Arthroscopic Bankart Repair Versus Arthroscopic Latarjet for Anterior Shoulder Instability

A Matched-Pair Long-Term Follow-up Study

Cristina Delgado,* MD, PhD, Elena Calvo,† MD, Maria Valencia,* MD, PhD, Natalia Martínez-Catalán,* MD, PhD, Gonzalo Luengo-Alonso,* MD, PhD, and Emilio Calvo,*‡ MD, PhD
Investigation performed at Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain

Background: The Bankart and the Latarjet procedures are 2 of the most commonly utilized surgical techniques to treat anterior shoulder instability. However, the long-term outcomes after these procedures remain unclear, and there is not enough information regarding arthroscopic Latarjet.

Purpose: To analyze long-term outcomes of patients with anterior glenohumeral instability managed with an arthroscopic Bankart or Latarjet procedure.

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

Methods: Patients who underwent an arthroscopic Latarjet were matched-paired in a 1:1 ratio with patients who underwent an arthroscopic Bankart procedure at a single institution between 2007 and 2012. Recurrence at the time of follow-up as well as intraoperative and postoperative complications were recorded and compared between the 2 groups. Postoperative status was assessed at the final follow-up using the Rowe score, the Western Ontario Shoulder Instability Index (WOSI), the Subjective Shoulder Value, and the return-to-sport rate.

Results: A total of 80 patients, 40 patients in each group, were included (overall mean age, 26.5 ± 15.4 years). The mean follow-up was 13.2 years (range, 10-17 years). The recurrence rate was significantly higher in the Bankart group compared with the Latarjet group (35% vs 10%, respectively; $P = .009$). The mean estimate for the cumulative proportion of stable shoulders at 15-year follow-up was 64.4% in the Bankart group and 89.6% in the Latarjet group ($P = .008$). Revision surgery because of instability was necessary in 8 (20%) patients in the Bankart group and 2 (5%) in the Latarjet group ($P = .41$). There was no significant group difference in complication rate (15% in the Bankart group vs 17.5% in the Latarjet group; $P = .48$). The WOSI score was significantly better in patients treated with arthroscopic Latarjet ($P = .004$). More than half of the patients were able to completely return to their previous sport (52.5%), with no significant difference between groups.

Conclusion: Arthroscopic Latarjet was associated with a significantly lower recurrence rate and better postoperative WOSI score and sports activity level at long-term follow-up compared with arthroscopic Bankart, without any greater risk of complications.

Keywords: anterior shoulder instability; long term; arthroscopic Bankart repair; arthroscopic Latarjet

Anterior glenohumeral instability is a common condition frequently affecting young and active patients with an overall incidence rate of 23.9 per 100,000 people per year.[40] The Bankart procedure is the most common surgical procedure to treat shoulder instability. Although good short-term outcomes regarding recurrence and complication rates have been reported, the rate of recurrent instability increases up to 35% to 37.5% at mid- and long-term follow-up.[27] On the other hand, bone loss has been identified as a risk factor for soft tissue repair failure.[9,38] In this situation, glenoid augmentation procedures have been considered the standard of treatment, either

The Orthopaedic Journal of Sports Medicine, 13(3), 23259671241313474
DOI: 10.1177/23259671241313474

transferring the coracoid (Latarjet procedure) or through free bone grafts.[8] Good to excellent outcomes of the Latarjet procedure have been reported, with low redislocation rates noted at 0% to 8%.[2,16] In 2007, Lafosse first described the arthroscopic Latarjet, and it has since been shown to have a low redislocation rate and good clinical outcomes.[13,16] However, as it is a nonanatomic and more invasive technique, it is considered to have more complications, including infection, graft fracture or nonunion, subscapularis damage, or neurovascular injuries,[15,36] as well as hardware-related complications, scapular dyskinesia, and glenohumeral arthrosis.[6,26]

This complication rate appears to be lower in the arthroscopic Latarjet. In a recent multicenter study involving 1555 patients who underwent an arthroscopic Latarjet procedure, a 2.2% rate of major complications was found.[16,36] However, there is paucity of studies analyzing long-term results of the arthroscopic Latarjet procedure. Therefore, although publications exist analyzing the short- and mid-term results and complications of both the Bankart and the Latarjet procedures, there are few comparative trials evaluating these techniques, and very little evidence exists on the long-term outcomes of either procedure. Moreover, no studies comparing the long-term results between arthroscopic Bankart and arthroscopic Latarjet exist.

The purpose of the current study was to compare the long-term outcomes of patients with anterior glenohumeral instability managed with an arthroscopic Bankart or an arthroscopic Latarjet procedure. The null hypothesis was that no differences in recurrence rate and clinical long-term results would exist between these procedures.

METHODS

Study Population

The protocol for this study received institutional review board approval. We conducted an observational, retrospective study of prospectively collected data on patients with anterior glenohumeral instability scheduled for an arthroscopic Bankart or arthroscopic Latarjet procedure as a primary surgery. Patients who underwent an arthroscopic Latarjet were matched-paired in a 1:1 ratio with patients who underwent an arthroscopic Bankart procedure according to preoperative features except for bone loss. All procedures were performed at our institution between 2007 and 2012.

