Concurrent rupture of the rotator cuff and anterior dislocation of the shoulder in the older patient

RJ Neviaser, TJ Neviaser and JS Neviaser

This information is current as of January 22, 2009

Reprints and Permissions
Click here to order reprints or request permission to use material from this article, or locate the article citation on jbjs.org and click on the [Reprints and Permissions] link.

Publisher Information
The Journal of Bone and Joint Surgery
20 Pickering Street, Needham, MA 02492-3157
www.jbjs.org
Concurrent Rupture of the Rotator Cuff and Anterior Dislocation of the Shoulder in the Older Patient

BY ROBERT J. NEVIASER, M.D., WASHINGTON, D.C., THOMAS J. NEVIASER, M.D., FAIRFAX, VIRGINIA, AND JULES S. NEVIASER, M.D., LORIS, SOUTH CAROLINA

From the Department of Orthopaedic Surgery, George Washington University Medical Center, Washington

ABSTRACT: Thirty-one patients who were unable to abduct the involved arm after reduction of a primary anterior dislocation of the glenohumeral joint were found to have a ruptured rotator cuff. All of the patients were more than thirty-five years old. Twenty-nine of them were initially presumed to have had an injury to the axillary nerve, although this injury was confirmed in only four of the patients who had electrodiagnostic studies.

In eight patients, the subscapularis tendon and anterior part of the capsule had ruptured from the lesser tuberosity. Recurrent instability developed in all eight patients, and repair of these structures alone was successful in restoring stability.

The association between primary anterior dislocation of the glenohumeral joint and rupture of the rotator cuff in the older patient who cannot abduct the arm after reduction is poorly appreciated, as it is often missed. In our series of such patients, the incidence of injury to the axillary nerve was 7.8 per cent, as compared with 100 per cent for rupture of the rotator cuff. However, the comparative rates of occurrence of these two entities in older patients who have an anterior dislocation have not been determined.

Although other authors3-8,11,12,17 have noted that a rupture of the rotator cuff can occur with primary anterior dislocation of the glenohumeral joint, this relationship is still not acknowledged adequately by the orthopaedic community. When evaluating a patient who cannot abduct the arm after reduction of an anterior dislocation, the physician tends to assume that this inability is caused by an axillary-nerve palsy. This assumption frequently results in an unnecessary delay in establishing the correct diagnosis of a ruptured rotator cuff, and the delay can result in a challenging reconstruction.

The purpose of this report is to present the results in thirty-one patients who were older than thirty-five years and who had a documented rupture of the rotator cuff of the shoulder after reduction of a primary anterior dislocation of the glenohumeral joint. A subset of eight of these patients had recurrent instability of the shoulder after the initial reduction.

Materials and Methods

Thirty-one patients were seen who had weakness in abduction of the involved arm after closed reduction of a primary anterior dislocation of the glenohumeral joint without fracture of the tuberosities of the humerus. No patient had had a previous dislocation or pain, weakness, or other complaints about the involved shoulder.

All of the patients, except one, were more than forty years old. The ages ranged from thirty-five to seventy-eight years, and the average age was 57.5 years. There were twenty-two men and nine women. The interval of time between the dislocation and the diagnosis of a tear of the rotator cuff ranged from ten days to two years and averaged 7.6 months. Two patients were seen by us for initial treatment, and the remaining twenty-nine patients had been referred to us by other physicians because physical therapy had failed to restore abduction. All of the dislocations had been documented by physical examination and radiographs.

The histories of the patients were remarkably similar. All of the patients were unable to abduct the involved arm after reduction of the dislocation. The twenty-nine patients who originally had been treated by other physicians were initially presumed to have had an injury to the axillary nerve, although this diagnosis was confirmed in only four of the twenty patients who had had electromyography. All of the thirty-one patients had pain (especially at night), weakness, and varying inability to abduct the affected arm. No patient had had previous operative treatment for the rupture of the rotator cuff or for the dislocation.

In eight patients, episodes of recurrent instability of the shoulder had developed after reduction. All of these patients had sustained the initial dislocation when they were more than forty years old, and all had a documented tear of the rotator cuff. Three of these patients had recurrent dislocation, and five had recurrent subluxation.

Each of the patients in this series had single-contrast arthrography of the shoulder that was performed by one of us. In each patient, there was extravasation of contrast medium from the glenohumeral joint into the subacromial...
Rupture of the subscapularis tendon and of the anterior part of the capsule from the lesser tuberosity in a patient who had recurrent instability (SS/AC = subscapularis tendon and anterior part of the capsule, HH = humeral head, and LT = lesser tuberosity).

space, confirming the presence of a rupture of the rotator cuff.

Decompression of the subacromial space and repair or reconstruction of the rotator cuff were performed on every patient. Each patient had a tear through the full thickness of the rotator cuff. In twenty patients, in whom the supraspinatus tendon and part of the infraspinatus tendon were involved, direct repair of the tendons was possible after extensive mobilization of the cuff. In addition to the repair of the cuff, a prosthetic replacement was needed in one patient because of extensive loss of the articular cartilage of the humeral head. Complete closure of the rotator cuff by direct suture was not possible in three patients in whom the entire supraspinatus tendon and infraspinatus tendon had ruptured. The musculotendinous units were severely retracted and could not be mobilized sufficiently to close the cuff directly. One of these patients needed a free biceps graft\footnote{one, a freeze-dried graft of a rotator cuff from a}

Reattachment of the subscapularis tendon and the anterior part of the capsule to the lesser tuberosity restored stability (LT = lesser tuberosity and SS/AC = subscapularis tendon and anterior part of the capsule).
All of the eight patients in whom recurrent dislocation or subluxation of the shoulder had developed had a rupture of the subscapularis tendon and the underlying anterior part of the capsule. In each shoulder, these structures were found to be ruptured from their insertions into the lesser tuberosity (Fig. 1-A). It was possible to reattach the structures to the lesser tuberosity (Fig. 1-B) in all patients.

