Borderline Glenoid Bone Defect in Anterior Shoulder Instability

Latarjet Procedure Versus Bankart Repair

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Background: The optimal procedure for anterior shoulder instability with a borderline (15%-20%) bone defect on the anterior rim of the glenoid is still controversial.

Purpose: To compare the clinical outcome and recurrence rate between the arthroscopic Bankart repair and Latarjet procedure among patients with recurrent anterior shoulder instability and a borderline glenoid bone defect.

Study Design: Cohort study; Level of evidence, 3.

Methods: The authors retrospectively reviewed cases of arthroscopic Bankart repair and the Latarjet procedure for recurrent anterior shoulder instability with a borderline (15%-20%) glenoid bone defect. Enrollment comprised 149 patients (Bankart group, n = 118; Latarjet group, n = 31). The mean follow-up and age at operation were 28.9 ± 7.3 months (range, 24-73 months) and 26 ± 5 years (range, 16-46 years), respectively.

Results: Rowe and UCLA (University of California, Los Angeles) shoulder scores significantly improved from 42.0 ± 14.3 and 22.9 ± 3.2 preoperatively to 90.9 ± 15.4 and 32.5 ± 3.3 postoperatively in the Bankart group ($P < .001$) and from 41.0 ± 17.9 and 22.3 ± 3.4 to 91.1 ± 16.1 and 32.3 ± 3.4 in the Latarjet group ($P < .001$), respectively. There were no significant between-group differences in Rowe ($P = .920$) or UCLA ($P = .715$) scores at the final follow-up. Mean postoperative loss of motion during forward flexion, external rotation in abduction, and internal rotation to the posterior was 3.0° ± 6.2°, 11.6° ± 10.2°, and 0.6 spinal segment in the Bankart group and 3.7° ± 9.8°, 10.3° ± 12.8°, and 0.9 spinal segment in the Latarjet group, respectively. These differences were not significant. However, the loss of external rotation at the side was significantly greater in the Bankart group (13.3° ± 12.9°) than in the Latarjet group (7.3° ± 18.1°, $P = .034$). The overall recurrence rate was significantly higher in the Bankart group (22.9%) than in the Latarjet group (6.5%), ($P = .040$).

Conclusion: The Latarjet procedure and arthroscopic Bankart repair both provided satisfactory clinical outcome scores and pain relief for anterior shoulder instability with a borderline glenoid bone defect. However, the Latarjet procedure resulted in significantly lower recurrences and less external rotation limitation than the arthroscopic Bankart repair. Therefore, the Latarjet procedure could be a more reliable surgical option in anterior recurrent instability with a borderline glenoid bone defect.

Keywords: shoulder; instability; anterior; glenoid defect; borderline; arthroscopic; Latarjet

Patients with recurrent anterior shoulder dislocation commonly have a defect in the anterior rim of the glenoid bone accompanied by glenoid labrum detachment,[5,16] and these bony lesions are reportedly a risk factor for arthroscopic Bankart repair failure.[5,7,8,31] Pagnani[25] reported that patients with a large bony defect of the glenoid could regain sufficient stability with open capsular repair and that bone block procedures did not appear to be necessary for these patients. However, most studies have emphasized the necessity of bony procedures for patients with a large defect of the glenoid. Burkhart and De Beer[9] reported that for patients with anterior-inferior shoulder instability attributed to trauma, those with a large bony defect had a significantly higher recurrence rate after an arthroscopic Bankart repair than those without such a lesion. The authors indicated that in these cases, the Latarjet procedure should be considered for shoulder reconstruction. Provencher et al[26] stated that for patients with recurrent

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shoulder instability associated with glenoid bone loss ≥20% to 25%, an open bone augmentation procedure is required to reconstitute the glenoid osseous arc. Similarly, Boileau et al[7] reported that bone loss involving ≥25% of the glenoid surface might lead to a recurrence rate of 75%. Accordingly, a defect involving ≥20% to 25% of the glenoid bone has historically been considered critical bone loss that can cause recurrence; the consensus has been that arthroscopic soft tissue repair alone cannot sufficiently restore glenohumeral joint stability and that an additional bony augmentation procedure is required in these cases.[1,20,22,24,26]

