Case Report

Arthroscopic Reduction and Repair of a Locked Posterior Shoulder Dislocation

Nikhil N. Verma, M.D., Robert A. Sellards, M.D., and Anthony A. Romeo, M.D.

Abstract: Locked posterior shoulder dislocations are an uncommon but difficult problem for the orthopaedic clinician. Furthermore, they are often missed on initial presentation, resulting in significant delays in treatment. Traditional treatment has involved formal open reduction, most commonly from an anterior approach, followed by transfer of the lesser tuberosity or subscapularis tendon into the anterior humeral head defect. We present the case of a patient with locked posterior shoulder dislocation, who was treated with arthroscopically assisted reduction followed by arthroscopic posterior stabilization. Use of this technique allows the surgeon to reduce the dislocation without performing an open arthrotomy, thereby decreasing the patient's overall morbidity. Furthermore, an arthroscopic technique used for stabilization allows visualization of the entire glenohumeral joint and enables the surgeon to directly address posterior disease, rather than compensating for the defect with an anteriorly based transfer. **Key Words:** Shoulder—Posterior dislocation—Arthroscopy.

Locked posterior dislocations of the shoulder offer a unique challenge to the treating physician. They are uncommon (<5% of all shoulder dislocations).[1] When they do occur, treatment is often compromised by a delay in presentation and diagnosis. In a single series,[2] 79% of cases were missed on initial evaluation. Furthermore, in the series reported by McLaughlin,[3] mean time between injury and diagnosis was 8 months. Traditionally, treatment of a patient with chronic, locked posterior shoulder dislocation has included formal open reduction, with transfer of the lesser tuberosity into the anterior humeral head defect if necessary to provide stability. To our knowledge, arthroscopic management of this problem has not been reported. We report the case of a patient with a chronic, locked posterior shoulder dislocation that was treated with an arthroscopically assisted reduction followed by posterior arthroscopic stabilization.

CASE REPORT

A 26-year-old, right hand–dominant man was involved in an assault, during which he suffered an injury to his right shoulder. After the injury occurred, the patient was seen in a local emergency room with complaints of right shoulder pain. Plain radiographs were obtained and were negative by report. A shoulder contusion was diagnosed, and the patient was referred for follow-up with his primary care physician. Physical therapy for active and passive range-of-motion exercises was begun, but the patient continued to report significant pain and disability. When he failed to improve within 4 weeks after the injury, he was referred to our office for further evaluation.

From the Department of Orthopaedic Surgery, Section of Sports Medicine, Rush Medical College, Rush-Presbyterian-St. Luke's Medical Center (N.N.V., R.A.S., A.A.R.), Chicago, Illinois, U.S.A.

Address correspondence and reprint requests to Nikhil N. Verma, M.D., Midwest Orthopaedics at Rush, 1725 West Harrison St, Suite 1063, Chicago, IL 60612, U.S.A. E-mail: nikhilverma@hotmail.com

Cite this article as: Verma NN, Sellards RA, Romeo AA. Arthroscopic reduction and repair of a locked posterior shoulder dislocation. Arthroscopy 2006;22:1252.e1-1252.e5 [doi:10.1016/j.arthro.2006.04.086].

