Good clinical outcome of combined Bankart-Bristow procedure for recurrent shoulder instability

126 patients followed for 2–6 years

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ABSTRACT – 126 patients (100 men) with recurrent anterior shoulder dislocation or subluxation with severe Bankart lesion were treated with a combined Bankart and modified Bristow procedure and reviewed for this study. The mean age at operation was 25 (14–69) years, and mean follow-up period 41 (24–75) months. Averages of the Rowe score, the Constant score and the ASES score at final follow-up were 90, 95 and 91 points, respectively. The clinical outcome was excellent in 97 patients (77%), good in 16 (13%) and fair in 13 (10%). 2 patients had resubluxation, while no patient had a complete redislocation. The average loss of range of motion of external rotation, as compared to the contralateral shoulder side was 13 degrees. 67 of 72 patients returned to sports. No major postoperative complications occurred. This procedure had an excellent clinical outcome in cases of recurrent anterior shoulder dislocation or subluxation.

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Various surgical methods have been used to treat recurrent anterior shoulder dislocation or subluxation, including open procedures, such as the Bankart, Bristow, Putti-Platt, and Boytchev procedures, as well as arthroscopic procedures, such as the Caspari. However, they have often failed in patients with a large bony Bankart lesion or Hill-Sachs lesion, those with massive rupture of the glenohumeral ligament, and those whose shoulders are frequently subject to severe anterior stress, such as patients active in contact sports (Hayashida et al. 1998, Kimura et al. 1999).

Yoneda et al. (1999) reported that the Bankart procedure augmented by coracoid transfer (Bankart and modified Bristow procedure) resulted in a good clinical outcome in contact athletes with traumatic anterior shoulder instability. Yoneda divided Bankart lesions into five types: type 1, labral detachment with a well-developed glenohumeral ligament; type 2, labral detachment with a poorly-developed glenohumeral ligament; type 3, ligamentous tear with labral disruption; type 4, ligamentous disruption with a bony defect of the glenoid; and type 5, slack glenohumeral ligament without a classic Bankart lesion (Hayashida et al. 1998). Since 1992, we have also performed the Bankart and modified Bristow procedure in patients with recurrent anterior shoulder dislocation or subluxation with a Bankart lesion of types 3, 4 and 5, while we have used the Caspari procedure in cases with type 1 or 2 Bankart, according to Yoneda's classification.

We evaluated the clinical outcome of the Bankart and modified Bristow procedure in recurrent anterior shoulder dislocation or subluxation.

Patients and methods

Since 1992, we have performed the Bankart and modified Bristow procedure in 1) patients with types 3, 4 and 5 Bankart lesions, according to Yoneda's classification, and/or 2) those who required high shoulder joint stability for their jobs or sports regardless of the type of Bankart

lesion. We retrospectively evaluated 126 patients (100 men) who were treated for recurrent anterior shoulder dislocation or subluxation during 1992–1999. 112 of them had suffered dislocations and 14 had had subluxations of the shoulder joint. Their mean age at operation was 25 (14–69) years. All of them were observed for more than 2 years after surgery, and the mean follow-up period was 41 (24–75) months. 72 patients had played sports before their injury: 45 at a competitive level and 27 a recreational one. Their mean age at initial dislocation or subluxation was 17 (13–40) years. 51 had dislocated or subluxated their shoulder more than 10 times before the operation. Their preoperative average Rowe (1978), Constant and Murley (1987) and ASES (American Shoulder and Elbow Surgeons, Richards et al. 1994) scores were 43 (15–60), 89 (70–96), and 85 (75–97) points, respectively. All cases showed positive anterior apprehension signs on physical examination.

As part of the clinical follow-up, we assessed the Rowe (stability, motion, and function), Constant (pain, ADL, ROM and power) and ASES scores in each patient, and evaluated their ability to return to sporting activities and the occurrence of complications. We divided the clinical outcome into four grades, according to the shoulder rating system of Rowe et al. (1978). All patients were also asked whether they were satisfied with the operative result and if they would undergo this procedure again.

Surgical technique (Figure)

The patient was placed on an operating table in the beach-chair position under general anesthesia. The glenohumeral joint was first examined by arthroscopy. This was followed by an open procedure. An incision was made from the coracoid process and extended 6–10 cm towards the axillary fold. The deltopectoral groove was dissected bluntly, and the coracoid process and conjoined tendon were exposed. A cannulated 3.5 mm screw (DePuy Ace, Warsaw, IN, USA) with a washer was inserted into the coracoid process to a depth of about 15 mm before the process was removed.