However, the optimal surgical treatment of anterior shoulder instability associated with loss of 15% to 20% of the glenoid bone (ie, a borderline defect) remains controversial. Various reports indicate that arthroscopic soft tissue repair alone can restore stability for patients with recurrent anterior shoulder instability accompanied by a defect involving ≤20% of the glenoid bone.[11,23] However, Shaha et al[28] recently reported that glenoid bone loss ≥13.5% may lead to an unacceptable outcome after arthroscopic Bankart stabilization and suggested that the threshold for critical bone loss should be lower than the widely accepted 20% to 25%. In a biomechanical cadaveric study by Yamamoto et al,[35] anterior glenoid defects ≥19% of the glenoid length caused persistent instability after Bankart lesion repair, and the authors suggested that the deficient glenoid cavity should be reconstructed to provide sufficient stability. A similar biomechanical study reported that a glenoid defect ≥15% of the largest anteroposterior glenoid width should be considered the critical amount of bone loss at which glenohumeral translation could not be restored with isolated soft tissue repair alone and that bony restoration procedures would be required in such cases.[30] However, there has been no study comparing the clinical outcomes after arthroscopic soft tissue repair and bony augmentation procedures for patients with recurrent anterior shoulder instability and a borderline glenoid bone defect.

The purpose of this study was to compare the clinical outcomes and recurrence rates of the arthroscopic Bankart repair and Latarjet procedure for patients with recurrent anterior shoulder instability and a borderline glenoid bone defect. We hypothesized that the Latarjet procedure would provide satisfactory clinical outcomes and a lower recurrence rate than the arthroscopic Bankart repair for patients with a borderline bone defect.

METHODS

This study was approved by our institutional review board (Kyung Hee University Hospital, KHUH 2017-10-033-0), and informed consent was obtained from all participants.

Patient Selection

We retrospectively reviewed the cases of all patients surgically treated for recurrent anterior shoulder instability at our institution from October 2006 to December 2014. We included those with a borderline glenoid bone defect (involving 15% to 20% of the bone) on preoperative 3-dimensional computed tomography and at least 2 years of follow-up data. The glenoid bone defect was measured with the anteroposterior distance from the bare area in the 3-dimensional computed tomography en face view.[13] We excluded patients with a bony Bankart lesion or engaging Hill-Sachs lesion and those who had undergone revision surgery or other concomitant procedures. The concept of glenoid track described by Di Giacomo et al[14] was used to assess the engaging Hill-Sachs lesion. It was classified as an engaging Hill-Sachs lesion if the width of the humeral head defect was greater than the glenoid track.[14,34] The engaging Hill-Sachs lesion was also confirmed via arthroscopy with the arm in abduction–external rotation for patients who underwent arthroscopic surgery.

During the study period, 735 patients underwent surgery for recurrent anterior shoulder instability. A total of 28 patients with a borderline glenoid bone defect were lost to follow-up before 2 years (n = 23, arthroscopic Bankart repair; n = 5, Latarjet procedure). After application of our inclusion and exclusion criteria, 149 patients were enrolled for analysis. The arthroscopic Bankart repair and Latarjet operation were performed for 118 and 31 patients, respectively. The procedure was chosen by an operator per the clinical situation without any restriction. However, the Latarjet procedure was preferred for patients with more frequent episodes of dislocation. In the Bankart group, the mean age at the time of operation was 25.6 years (range, 16-42 years), and the mean follow-up period was 28.2 months (range, 24-65 months). In the Latarjet group, the mean age at the time of operation was 27.4 years (range, 21-46 years), and the mean follow-up period was 30.9 months (range, 24-73 months). There were 104 (88.1%) men and 14 (11.9%) women in the Bankart group and 26 (83.9%) men and 5 (16.1%) women in the Latarjet group. Table 1 summarizes the characteristics of the 2 groups.