0749-8063/06/2211-4153$32.00/0

doi:10.1016/j.arthro.2006.04.086

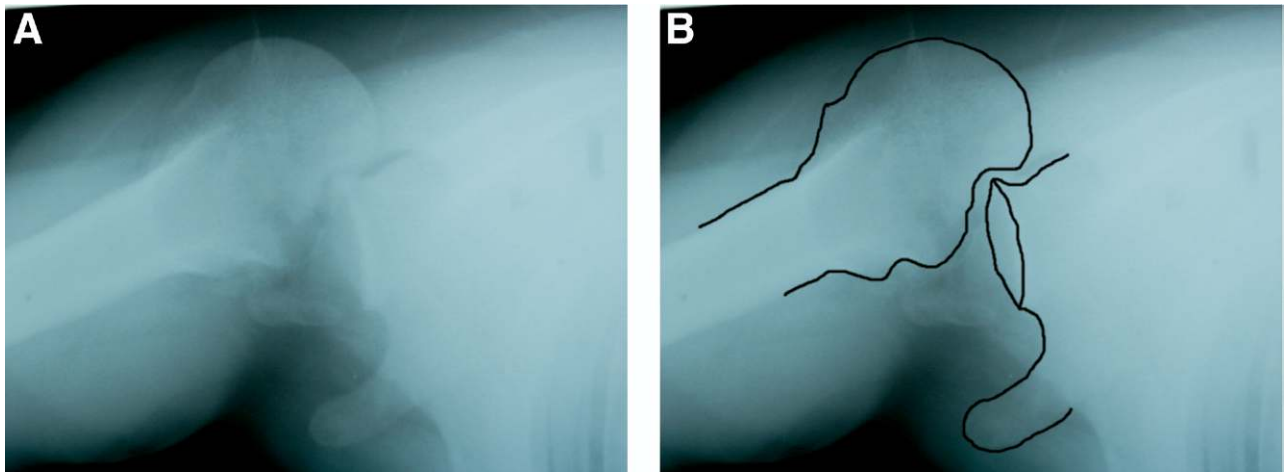

Figure 1. (A) Axillary lateral radiograph of the right shoulder obtained 4 weeks after injury shows a locked posterior shoulder dislocation with a moderately sized reverse Hill-Sachs lesion. (B) The articular edge of the glenoid and humeral head have been outlined to clearly show the posterior dislocation.

The patient was seen in our office with continued reports of persistent shoulder pain and decreased range of motion. On physical examination, his active and passive forward flexion was limited to 90°, and external rotation was limited to −10°. Distal neurovascular examination was unremarkable. A complete radiographic evaluation, including anteroposterior, scapular Y, and axillary lateral views, was performed. The standard axillary lateral radiograph revealed a locked posterior shoulder dislocation with a significant reverse Hill-Sachs lesion (Fig 1). A computed tomography (CT) scan revealed approximately 20% involvement of the articulating surface of the humeral head (Fig 2). Given the chronicity of the injury, definitive management was scheduled to include attempted closed reduction under anesthesia, possible open reduction, and open versus arthroscopic posterior capsulolabral repair.

The patient was brought to the operating room after he had been intubated under general anesthesia with complete muscle relaxation and placed in the left lateral decubitus position. An attempt at closed reduction was unsuccessful. Through a small posterior skin incision made at the site of the standard posterior arthroscopic portal, a 4-mm metal rod (switching stick) was introduced into the glenohumeral joint. It was placed medial and superior to the humeral head, resting on the anterior rim of the glenoid. A reduction maneuver was then performed, with the assistant providing lateral and slight distal traction of the extremity, while the surgeon slowly levered the switching stick anteriorly and laterally using the anterior rim of the glenoid as a fulcrum. It is important to note that the switching stick provided a lateral force through the rotator cuff tissue—not the humeral articular surface. As the arm was gently externally rotated, the humeral head was noted to reduce within the glenohumeral joint; this reduction was confirmed on clinical examination. However, further range-of-motion testing revealed that the shoulder was grossly unstable and easily dislocated posteriorly with the humerus in neutral rotation. On the basis of this instability, the deci-

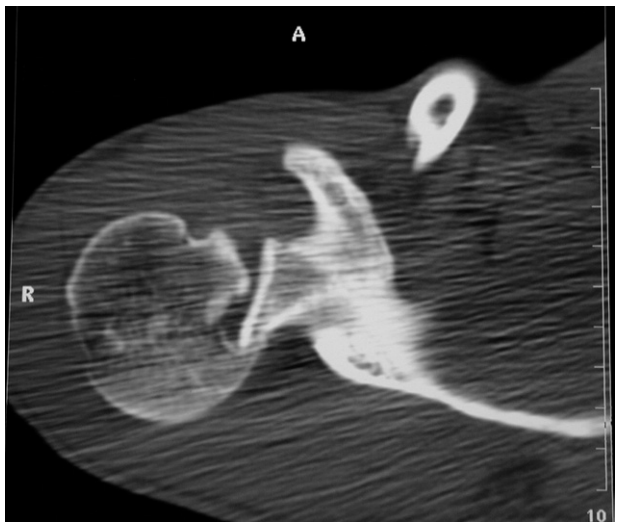

Figure 2. Axial computed tomography scan of the right shoulder shows impaction fracture with approximately 20% involvement of the anterior humeral head.

sion was made to proceed with arthroscopic surgical stabilization.

The shoulder was once again reduced, and an arthroscopic examination was performed with use of the standard posterior portal. A significant amount of blood was seen within the joint, along with obvious loose cartilage fragments. An anterior portal was established, and a large reverse Hill-Sachs lesion was identified on the anterior aspect of the humeral articular surface (Fig 3). The capsulolabral complex was completely disrupted off of the posterior glenoid rim, starting from just posterior to the biceps tendon and extending inferiorly to the 6 o'clock position (Fig 4). At this point, an accessory posterior-inferior portal was established, and arthroscopic repair of the posterior capsulolabral complex was performed with the use of 3 suture anchors. Once this had been completed, the arm was taken through a full range of motion, and no recurrent instability was noted.

Postoperatively, the patient was placed in a gunslinger brace and maintained in approximately 10° of external rotation. No active or passive range of motion was allowed. At 6 weeks, the brace was discontinued, and the patient began range-of-motion activities; he advanced to strengthening exercises within 3 months. At 6 months postoperatively, all restrictions were discontinued, and the patient was advanced as tolerated.