The upper two-thirds of the subscapularis tendon was separated at a point 1 cm proximal to its insertion on the lesser tuberosity and reflected medially. The rotator interval capsule was dissected along the superior border of the subscapularis tendon, and pathologic changes in the glenohumeral joint were noted. The capsule was cut from the glenoid rim to the 6 o'clock position (right shoulder) with the arm abducted 45 degrees and at neutral rotation. Three suture anchors (STATAK, 3.5 mm in diameter, Zimmer, Warsaw, IN, USA) were inserted into the edge of the glenoid rim at 1.5, 3, 4 o'clock positions (right shoulder), and a drill hole for the coracoid transfer was made at the 4 o'clock position 1 cm medial to the glenoid neck (Lombardo 1991). The capsular flap was sutured after shifting it superiorly, and it was then attached to the glenoid rim. The rotator interval defect was closed with side-to-side sutures. We adjusted the sutures to allow 45 degrees of abduction and 0 degrees of external rotation with the patient's arm at the side after the Bankart repair.

The tip of the coracoid process was transferred to the prepared anterior glenoid neck at the 4 o'clock position (right shoulder). Finally, the subscapularis tendon was reattached to its original location. A postoperative radiograph is shown in the Figure.

Postoperative regimen

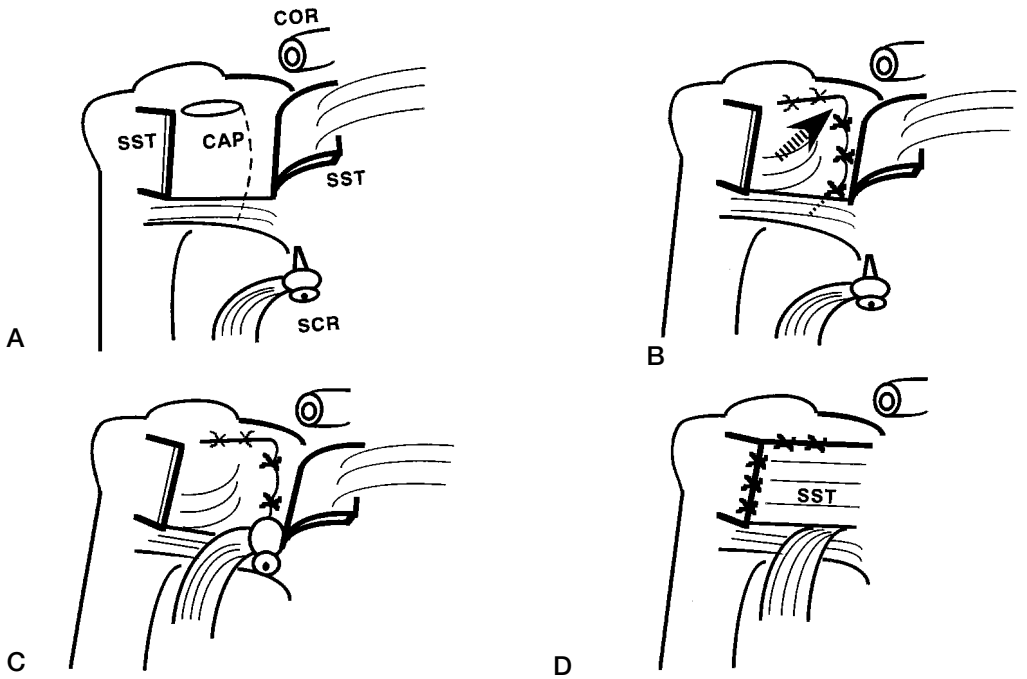
After postoperative Velpeau immobilization for 3 weeks, passive or self-assisted active exercises for range of motion were started. Muscle strengthening exercises were started at 6 weeks following surgery. Normal daily activity was allowed at 2 months after surgery. Athletic activity started at 3 months and a return to contact sports was allowed at 6 months after surgery.

Results

Clinical outcome

The average Rowe score was 90 (55–100) points at the last follow-up. The clinical outcome was excellent in 97 patients (77%), good in 16 (13%) and fair in 13 (10%). No patient was graded as poor. The average Constant score at final follow-up was 95 points and the average ASES score 91 points (Table 1).

2 patients (1.6%) had recurrent subluxation, while none had a redislocation. Both of them had originally suffered a subluxation. Apprehension signs were positive in 14 patients (11%). The aver-



Surgical method of the Bankart and modified Bristow procedure.