Surgical Techniques

Arthroscopic Bankart Repair. All operations were performed by a senior orthopaedic surgeon with the patient in a 70° beach-chair position. We developed a standard posterior viewing portal and anteroinferior and anterosuperior working portals. The detached labral margin of the Bankart lesion and the glenoid rim were debrided with a motorized shaver. The glenoid rim was decorticated with a motorized bur 1 to 2 mm medially from the edge of the articular cartilage to stimulate postoperative healing. A suture anchor was inserted at the 5:30- to 6-o'clock positions through the anteroinferior portal, 1 to 2 mm from the articular cartilage of the glenoid rim. After 1 suture strand was retrieved through the anterosuperior portal, a suture hook loaded with 1-0 polydioxanone monofilament suture (to act as a shuttle relay) was used to penetrate the glenoid labrum and capsule approximately 1 cm lateral to the glenoid rim through the anteroinferior portal. One of the suture anchor strands was pulled back through the capsulolabral structure from the anterosuperior portal in the manner of a shuttle relay. The suture was tied with a nonsliding knot with alternating half-hitches to attach

TABLE 1
Patient Characteristics[a]

	Bankart Repair (n = 118)	Latarjet Procedure (n = 31)	*P* Value
Age, y	25.6 ± 5.1	27.4 ± 5.0	.092
Male:female, n	104:14	26:5	.526
Dominant arm	81 (68.6)	22 (71.0)	.803
Follow-up period, mo	28.2 ± 5.9	30.9 ± 10.9	.072
No. of dislocations	5.2 ± 3.6	10.8 ± 5.8	<.001
Participation in collision sports	27 (22.9)	8 (25.8)	.732
Bone loss rate, %	17.5 ± 1.3	17.9 ± 1.4	.159

[a]Values are presented as mean ± SD or n (%) unless noted otherwise.

the capsulolabral structure to the glenoid articular margin. Additional anchors were similarly placed at the 4- and 3-o'clock positions. The mean number of suture anchors used was 3.4 (range, 3-4).

Latarjet Operation. The Latarjet procedure was performed in accordance with the technique modified by Walch, based on the method devised by Latarjet.[21,32] A deltopectoral approach was used for all operations with the patient in a 70° beach-chair position. A vertical skin incision was made 1 cm lateral and inferior to the tip of the coracoid and extended to a point 5 cm medial to the anterior axillary fold. The deltoid muscle and cephalic vein were retracted laterally, and the pectoralis major was retracted medially. A Hohmann retractor was placed over the top of the coracoid process with the patient's arm abducted and rotated externally. Then, the coracoacromial ligament was exposed and incised 1 cm from its coracoid attachment with electrocautery so that the 1-cm stump of the coracoacromial ligament (CAL) could be fixed to the capsule later. With the arm rotated internally, the pectoralis minor tendon was released from the medial aspect of the coracoid with electrocautery, and the soft tissue of the coracoid undersurface was removed with a periosteal elevator. A 2.5- to 3-cm coracoid graft was obtained with a 90° oscillating saw and a curved osteotome on the coracoid base. After the undersurface of the coracoid was flattened, the broad cancellous portion was exposed to improve graft healing. Two drill holes were made with a 2.5-mm drill bit at the midline of the coracoid and 1 cm apart from each other and then overdrilled with a 3.2-mm drill bit. The subscapularis muscle was split between the superior two-thirds and the inferior one-third to expose the underlying joint capsule. To expose the anterior glenoid rim and scapular neck, a vertical arthrotomy was made, and the anteroinferior labrum and periosteum were excised. After decortication, a 2.5-mm drill bit was used to drill an inferior hole in the glenoid neck, ensuring that the hole was drilled parallel to the glenoid surface. The coracoid graft was then rotated to an appropriate position, and the inferior screw was adequately tightened with 3.5-mm screw. A hole was drilled in the superior portion of the glenoid neck through the previously made hole in the coracoid graft. The superior screw was inserted through the hole and tightened into the position at which the coracoid was parallel to the articular glenoid margin without lateral overhang. The CAL stump was attached to the joint capsule with No. 2 Ethibond suture (Ethicon, Inc). After the split subscapularis muscle was repaired, a drain was inserted. Finally, the wound was closed with a subcuticular suture.

Postoperative Rehabilitation

All patients underwent the same postoperative rehabilitation protocol. The use of an abduction brace shoulder sling was recommended for 4 weeks. Patients were permitted to perform a pendulum exercise and passive forward flexion (FF) immediately after surgery. Active FF and passive external rotation were performed at 6 weeks postoperatively, and active motion in all directions was allowed at 3 months postoperatively. Contact sports were not allowed for 6 months.

