative treatment is indicated for fragments larger than 25% of the glenoid surface, if the displacement is more than 5 mm or in the presence of residual instability.[6]

There could, however, be controversy on which type of surgery would be best in this case. Although the glenoid fossa was anteriorly displaced, we decided to do a posterior approach to allow for a better fixation of the fossa to the glenoids neck, which was successfully achieved, as described on the case presentation. We decided to use plate and screw fixation as opposed to pins or sutures, because a stronger bony fixation in a 14-year-old patient could be achieved with this method.

Regarding the absence of associated lesions, presumably because of the patient's age (adolescent), the capsular laxity allowed for the great displacement of the glenoid fossa without any capsulo-labral complex tears.

Degenerative changes and avascular necrosis have both been reported as potential complications for articular fractures in the shoulder. Fortunately, after 6 years of follow up, no clinical or radiographic evidence of these complications have been present in this case.

CONCLUSIONS

The fracture/dislocation of the glenoid fossa is an uncommon injury that can be effectively treated by open reduction and internal fixation. A posterior surgical approach was useful to achieve anatomic reduction and strong fixation in this case presentation.

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