A. A cannulated screw (SCR) with a washer was inserted into the coracoid process (COR) which was then cut off and reflected caudally. The upper two-thirds of the subscapularis tendon (SST) was separated at a point 1 cm proximal to its insertion on the lesser tuberosity and reflected medially. The capsule (CAP) was cut from the glenoid rim.

B. The capsular flap was sutured with suture anchors after shifting it superiorly (arrow), and it was then attached to the glenoid rim.

C. The tip of the coracoid process was transferred to the prepared anterior glenoid neck.

D. The subscapularis tendon (SST) was reattached to its original location.

E. Postoperatively. The right shoulder of a 32-year-old woman with 3 STATAK anchors and a cannulated screw with a washer.

age loss of range of motion, as compared to the contralateral shoulder, was 3 degrees for forward elevation, 13 degrees for external rotation with the arm at the side, and 8 degrees for external rotation at 90 degrees of abduction.

Return to sports

Of 72 patients who had played sports before the injury, 40 returned to these sports at preinjury or higher levels (complete return) and 27 returned to playing their former sports at a lower than preinjury level (incomplete return). 5 patients could not return to their previous sports. Overall, 96% of the patients returned to their former sports (Table 2).

18 of 23 patients who preoperatively played contact sports, such as rugby and judo, returned to their former sports. All 4 patients who participated in throwing sports, such as baseball and handball,

Table 1. Clinical outcome at final follow-up

Score	Parameter (max. score)	Average score
Rowe		
Stability	(50)	45
Motion	(20)	18
Function	(30)	28
Total	(100)	90
Constant		
Pain	(15)	13
ADL	(20)	19
ROM	(40)	39
Power	(25)	24
Total	(100)	95
ASES	(100)	91

Table 2. Postoperative return to sports

Return to sports	Contact sports	Non-contact sports	Total
Complete	13	27	40
Incomplete	5	22	27
Impossible	5	0	5

returned to their former sports, although they could no longer throw a ball as well as before because of limitated range of motion of the shoulder. All patients who played other sports returned to their former sports at the preinjury level.

Patient satisfaction

85 patients (67%) were completely satisfied and 41 (33%) were almost satisfied with the operative result. 118 patients (94%) would have agreed to undergo the same type of surgery again.

Complications

Although a cannulated screw broke in 1 patient, the clinical outcome in that case was excellent and no joint instability was found. No infection, neurovascular complications or osteoarthrotic changes in the glenohumeral joint were seen.

Discussion

The main cause of traumatic anterior shoulder instability is disruption of the inferior glenohumeral ligament (IGHL)-labrum complex. Functional insufficiency of the IGHL is usually caused by detachment of the labrum from the anterior glenoid rim (Bankart lesion). The Bankart procedure aims to correct anterior shoulder instability by repairing the detached IGHL-labrum complex. On the other hand, the modified Bristow procedure eliminates anterior translocation of the humeral head from outside the capsule by coracoid transfer. The transferred coracoid itself plays the role of a bony block filling up the defect in the anterior glenoid rim. The conjoined tendon also acts as a buttress against anterior subluxation of the humeral head during abduction and external rotation of the arm. Although both the Bankart and modified Bristow procedures are established and popular methods for anterior shoulder instability, the rate of recurrence of anterior dislocation of the shoulder is reported to be 3–6% after both, and the clinical outcome of these procedures is not satisfactory for athletes involved in contact sports (May 1970, Rowe et al. 1984, Morioka 1994, Hovelius et al. 1996, Gill et al. 1997, Matsen et al. 1990). Uhorchak et al. (2000) recently reported that the rates of recurrence of dislocation and subluxation were 3% and 20%, respectively, after the modified Bankart repair and anterior capsulorrhaphy in athletes involved in contact sports.

On the other hand, the combined Bankart and modified Bristow procedure effectively prevents anterior dislocation by intra-articular and extra-articular reinforcement of antero-inferior stability. Several reports have shown that this procedure was effective in cases where the IGHL-labrum complex was badly damaged, in those with congenital joint laxity, and participants in contact sports (Toga et al. 1991, Hayashida et al. 1998, Kimura et al. 1999). Yoneda et al. (1999) found that the postoperative recurrence rate was 1% and the rate of return to sports was 96% after the Bankart and modified Bristow procedure in 83 cases of recurrent anterior dislocation of the shoulder. Kato et al. (1999) also reported a low recurrence rate (4%) and a high rate of return to preinjury sports (96%) after the Bankart and modified Bristow procedure. In our series of 126 cases treated by the Bankart and modified Bristow procedure, the recurrence rate was 2% and rate of return to sports activities 96%.