Clinical Assessment

Postoperative evaluations were conducted regularly on an outpatient basis (at 3 and 6 weeks and 3, 6, and 12 months postoperatively, as well as at final follow-up), and the results of the final follow-up were analyzed. Functional outcomes were assessed with the Rowe score and the University of California, Los Angeles (UCLA), Shoulder Rating Scale. Standardized physical examinations, including the apprehension/relocation test, were performed, and postoperative recurrent dislocation episodes were investigated for all patients by a senior orthopaedic surgeon. Postoperative recurrent instability was defined as the presence of dislocation or subluxation or subjective instability with a positive apprehension test. Pre- and postoperative pain levels were assessed with a visual analog scale for pain (VAS) score. Shoulder range of motion (ROM) was evaluated by testing FF, external rotation at the side (ERs), external rotation in abduction (ERa), and internal rotation to the posterior (IRp). We recorded whether the patient returned to sports postoperatively, and with a questionnaire, patients subjectively assessed their levels of return to preinjury sports activities. We modified a previously published grading system[12] to develop a 4-grade scale of postoperative sports activity: grade 1, return to the same sport at the same level; grade 2, return to the same sport at a lower level; grade 3, cessation of the preinjury sport (change of sport); and grade 4, cessation of sport activity.

TABLE 2
Clinical Outcomes and Range of Motion After Arthroscopic Bankart Repair[a]

	Preoperative	Final Follow-up	*P* Value
VAS			
At rest	0.4 ± 0.6	0.3 ± 0.5	.066
With motion	2.0 ± 1.1	0.6 ± 0.7	<.001
UCLA score	22.9 ± 3.2	32.5 ± 3.3	<.001
Rowe score	42.0 ± 14.3	90.9 ± 15.4	<.001
ROM, deg			
FF	167.9 ± 5.5	164.9 ± 6.4	<.001
ERs	68.0 ± 9.6	54.6 ± 9.2	<.001
ERa	77.1 ± 8.2	65.5 ± 6.7	<.001
IRp	T6.9 ± T2.2	T7.5 ± T2.0	.006

[a]Values are presented as the mean ± SD. ERa, external rotation in abduction; ERs, external rotation at the side; FF, forward flexion; IRp, internal rotation to the posterior; ROM, range of motion; UCLA, University of California, Los Angeles, Shoulder Rating Scale; VAS, visual analog scale for pain.

TABLE 3
Clinical Outcomes and Range of Motion After the Latarjet Procedure[a]

	Preoperative	Final Follow-up	*P* Value
VAS			
At rest	0.4 ± 0.6	0.2 ± 0.5	.206
With motion	1.8 ± 0.8	0.7 ± 0.7	<.001
UCLA score	22.3 ± 3.4	32.3 ± 3.4	<.001
Rowe score	41.0 ± 17.9	91.1 ± 16.1	<.001
ROM, deg			
FF	166.6 ± 7.3	162.9 ± 6.2	.043
ERs	65.2 ± 11.5	57.9 ± 9.7	.033
ERa	79.2 ± 8.3	68.9 ± 7.3	<.001
IRp	T7.1 ± T2.7	T8.0 ± T2.3	.140

[a]Values are presented as the mean ± SD. ERa, external rotation in abduction; ERs, external rotation at the side; FF, forward flexion; IRp, internal rotation to the posterior; ROM, range of motion; UCLA, University of California, Los Angeles, Shoulder Rating Scale; VAS, visual analog scale for pain.

Statistical Analysis

Pre- and postoperative clinical outcomes were compared with the paired *t* test. The arthroscopic Bankart repair and Latarjet procedure were compared with the Student *t* test and chi-square test. The Mann-Whitney *U* test was used to investigate differences in the level of return to sports between the arthroscopic Bankart repair and Latarjet operation groups. Statistical analysis was performed with SPSS (v 18.0; IBM) with a CI of 95%.

RESULTS

In the Bankart group, the Rowe and UCLA scores significantly increased preoperatively to postoperatively (Table 2). VAS scores for pain at rest and with motion improved preoperatively to postoperatively. The mean ROM measurements for FF, ERs, ERa, and IRp all increased from preopetive to postoperative.

