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Case Report

Case Report: Minimally Invasive Open Reduction and Internal Fixation of a Humeral Head-Splitting Fracture-Dislocation in A Young Man

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Abstract

Humeral head-splitting fractures are extremely rare injuries and are often associated with glenohumeral dislocation. We report one such case in which a young man sustained a head-splitting proximal humerus fracture with associated posterior dislocation of the shoulder. The patient was treated with minimally invasive open reduction and internal fixation (ORIF). At two weeks follow up, the patient was doing well, and gentle range-of-motion exercises were initiated.

Introduction

Posterior glenohumeral dislocations account for 1-4% of all glenohumeral dislocations and are occasionally associated with fractures [1]. Richard and Clarke originally described two types of humeral head fractures: humeral head impression fractures, or enoche fractures, and the less common head-splitting fractures [1]. Head-splitting fractures are extremely rare injuries that are most commonly a result of high-energy trauma such as a direct fall onto the shoulder with humeral head impaction on the glenoid. On review of the current literature, preserving the humeral head with ORIF when possible is the preferred technique in young patients with glenohumeral fracture-dislocations [2]. This case report describes our experience in treating a young man who sustained a humeral head-splitting fracture with associated posterior glenohumeral dislocation from a high-energy dirt bike accident. Surgical management involved attempted closed reduction followed by minimally invasive open reduction and internal fixation (ORIF) with cannulated screws to stabilize the fracture. Since few orthopaedic surgeons have experience in treating these fracture-dislocations with few examples present in the literature, our case report may be a valuable resource for future treatment of humeral head-splitting fractures with associated glenohumeral subluxation or dislocation [1-4].

Case Description

A 32-year-old male presented to an outside emergency department after falling from his dirt bike and landing on his face and bilateral shoulders. His chief compliant was bilateral shoulder pain. Gross deformity of both shoulders was observed on physical exam. Neurovascular status was determined to be intact. Initial outside radiographs demonstrated a left shoulder anterior dislocation as well as a right shoulder proximal humerus fracture-dislocation (Figure 1).

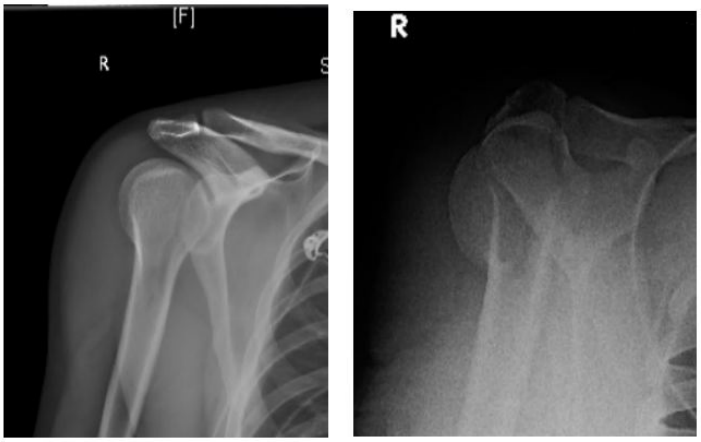

Figure 1: Initial AP and Scapular Y plain film views demonstrating a proximal humerus fracture-dislocation.

Attempted closed reduction was performed under conscious sedation. The left shoulder was reduced; however, the right shoulder closed reduction was unsuccessful. CT scan revealed a displaced coronal split of the humeral head involving the articular surface and impaction on the posterior glenoid rim. (Figure 2).

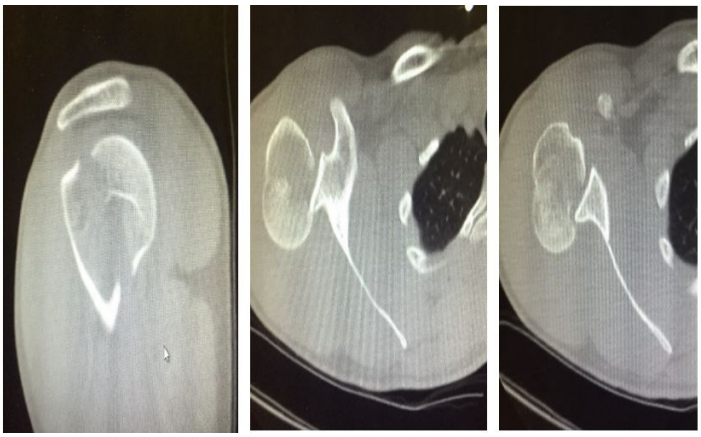

Figure 2: CT scan cuts reveal impacted humeral head-splitting fracture with posterior glenohumeral dislocation.

