CASE REPORTS

ANTERIOR GLENOHUMERAL DISLOCATION WITH IPSILATERAL HUMERAL SHAFT FRACTURE

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An anterior glenohumeral dislocation with an ipsilateral humeral shaft fracture is a rare injury, usually resulting from severe trauma. The mechanism of injury may involve two distinct forces or a high-velocity injury, such as a motor vehicle accident. Prompt recognition of both injuries is required for proper treatment and stresses the importance of obtaining radiographs of the joint above and below the fracture. A review of the literature shows only nine reported cases. A description of the injury, mechanism of injury, and treatment of both the dislocation and fracture will be discussed. In addition, two new cases are presented, one with an upper brachial plexopathy (Table).

CASE REPORTS

Case 1. A 29-year-old man was traveling approximately 35 mph on his motorcycle when he struck the side of an automobile. He presented to the emergency room complaining of right shoulder pain. Physical examination revealed an obvious deformity of the right shoulder with fullness anteriorly and a prominent acromion process posterolaterally. Radiographs of the right shoulder and humerus revealed a right anterior glenohumeral dislocation with a transverse fracture of the proximal one third of the humeral shaft (Fig 1).

Under intravenous sedation in the emergency room, the dislocation was easily reduced with longitudinal traction and abduction of the proximal fragment. The patient was placed on a coaptation splint for 2 weeks, followed by application of a functional humeral brace for an additional 8 weeks. Gentle shoulder and elbow range-of-motion exercises were started at 3 weeks. During rehabilitation, the patient showed signs of shoulder girdle weakness. A nerve conduction velocity test performed 4 months post-injury revealed an upper brachial plexopathy including the fifth, sixth, and seventh cervical nerve roots. The patient continued his therapy and his strength slowly improved. Range of motion at 1 year showed 180° abduction, 180° forward flexion, and 40° external rotation. There was no noticeable atrophy, and the humeral shaft fracture healed in bayonet apposition (Fig 2).

Case 2. A 67-year-old man was the unrestrained passenger in a motor vehicle accident and reportedly was thrown through the windshield. He sustained multiple facial fractures and lacerations, a right intertrochanteric hip fracture, and bilateral humeral shaft fractures with a left anterior glenohumeral dislocation. After initial stabilization, the patient was taken to the operating room for internal fixation of the right intertrochanteric hip fracture and closed reduction of the glenohumeral dislocation with intramedullary rodding of both humeri (Fig 3). The glenohumeral joint was reduced with longitudinal traction and abduction of the proximal fragment similar to Case 1. The humeral shaft fracture was then reduced and stabilized with an intramedullary rod in a closed fashion. Gentle range-of-motion exercises of both upper extremities were started postoperatively, and active range of motion of the left shoulder was started 3 weeks postoperatively. The fractures healed without difficulty, and 1 year postoperatively, his left shoulder showed 90° abduction, 90° forward flexion, and 20° external rotation.

DISCUSSION

The mechanism of injury in an anterior glenohumeral dislocation with an ipsilateral humeral shaft fracture is not always known. Some authors have suggested two distinct forces, one causing the dislocation and a second causing the fracture. The forces can occur simultaneously, as reported by Barquet,1 or may occur in two separate injuries, as noted by Baker.2 Another possible mechanism occurs with high-velocity injuries, such as the two motor vehicle accidents reported in this article. Sankaran-Kutty and Sadat-Ali3 discussed the mechanism of injury in a motor vehicle accident and compared it to a femoral shaft fracture associated with an ipsilateral hip dislocation. They suggested that an axial load to the humerus through the flexed elbow can result in a humeral shaft fracture and glenohumeral dislocation. They also suggested that energy is simultaneously dissipated to cause a humeral shaft fracture and an anterior glenohumeral dislocation if the shoulder is extended or a posterior glenohumeral dislocation if the shoulder is forward-flexed.

The deformity that occurs with an anterior glenohumeral dislocation with a humeral shaft fracture is usually obvious. Baker2 stated that an extreme varus deformity should occur with
Table

REPORTED CASES OF AN ANTERIOR GLENOHUMERAL DISLOCATION WITH AN IPSILATERAL HUMERAL SHAFT FRACTURE

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<td>Complete passive ROM at 3 weeks deftoid function at 3 months “Good” at 3 months Complete ROM reduction ulnar nerve neuropathy</td>
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<td>Büttler (1941)</td>
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<td>Barquet (1985)*</td>
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<td>Brooks (1989)*</td>
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<td>Upper brachial plexopathy resolved Bilateral humeral fractures intertrochanter hip fracture</td>
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<td>29/M</td>
<td>Anterior</td>
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*Obtained from Barquet, (1985).

N/A = not available; P/3, M/3, and D/3 = proximal, middle, and distal third; MVA = motor vehicle accident; MCA = motorcycle accident; ROM = range of motion.

these injuries. When extreme abduction of the proximal fragment of a transverse humeral fracture is noted, an anterior glenohumeral dislocation should be suspected. The patient in Case 1 of this study did not have a varus deformity most likely secondary to his upper brachial plexopathy. Since these injuries are usually the result of high-energy trauma, evaluation for associated injuries such as a brachial plexus injury is imperative. Radiographs of the shoulder and elbow joint should always be obtained when evaluating a humeral shaft fracture.