In the Latarjet group, the postoperative Rowe and UCLA scores significantly improved as compared with the preoperative scores (Table 3). The VAS scores for pain at rest and with motion improved from 0.4 ± 0.6 and 1.8 ± 0.8 preoperatively to 0.2 ± 0.5 and 0.7 ± 0.7 postoperatively, respectively. The preoperative mean FF, ERs, ERa, and IRp ROMs were greater than those recorded at the final follow-up.

There were no significant differences in preoperative clinical scores and ROMs between the groups (Table 4).

There were no significant differences in VAS scores for pain at rest ($P = .766$) or with motion ($P = .418$), Rowe score ($P = .920$), or UCLA score ($P = .715$) between the Bankart and Latarjet groups at the final follow-up (Table 5).

There were no significant between-group differences in the postoperative decrease in FF, ERa, or IRp ROM. However, the postoperative loss of ERs was significantly greater in the Bankart group (13.3°) than in the Latarjet group (7.3°, $P = .034$).

TABLE 4
Comparison of Preoperative Clinical Outcomes and Range of Motion Between the Arthroscopic Bankart Repair and Latarjet Procedure Groups[a]

	Bankart Repair	Latarjet Procedure	*P* Value
VAS			
At rest	0.4 ± 0.6	0.4 ± 0.6	.805
At motion	2.0 ± 1.1	1.8 ± 0.8	.342
UCLA score	22.9 ± 3.2	22.3 ± 3.4	.357
Rowe score	42.0 ± 14.3	41.0 ± 17.9	.728
ROM, deg			
FF	167.9 ± 5.5	166.6 ± 7.3	.290
ERs	68.0 ± 9.6	65.2 ± 11.5	.167
ERa	77.1 ± 8.2	79.2 ± 8.3	.205
IRp	T6.9 ± T2.2	T7.1 ± T2.7	.701

[a]Values are presented as the mean ± SD. ERa, external rotation in abduction; ERs, external rotation at the side; FF, forward flexion; IRp, internal rotation to the posterior; ROM, range of motion; UCLA, University of California, Los Angeles, Shoulder Rating Scale; VAS, visual analog scale for pain.

The overall recurrence rates were 22.9% (27 of 118 shoulders) in the Bankart group and 6.5% (2 of 31 shoulders) in the Latarjet group at the last follow-up. The recurrence rate was significantly higher in the Bankart group than in the Latarjet group ($P = .040$). In the Bankart group, of the 27 patients who had recurrent postoperative instability, 4 were treated nonoperatively and 23 underwent the revision surgery. Among these, 5 patients underwent arthroscopic revision Bankart repair; 2, open Bankart repair with capsular shift; 2, arthroscopic revision Bankart repair with remplissage procedure; and 14, Latarjet procedure. In the Latarjet group, 2 patients who had recurrent postoperative instability were managed nonoperatively. There were no complications other than recurrent instability, such as infection or hematoma or hardware-related complication (anchor or screw), in either group.

TABLE 5
Comparison of Postoperative Clinical Outcomes and the Loss of Range of Motion Between the Arthroscopic Bankart Repair and Latarjet Procedure Groups[a]

	Bankart Repair	Latarjet Procedure	*P* Value
VAS			
At rest	0.3 ± 0.5	0.2 ± 0.5	.766
At motion	0.6 ± 0.7	0.7 ± 0.7	.418
UCLA score	32.5 ± 3.3	32.3 ± 3.4	.715
Rowe score	90.9 ± 15.4	91.1 ± 16.1	.920
Loss of ROM			
FF	3.0 ± 6.2	3.7 ± 9.8	.603
ERs	13.3 ± 12.9	7.3 ± 18.1	.034
ERa	11.6 ± 10.2	10.3 ± 12.8	.568
IRp, spinal segment	0.6	0.9	.556

[a]Values are presented as the mean ± SD. ERa, external rotation in abduction; ERs, external rotation at the side; FF, forward flexion; IRp, internal rotation to the posterior; ROM, range of motion; UCLA, University of California, Los Angeles, Shoulder Rating Scale; VAS, visual analog scale for pain.