At 4-year follow-up, the patient reported no pain and no limitations with regard to his right upper extremity. On physical examination, range of motion was full and symmetric to the opposite side with, specifically, forward flexion to 170°, internal rotation behind the back to the midscapular level, and external rotation at the side to 70°. Strength testing revealed 5/5 strength with regard to external rotation at the side and forward flexion in the scapular plane. Belly press and lift-off tests were negative. No evidence was found of posterior laxity or subluxation, and the patient had returned to his presurgical level of recreational athletic participation. Radiographic examination showed preservation of the glenohumeral joint space on the anteroposterior view, with no posterior subluxation or glenoid erosion on the axillary lateral view (Fig 5).

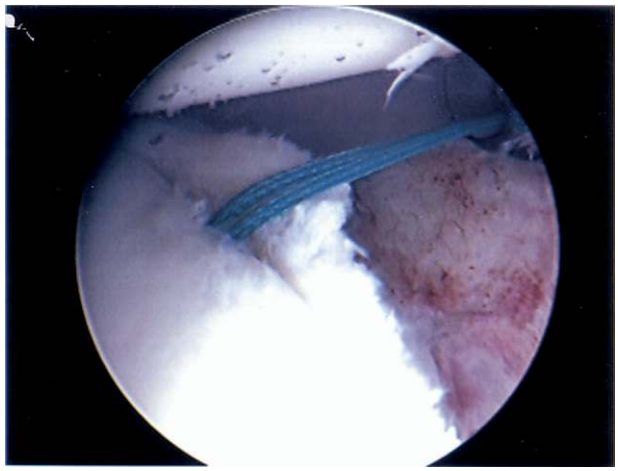

FIGURE 4. Arthroscopic view from the anterior portal of the right shoulder shows complete disruption of the posterior labrum and capsule from the glenoid rim.

FIGURE 3. Arthroscopic view from the anterior portal of the right shoulder shows direct visualization of the anterior humeral head impaction fracture.

FIGURE 5. Axillary lateral radiograph reveals a well-centered humeral head with no evidence of posterior glenoid erosion or wear.

DISCUSSION

Posterior dislocations of the shoulder are uncommon, representing less than 5% of all shoulder dislocations; they are often missed on initial presentation.[1] The keys to making the correct diagnosis involve maintaining a high index of suspicion, performing a thorough physical examination, and obtaining a complete radiographic series, including an axillary lateral view. On physical examination, the shoulder may appear flattened anteriorly with a prominent, squared-off anterior acromion and prominent coracoid process. Range-of-motion examination will reveal limited forward flexion, although in contrast to anterior dislocation, forward flexion to greater than 90° may be possible. The hallmark on physical examination is loss of external rotation.

On radiographic evaluation, the key to diagnosis is obtaining an axillary lateral view. On the anteroposterior view, the dislocation can be easily missed. Clues to diagnosis include loss of normal joint space and overlap between the humeral head and the glenoid rim, as well as an internally rotated view of the humeral head, the so-called "light bulb sign." On axillary view, the dislocation is easily appreciated, with the humeral head located posterior to the glenoid. Furthermore, the degree of impaction of the anterior humeral head on the posterior glenoid can be approximated. Most authors, however, recommend that a CT scan be obtained on a routine basis for evaluation of the size of the humeral head lesion; this assessment is a key element in the treatment decision-making process.

Management of a chronic locked posterior shoulder dislocation includes attainment of a closed reduction and assessment of the size of the humeral head defect. In the chronic situation, closed reduction has been difficult to achieve. The length of time between injury and the diagnosis needed to classify a dislocation as chronic, however, is not clearly defined. It is known that in the delayed setting, closed reduction without general anesthesia should not be attempted and, even with anesthesia, closed treatment is often unsuccessful.

If closed reduction fails, open reduction through an anterior approach has been advocated. Once reduction has been achieved, reconstruction is performed according to the size of the anterior humeral head defect. In cases in which the defect is less than 20%, the shoulder is often stable and may be placed in an external rotation brace for 3 to 6 weeks. With larger head defects of between 20% and 45%, transfer of the subscapularis tendon or lesser tuberosity into the defect has been the conventional method of treatment. For larger defects (greater than 45%), reconstructive options include allograft reconstruction, humeral arthroplasty, and total shoulder arthroplasty.

To our knowledge, no techniques have been described for arthroscopic treatment of patients with locked posterior shoulder dislocation. A review of the literature has revealed a single case report in which arthroscopy was used to remove loose bodies from the joint after a posterior dislocation had been reduced.[4] The authors concluded that this could be an effective tool for the management of shoulders with the following criteria: healthy articular cartilage, humeral head defect $<20\%$, and the presence of a loose body between the glenoid and the humeral head.