Once diagnosed, treatment of these injuries is extremely variable. Winderman, in 1940, first described an anterior glenohumeral dislocation with an ipsilateral oblique fracture of the proximal to middle third of the humerus. The injury was 4 days old at the time of presentation, and attempts at closed reduction of the glenohumeral dislocation were unsuccessful. A traction pin was therefore applied to the proximal fragment, and, using the pin, the dislocation was reduced without difficulty. The fracture was managed in a splint for 5 weeks, and 3 months post-injury, range of motion and function were reported as complete.

Barquet also described closed reduction through a traction pin in a case where the proximal fragment was too short to allow adequate manipulation. Sankaran-Kuttly and Sadat-Ali and Brooks and Carvell took this technique one step further by utilizing an external fixator for fracture treatment after reduction of the glenohumeral dislocation.

It is plausible that fractures which are more proximal could require some type of pin or external fixation device to aid in reduction of the glenohumeral joint. Milch, however, reduced a glenohumeral dislocation with an associated proximal one-third humerus fracture using a
Fig 1: Anterior glenohumeral dislocation with a transverse fracture of the proximal one-third humeral shaft.

Fig 2: Humeral shaft fracture healed in bayonet apposition.

Fig 3: Intramedullary rodding of a humeral shaft fracture after reduction of the glenohumeral joint.

study and suggests that most of the acute glenohumeral dislocations in this type of injury can be reduced by a simple closed maneuver. This can sometimes be difficult secondary to the short proximal fragment. In both Case 1 and Case 2, the proximal fragment was large enough that it could be controlled in such a fashion to allow reduction of the glenohumeral joint with simple longitudinal traction and abduction. The distal fragment, however, must also be controlled to prevent neurovascular injury from fracture manipulation. Obviously, a closed, controlled reduction is preferred to open reduction or placement of traction pins, which could potentially cause neurovascular injury.

Management of the humeral shaft fracture after reduction of the glenohumeral joint was by closed methods (splint/brace) in most cases. Internal fixation was performed in two cases, including Case 2 of this study. However, our patient had multiple fractures, including a hip fracture and bilateral humeral shaft fractures. It was felt that internal fixation would expedite the patient’s mobilization. His limited range of motion at 1 year was most likely the result of his age and capsular scarring. There were no reports of nonunion or delayed union in any case, regardless of treatment.

To our knowledge, Case 1 is the only reported case of its type with an upper brachial plexopathy. This may account for the lack of varus deformity on the initial radiograph. Milch\(^6\) had one patient with an ulnar nerve neuropraxia, which, similar to our case, resolved completely.

**Conclusion**

An anterior glenohumeral dislocation with ipsilateral humeral shaft fracture is a rare injury. Only 11 cases (including our two patients) have been reported in the literature. The importance
of obtaining radiographs of the joint above and below a fracture is illustrated in these injuries. Reduction of the glenohumeral joint can usually be obtained by simple closed methods; however, some authors recommend placement of a pin in the proximal fragment to aid in reduction. Management of the fracture has been successfully reported utilizing splinting, internal fixation, and external fixation but should obviously be modified according to the patient’s health and other associated injuries.

REFERENCES


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USE OF AN INFRA-MENISCAL PORTAL FOR COMPLEX POSTERIOR HORN MENISCAL RESECTION

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Resection of irreparable posterior meniscal pathology is at times a difficult task. We present the clinical application of a previously undescribed infra-meniscal portal that diminishes the risk of articular cartilage damage and simplifies complex meniscal resection.

Numerous knee arthroscopic portals have been described in the literature.1-6 Standard arthroscopic portals are adequate for resection of the vast majority of intraarticular pathology. However, certain situations such as irreparable bucket-handle meniscal tears and complex posterior horn tears are potentially more complicated.7 The use of an infra-meniscal portal has greatly facilitated careful posterior horn resection while minimizing potential damage to articular cartilage. A recent case will serve to illustrate the benefit of an infra-meniscal portal.

CASE REPORT

A 37-year-old man sustained a bucket-handle tear of the medial meniscus. The meniscus was deemed irreparable since a minimum of a 4 mm wide peripheral rim remained, and the fragment was noted to have some vertical tears within its substance. Attempts to reduce the displaced fragment were unsuccessful because the segment was twisted and trapped within the intercondylar notch (Fig 1).

At this point, the anterior portion of the tear was detached with a meniscal blade through the anteromedial portal in a manner previously described.7 Next, the arthroscope was exchanged anteromedially, and a grasping instrument was inserted anterolaterally to apply a distraction force on the retained meniscal segment.

Under direct arthroscopic visualization, a medial infra-meniscal portal was then made to allow passage of a biting instrument (Figs 2-4). The posterior attachment was easily resected, and the detached fragment was removed through the anterolateral portal. Contouring of the remaining meniscal edge was carried out in a routine manner (Fig 5).

DISCUSSION

Medial Infra-Meniscal Portal. Under direct arthroscopic visualization, an 18 gauge spinal needle is placed under the medial meniscus in zone 2.8 It is directed in an oblique fashion from anterior to posterior toward the posteromedial meniscal horn. The needle is placed posterior to the major component of the super-

Fig 1: Bucket-handle medial meniscal tear with entrapment of meniscal fragment in the intercondylar notch.