Most patients (94.6%) had returned to sports activities by the final evaluation. In the Bankart group, 26 (22.0%) patients returned to preinjury sports activities at the same level (grade 1); 58 (49.2%) returned at a lower level (grade 2); 27 (22.9%) changed sports (grade 3); and 7 (5.9%) were not participating in sports at the final follow-up (grade 4). In the Latarjet group, 6 (19.4%) patients were categorized as grade 1, 16 (51.6%) as grade 2, 8 (25.8%) as grade 3, and 1 (3.2%) as grade 4 at the final follow-up. There was no significant difference in the level of return to preinjury sports activities between the groups at the final follow-up (P = .905) (Table 6). There was also no significant difference in the level of return to sport activities between the groups in collision sports and noncollision sports (P = .603 and .643, respectively).

DISCUSSION

Arthroscopic Bankart repair has been the surgical treatment of choice for recurrent anterior shoulder dislocation for various reasons, including satisfactory clinical outcomes and rapid return to activities of daily living.[3] However, Wasserstein et al[33] reported that the risk of postoperative dislocation after arthroscopic Bankart repair was significantly higher for patients with ≥3 preoperative dislocations. In this study, the mean number of preoperative dislocations among the patients who underwent arthroscopic Bankart repair for anterior shoulder instability with a borderline glenoid bone defect was 5.2, and the recurrence rate was as high as 22.9%. Repeated episodes of anterior dislocation are accompanied by microimpaction involving the anterior articular surface of the glenoid, leading to bone loss. The resulting defect in the glenoid bone anterior rim is not only common among patients with recurrent shoulder instability but also represents an important risk factor that predicts the outcome of arthroscopic repair.[29] Although there is no question that arthroscopic soft tissue repair alone is insufficient to provide stability in cases of a large bone defect (≥20%), the choice of treatment in cases involving borderline defects (15%-20%) is controversial and left to the surgeon's preference.[1,26]

Recent studies suggest that the amount of bone loss that determines the failure of arthroscopic Bankart repair is lower than that currently accepted as predictive of poor outcome by many surgeons.[15,17,28-30] In a biomechanical study, Ghodadra et al[17] demonstrated that 15% bone loss in a diameter based on the best-fit circle of the glenoid significantly increased the mean peak glenohumeral contact pressure. Shin et al[29] suggested that the critical amount of anterior glenoid bone loss that can cause recurrent glenohumeral instability after an arthroscopic Bankart repair was ≥17.3% of the longest anteroposterior glenoid width and, in such cases, an additional procedure should be considered. Moreover, Dickens et al[15] reported that arthroscopic stabilization reliably led to acceptable outcomes and low recurrence rates only for patients with glenoid bone loss ≤13.5%, which supports the concept of subcritical bone loss proposed by Shaha et al.[28]

The Latarjet operation has been used to provide shoulder stability for patients with a large bone defect in the anterior glenoid rim. Burkhart et al[10] demonstrated that open Latarjet reconstruction can restore stability and function among >95% of patients with significant bone loss. Bessière et al[4] reported that although the patients who underwent the Latarjet bone block procedure had a significantly higher number of instability episodes and glenoid bone lesions than the patients who underwent arthroscopic Bankart repair, recurrent instability was identified in 10% of patients who underwent Latarjet bone block and 22% of those who underwent arthroscopic Bankart repair. Among our patients with recurrent anterior instability and a borderline anterior glenoid rim defect, the Latarjet procedure resulted in a significantly lower recurrence rate than the arthroscopic Bankart repair, indicating that, as compared with the Bankart repair, the Latarjet procedure can provide better stability.

Blonna et al[6] reported that although the arthroscopic Bankart repair had a higher recurrence rate than the Latarjet procedure, it provided better return to sport and improved patients' subjective perception of their shoulders. However, Hovelius et al[18] indicated that patients who underwent the Latarjet procedure showed better shoulder stability and higher subjective clinical scores than those who underwent arthroscopic Bankart repair. In the current study, there was no significant difference in clinical outcomes in the Latarjet procedure and arthroscopic Bankart repair groups, and both showed satisfactory pain relief and improved clinical status as compared with preoperative conditions. The Latarjet procedure and arthroscopic Bankart repair both appear to provide satisfactory outcomes for patients treated for recurrent anterior shoulder instability with an associated borderline glenoid bone defect.