Our technique of reducing locked posterior dislocations uses the traditional methods of reduction, with the added assistance of an arthroscopic switching stick to atraumatically disengage the humerus from the glenoid, translate the articular surface laterally, and gently reduce the articular surface into the glenoid. A key point is that leverage is applied through the soft tissues of the rotator cuff and capsule—not the articular surface. The advantage of this technique is that it eliminates the need for an open procedure to reduce the joint. Once reduction has been achieved through this minimally invasive technique, one may immediately proceed with arthroscopy to address the persistent soft tissue pathoanatomy associated with posterior glenohumeral dislocation.

Arthroscopy of the glenohumeral joint enables the surgeon to directly address all aspects of intra-articular soft tissue disease associated with these traumatic injuries. The traditional open anterior procedure does not allow adequate exposure for treatment of posterior labral disease. Therefore, an anteriorly based transfer of the subscapularis tendon or lesser tuberosity was devised to compensate for the posterior capsulolabral injury by limiting motion and filling the anterior humeral head defect. Analogous to the Bankart lesion of anterior dislocations, it seems intuitive that the reverse Bankart lesion should be repaired primarily to restore normal anatomy and posterior stability, providing the patient with the best opportunity to regain normal function.

Published results of traditional techniques for treating locked posterior dislocation of the shoulder are somewhat limited. In 1990, Walch et al.[5] reported on 10 patients with subscapularis transfer and reported 3 excellent, 1 good, 5 fair, and 1 poor result. In 1987, Hawkins et al.[6] reported their results of 9 McLaughlin transfers and 4 modified McLaughlin transfers. In this series, a successful outcome was noted in 4 of 9

McLaughlin transfers and in 4 of 4 modified McLaughlin transfers. Furthermore, an average forward elevation of 165° was reported, along with external rotation of 40° and internal rotation to the 12th thoracic vertebra. Finally, Checchia et al.[7] reported good or excellent results in 7 of 9 patients treated with an anterior transfer after treatment had been delayed for longer than 4 weeks. Statistically significant differences in forward flexion and internal rotation were observed between operative and nonoperative sides at final follow-up. These limitations in rotation seem predictable, given the nature of the transfer. In our case, no limitations in rotation occurred; by directly repairing the posterior structures, we were able to avoid performing a modified McLaughlin procedure.

The potential advantages of all-arthroscopic management of this problem are multiple. First, the technique of using a switching stick to aid in reduction may improve the rate of successful closed reduction. Second, arthroscopy allows inspection of the entire glenohumeral joint to help the clinician to identify and address other areas of disease. Third, in keeping with the arthroscopic versus open debate for anterior instability, arthroscopic repair offers the advantages of lower morbidity and reduced pain, shorter surgical time, and improved cosmesis. Finally, an arthroscopic technique may provide the patient with an improved functional outcome and a better opportunity to achieve normal motion postoperatively. It should be noted that this procedure is limited to small and moderately sized humeral head defects (less than 45%) that remain unstable after closed reduction has been performed. Cases with larger humeral head defects will require articular reconstruction with the use of osteochondral allograft or arthroplasty.

Management of chronic, locked posterior shoulder dislocation may be difficult and diagnosis is often delayed, making treatment even more challenging. Traditional techniques have had limited success with closed reduction in the chronic situation; they involve an open anterior approach for reduction and reconstruction, often resulting in less favorable outcomes and limited postoperative motion. The use of an arthroscopic technique may improve the success rate of closed reduction and allow the surgeon to more directly address associated posterior pathoanatomy, improving the chance that a good functional outcome will be achieved.

REFERENCES

1. Blasier RB, Burkus JK. Management of posterior fracture-dislocations of the shoulder. *Clin Orthop* 1988;232:197-204.
2. Schultz T, Jacobs B, Patterson RL. Unrecognized dislocations of the shoulder. *J Trauma* 1969;9:1009-1023.
3. McLaughlin H. Posterior dislocations of the shoulder. *J Bone Joint Surg Am* 1952;34:584-590.
4. Alamo GG, Cimiano FJ, Suarez GG, Carro LP. Locked posterior dislocation of the shoulder: Treatment using arthroscopic removal of a loose body. *Arthroscopy* 1996;12:109-111.
5. Walch G, Boileau P, Martin B, et al. Luxations et fracture-luxations posterieures inveterees de l'epaule: A propos de 30 cas. *Rev Chir Orthop* 1990;76:546-558.
6. Hawkins RJ, Neer CS 2nd, Pianta RM, Menodza FX. Locked posterior dislocations of the shoulder. *J Bone Joint Surg Am* 1987;69A:9-18.
7. Checchia SL, Santos PD, Miyazaki AN. Surgical treatment of acute and chronic posterior fracture-dislocation of the shoulder. *J Shoulder Elbow Surg* 1998;7:53-65.