13 patients had a fair outcome (Rowe scores), all had positive apprehension signs after surgery, and two of these patients showed postoperative subluxation of the shoulder. Most of them were early cases and an insufficient superior shift of the IGHL with subsequent insufficient reduction in the volume of the joint cavity may have caused the postoperative shoulder instability. In recent cases, we intraoperatively confirmed with the anterior drawer test that the humeral head did not dislocate from the glenoid cavity after the repair.

Although all 4 patients active in throwing sports returned to their former sports after surgery, they had some difficulties in throwing motion, especially in reaching backwards with the arm. Postoperative early motion exercise should be done by athletes whose sport involves throwing or overhead activity to prevent limitation of external rotation of the shoulder. In our recent cases in which we intraoperatively confirmed the range of motion of the shoulder, we shortened the period of postoperative immobilization from our original postoperative period of 3 weeks to 2 or even 1 week.

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Constant C R, Murley A G H. A clinical method of functional assessment of the shoulder. Clin Orthop 1987; 214: 160-4.

Gill T J, Micheli L J, Gebhard F, Binder C. Bankart repair for anterior instability of the shoulder. Long-term outcome. J Bone Joint Surg (Am) 1997; 79: 850-7.

Hayashida K, Yoneda M, Nakagawa S, Okamura K, Fukushima S. Arthroscopic Bankart suture repair for traumatic anterior shoulder instability: Analysis of the causes of a recurrence. Arthroscopy 1998; 14: 295-301.

Hovelius L, Augustini B G, Fredin H O, Johansson M O, Norlin K R, Thorling J. Primary anterior dislocation of the shoulder in young patients: A ten-year prospective study. J Bone Joint Surg (Am) 1996; 78A: 1677-84.

Kato F, Sekiguchi Y, Sato T, Toga H, Hayashi H, Shoji T. Combined Bankart & Bristow operation for recurrent anterior dislocation of the shoulder (in Japanese). Orthop Surg Traumatol 1999; 42: 591-7.

Kimura A, Okamura K, Fukushima S, Nagamori M, Aoki M, Usui M, Ishii S, Hotta T. Usefulness of the STATAK in a Bankart repair and modified Bristow procedure for recurrent anterior dislocation of the glenohumeral joint (in Japanese). Shoulder Joint 1999; 23: 333-7.

Lombardo, S J. The modified Bristow-Latarjet procedure. In: Operative techniques in shoulder surgery (Eds. Paulos L E and Tibone J E). Aspen Publication. Gaithersburg 1991; 111-9.

Matsen F A III, Thomas S C, Rockwood C A. Anterior glenohumeral instability. In: The shoulder (Eds. Rockwood C A Jr, Matsen F A III). WB Saunders Co., Philadelphia 1990: 562-622.

May V R Jr. A modified Bristow operation for anterior recurrent dislocation of the shoulder. J Bone Joint Surg (Am) 1970; 52: 1010-6.

Morioka K. Modified Bristow procedure (in Japanese). Orthop Surg Traumatol 1994; 37: 1021-7.

Richards R R, An K-N, Bigliani L U, Friedman R J, Gartsman G M, Gristina A G, Iannotti J P, Mow V C, Sidles J A, Zuckerman J D. A standardized method for the assessment of shoulder function. J Shoulder Elbow Surg 1994; 3: 347-52.

Rowe C R, Petel D, Southmayd W W. The Bankart procedure: A long-term end-result study. J Bone Joint Surg (Am) 1978; 60: 1-16.

Rowe C R, Zerins B, Ciullo J V. Recurrent anterior dislocation of the shoulder after surgical repair. Apparent causes of failure and treatment. J Bone Joint Surg (Am) 1984; 66: 159-68.

Toga H, Kato F, Nakayama K, Abe Y. The combined Bankart-Bristow operation for recurrent dislocation of the shoulder in athletes (in Japanese). Orthop Surg Traumatol 1991; 34: 1173-8.

Uhorchak J M, Arciero R A, Huggard D, Taylor D C. Recurrent shoulder instability after open reconstruction in athletes involved in collision and contact sports. Am J Sports Med 2000; 28: 794-9.

Yoneda M, Hayashida K, Wakitani S, Nakagawa S, Fukushima S. Bankart procedure augmented by coracoid transfer for contact athletes with traumatic anterior shoulder instability. Am J Sports Med 1999; 27: 21-6.