TABLE 6
Level of Return to Sports at the Final Follow-up[a]

	Bankart Repair		Latarjet Procedure		
Grade	Collision	Noncollision	Collision	Noncollision	*P* Value
1	4 (14.8)	22 (24.2)	2 (25.0)	4 (17.4)	.905
2	15 (55.6)	43 (47.2)	4 (50.0)	12 (52.2)	
3	6 (22.2)	21 (23.1)	2 (25.0)	6 (26.1)	
4	2 (7.4)	5 (5.5)	0 (0)	1 (4.3)	

[a]Values are presented as n (%). Grade 1, return to the same sport at the same level; grade 2, return to the same sport at a lower level; grade 3, cessation of the preinjury sport (change of sport); grade 4, cessation of sports activity.

Several studies reported that arthroscopic Bankart repair could lead to more limited external rotation than the Latarjet procedure. Hovelius et al,[18] in their comparison of results after 17 years of follow-up, found that patients who underwent the Latarjet procedure showed an 11° loss in outward rotation with the arm at the side, whereas those who underwent Bankart repair showed a 19° loss. In a systematic review of studies comparing the Latarjet procedure and Bankart repair by An et al,[2] the calculated mean external rotation ROM losses were 20.9° and 11.5° after the Bankart repair and Latarjet procedure, respectively. In the present study, the postoperative loss in ERs was also significantly less in the Latarjet procedure group, which supports the results of previous studies. We considered that the Latarjet procedure reduced ERs limitation because excessive capsular tension was avoided by attaching the coracoacromial ligament to the midportion of the anterior capsule, whereas the arthroscopic Bankart repair creates capsular tension by pulling the retracted anterior capsule and labrum to their original position at the glenoid margin.

There are various conflicting reports about the return to sports after arthroscopic Bankart repair versus the Latarjet procedure. Rhee et al[27] reported that two-thirds of collision athletes with anterior shoulder instability were able to return to near preinjury sports activity levels after arthroscopic stabilization alone. Likewise, Blonna et al[6] reported that arthroscopic stabilization with anchors provided a better return to sport than the Latarjet procedure. However, Bessière et al[4] reported that 63% of patients who underwent the Bankart repair and 72% who underwent the Latarjet procedure returned to their preinjury sports at the same levels, although the difference was not statistically significant. Furthermore, 1 meta-analysis reported no significant differences at the preinjury level or at any level of return to sports for patients treated with arthroscopic Bankart repair or the Latarjet procedure.[19] In the current study, most patients returned to sports activities after the arthroscopic Bankart repair (94.1%) and Latarjet procedure (96.8%). There was no significant difference in the level of return to sports between operations, thus confirming that the surgical method does not have an effect on the level of postoperative return to sports.

Our study had some limitations. First, it was retrospective. Second, the number of patients in the Latarjet group was relatively small because the arthroscopic Bankart repair is usually the first surgical procedure performed for patients with recurrent anterior instability. Furthermore, because the Latarjet procedure could be considered the revision operation of choice in cases where the first operation fails, an arthroscopic Bankart repair was performed as the initial operation for most patients with a borderline bone defect. Third, since the minimum follow-up period in our study was 2 years, long-term follow-up results are needed. Fourth, patients with an engaging Hill-Sachs lesion were excluded from the study. For patients with anterior shoulder instability and an engaging Hill-Sachs lesion, it is often difficult to restore stability after an arthroscopic Bankart repair alone. Last, the patients may have participated in different levels of sports activity. However, we believe that our analysis of the level of return to preinjury sports activities is meaningful because we confirmed the return to preoperative activity levels and postoperative subjective satisfaction among our patients.

CONCLUSION

The Latarjet procedure and arthroscopic Bankart repair both showed satisfactory clinical outcomes and pain improvement for patients with recurrent anterior shoulder instability and a borderline glenoid bone defect. Moreover, as compared with the Bankart repair, the Latarjet procedure led to a significantly lower recurrence rate and less external rotation limitation and could be a more reliable surgical option in anterior recurrent shoulder instability with a borderline glenoid bone defect.

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