The patients were followed for two to eleven years (average, 5.1 years). Follow-up evaluations and physical examinations were performed by one of us. The patients were evaluated subjectively on the basis of relief of pain, improvement in strength, and, particularly, recurrent instability. The range of motion of the injured shoulder was measured and compared with that of the contralateral shoulder. The strength of the muscles was evaluated clinically on a scale of zero (absent) to 5 (normal strength).

The thirty-one patients were subdivided into three groups. Group I consisted of nineteen patients who had had a single dislocation, a ruptured rotator cuff, and no injury to the axillary nerve. Group II consisted of four patients who had had a single dislocation, a ruptured rotator cuff, and an injury to the axillary nerve that had been proved by both clinical and electrical testing. Group III was the subset of eight patients who had recurrent instability but no axillary-nerve palsy.

Results

All of the patients in Group I had dramatic relief of pain after the rotator cuff had been repaired, and none had pain at night. All but three patients regained full abduction of the arm as compared with the contralateral arm. Two patients lacked 10 degrees of full abduction as compared with the opposite side, and one patient could abduct the arm to only 90 degrees. The strength of the muscles about the shoulder was graded as 4 or 4+ (good) in all patients.

Although all four patients in Group II had relief of pain and no pain at night after the rotator cuff had been repaired, only one patient had full recovery of the function of the axillary nerve and the deltoid muscle. This patient regained full abduction and had a strength rating of 4. The remaining three patients regained only slight function of the axillary nerve and the deltoid muscle. Two of them could abduct the arm to only 45 degrees and the third, to only 90 degrees. The strength of the muscles about the shoulder was not better than 4− in any patient.

All of the eight patients in Group III had relief of pain, including nocturnal pain, and all regained full abduction of the arm. The strength of the muscles about the shoulder was 4 or 4+ in all patients. None of these patients had further symptoms of instability of the shoulder after a minimum follow-up of two years.

Discussion

Stevens, in 1926, and Codman, in 1934, first called attention to the possibility of rupture of the rotator cuff occurring concomitantly with anterior dislocation of the shoulder in older patients. This was later reiterated by Julius Neviaser and by McLaughlin. The relationship was noted more recently by both R. and T. Neviaser and by Hawkins et al. McLaughlin suggested that anterior dislocation of the shoulder occurs either by disruption of the glenohumeral ligaments (anterior mechanism) or by rupture of the rotator cuff (posterior mechanism). He believed that failure of the posterior support was more likely in patients who are older than forty years because tendinous structures usually degenerate and weaken with age.

Despite these periodic reminders in the literature, the diagnosis continues to be missed. Physicians often assume that the patient’s inability to abduct the arm after reduction of an anterior dislocation of the shoulder is due solely to an injury of the axillary nerve. The incidence of injury to the axillary nerve after anterior dislocation of the shoulder has been variously reported as 9 to 18 per cent.

In this series, only four (7.8 per cent) of the patients had a documented injury to the axillary nerve, and 100 per cent had rupture of the rotator cuff. These figures are not suggested to represent the true comparative incidence of these injuries after dislocation. However, when an older patient cannot abduct the arm, rupture of the rotator cuff should be suspected.

It is not the intent of this report to compare the results of early and late repair of the rotator cuff, but the good results that we obtained in the patients who had late repair or reconstruction of the rotator cuff must be placed in perspective. The surgical procedures in this series were performed by surgeons who had experience with operating on the rotator cuff. Technical problems are fewer and results are more predictable, however, when the repair is performed soon after the injury rather than later, when the tendons are scarred, fixed, and retracted.

Although there were only eight patients in Group III, the mechanism for recurrent dislocation or subluxation in that group has not been reported previously, to our knowledge. We have seen rupture of the subscapularis tendon and the anterior part of the capsule only in patients who are more than forty years old, and it should be considered as a possible diagnosis when recurrent dislocation or subluxation occurs in patients in this age group. Other mechanisms have also been described; this is not the only cause for recurrence and instability. When it is diagnosed, however, reattachment of the capsule and subscapularis tendon to the lesser tuberosity has been successful in correcting the instability. No additional repair of the capsular-glenoid labral complex has proved to be necessary.

The only remaining issue is whether or not the rupture of the rotator cuff in these patients was present before the dislocation, but it is not possible to determine this with certainty. No patient had symptoms of pain, weakness, loss of motion, or instability before the dislocation, and we assumed that the injury occurred at the time of the dislocation. Perhaps future experience with early surgical intervention in a consecutive series of such patients will enable the sur-
gion to determine whether the tear is acute or chronic by directly observing the quality of the tissue of the cuff.

**Conclusions**

Rupture of the rotator cuff can accompany primary anterior dislocation of the glenohumeral joint in patients who are older than forty years. In older patients who are unable to abduct the involved arm after reduction, rupture of the rotator cuff should be the primary suspicion.

Arthrography is indicated in a patient in whom a suspected injury of the rotator cuff is accompanied by dislocation, if abduction of the arm fails to improve in ten to fourteen days after the dislocation.

In patients who are more than forty years old, in whom recurrent instability develops after initial dislocation of the shoulder, a rupture of the subscapularis tendon and the underlying capsule should be suspected. If this injury is found, repair of the lesion alone will correct the problem.

**References**