The patient was then transferred to our institution for surgical management. After initial evaluation, the patient was informed of the risks, benefits, and alternatives and elected to proceed with closed versus open reduction and possible internal fixation of the right shoulder. The patient was brought to the operating room and a closed reduction was first attempted. The reduction maneuver involved internal rotation and axial traction to disimpact the humeral head from the glenoid which achieved an audible pop. Fluoroscopic images confirmed glenohumeral reduction, however, the fracture was seen to be highly unstable (Figure 3).

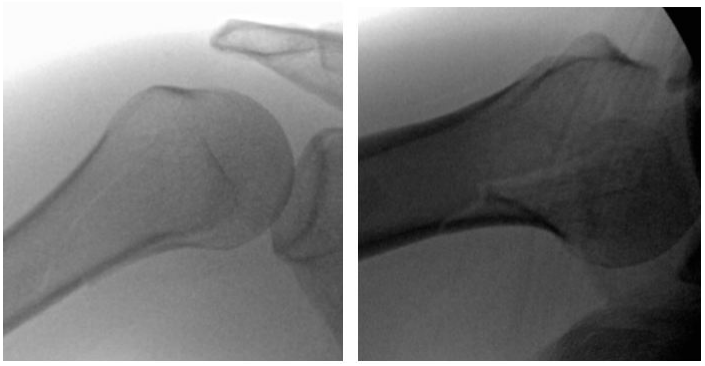

Figure 3: Intra-operative fluoroscopy showing successful closed reduced with residual fracture instability.

Therefore, minimally invasive open reduction and internal fixation was performed. Under x-ray guidance a reduction clamp was applied to reduce the fracture anatomically. Five Kirschner wires (K-wires) were passed across the fracture site in a posterior to anterior direction, being careful not to enter the glenohumeral joint. Three 6.5 mm partially threaded cannulated screws of appropriate length were then passed over the wires and tightened into place with good purchase. Two additional 4.5 mm partially threaded cannulated screws were placed, one in a slightly oblique orientation, perpendicular to the fracture line. The K-wires were removed, and range of motion assessed under fluoroscopy. The fracture appeared well reduced and stable with no intra-articular hardware penetration (Figure 4).

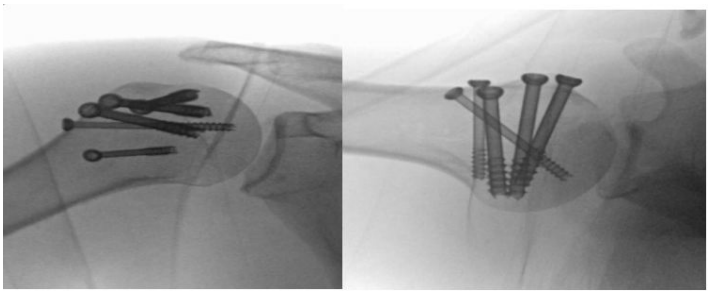

Figure 4: Fluoroscopic final images demonstrating anatomic fracture reduction with cannulated screw fixation.

The incision sites were closed, and the arm was placed in an abduction sling. At two weeks follow up, the patient reported improvement but residual shoulder pain and stiffness. Pendulum exercises were initiated, however the patient was lost to future follow-up.

Discussion

Humeral head splitting fractures with associated dislocations are extremely rare and usually occur in younger patients who

have been subjected to high-energy trauma. These fractures can be difficult to diagnose, and three radiographic views are usually recommended for accurate diagnosis5. Even with correct recognition, no best method exists for treating these injuries. Reported fixation techniques have included minimally invasive percutaneous screws, ORIF with locking or non-locking plate and screw constructs, and arthroplasty [2,6]. Hemiarthroplasty as well as total and reverse shoulder arthroplasty remain important treatment options because of the possibility of avascular necrosis of the humeral head [7,8]. However, this is not preferred for younger patients if the humeral head can be preserved because of long term poor results in patients who have undergone shoulder arthroplasty prior to 50 years of age [9]. Preservation of the humeral head, when possible, should be a primary focus for orthopaedic surgeons when treating head-splitting fractures in young patients.

Conclusion

There are currently very few case reports in the literature regarding posterior dislocations with associated humeral head splitting fractures. Our case reported technique involves use of closed reduction and minimally invasive ORIF with percutaneous cannulated screws for treating such fracture-dislocations in a young patient. In conclusion, good results can be achieved with this technique, avoiding the need for arthroplasty in young patients. Future studies should be performed to investigate mid and long-term outcomes of this technique in young patients.

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