Inclusion criteria for this study were (1) patients being between 18 and 50 years, (2) available preoperative magnetic resonance imaging (MRI) or computed tomography (CT), and (3) a minimum 10-year follow-up. Patients with previous surgeries including instability procedures and those with concomitant procedures (ie, superior labral anteroposterior repair, biceps tenodesis, remplissage, or rotator cuff repair) were excluded. Patients with posterior multidirectional glenohumeral instability and voluntary instability were also excluded.

Surgical Technique

All procedures were performed arthroscopically by the same senior surgeon (E.C.). The choice of the procedure was dependent on bone loss. In patients with anterior glenoid bone loss affecting ≥15% of the glenoid surface area[9] and in those with a large Hill-Sachs (HS) lesion,[12] a Latarjet procedure was performed following the technique described by Lafosse et al[22] using the DePuy Mitek arthroscopic Latarjet system.

Postoperatively, all patients were immobilized in a simple sling for 4 weeks. Pendulum exercises and passive forward flexion were initiated immediately after surgery. Active range of motion was progressively introduced in the fourth week postoperatively, avoiding active external rotation until 6 weeks after surgery. Physical therapy was scheduled after 4 weeks.

Imaging Studies

All patients had anteroposterior and scapular Y radiographic views of the shoulder. Measurements of bone defects on CT scan (Siemens Somatom Definition Flash 128 slice CT Dual Energy; Siemens Healthcare) or MRI scan (Siemens Magnetom Verio 3.0 T; Siemens Healthcare) were performed by a shoulder and elbow fellow, previously trained by a senior musculoskeletal radiologist, using Digital Imaging and Communications in Medicine (picture archiving and communication system) and Syngo via imaging software (Siemens Healthcare).

The glenoid track was measured as described by Gyftopoulos et al.[17] To measure the glenoid bone defect, sagittal images lateral to the level of the coracoid base were selected and then reoriented into the plane of the glenoid as defined by the superior pole, inferior pole, and most posterior osseous point of the glenoid. First, on the en face view, a best-fit circle was drawn around the posteroinferior cortical margin of the glenoid. The circle diameter (D) and bone loss length (d) were measured (Figure 1A). Bone loss was expressed as a percentage of the diameter of the circle according to the formula $d/D \times 100$. The glenoid track was

‡Address correspondence to Emilio Calvo, MD, PhD, Shoulder and Elbow Reconstructive Surgery Unit, Department of Orthopaedic Surgery and Traumatology, Hospital Universitario Fundación Jiménez Díaz, Avenida Reyes Católicos 2, Madrid 28040, Spain (email: ecalvo@fjd.es).

*Shoulder and Elbow Reconstructive Surgery Unit, Department of Orthopaedic Surgery and Traumatology, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain.

†Hospital Universitario Gregorio Marañón, Madrid, Spain.

Final revision submitted August 27, 2024; accepted September 5, 2024.

The authors declared that there are no conflicts of interest in the authorship and publication of this contribution. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

Ethical approval for this study was obtained from Fundación Jiménez Díaz (reference No. ER_PIC061-21_FJD).

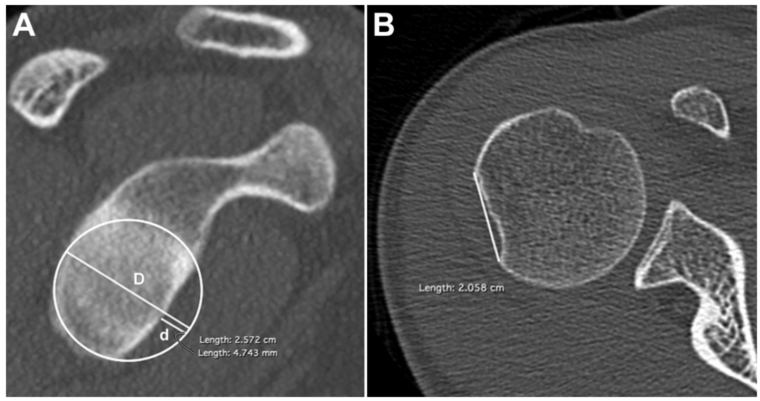

Figure 1. Glenoid track measurement. (A) En face view of a right shoulder. A best-fit circle is drawn along the posteroinferior glenoid rim, and the diameter of the circle and the portion of the defect are obtained. (B) Axial view of a right shoulder and estimation of a Hill-Sachs lesion. The distance from the medial edge of the Hill-Sachs lesion to the insertion of the rotator cuff is measured.

calculated as 83% of the glenoid width. If glenoid bone loss existed (d), the distance d was subtracted from 83% of the glenoid width, determining the width of the glenoid track according to the formula proposed by Di Giacomo et al[12]: Glenoid track = $0.83 \times D - d$.

For HS evaluation, an axial 2-dimensional view at the level of the widest medial extent of the HS lesion was obtained (Figure 1B). The HS interval was measured as the width of the HS lesion plus the width of the intact bone bridge between the rotator cuff attachments and the HS lesion (HS interval = bone bridge + HS lesion). When the HS interval was larger than the glenoid track, the HS lesion was determined to be off-track. If the HS interval was smaller than the glenoid track width, the HS lesion was considered on-track.[12]

Clinical Evaluation and Outcome Measurement

Medical records of all eligible patients were reviewed by 2 independent reviewers (C.D., El.C.) in a blinded fashion and independent from the surgeon performing the intervention. We recorded the preoperative features of the patients (age at surgery, sex, side affected, hand dominance, generalized ligamentous laxity based on Marshall et al[24] criteria, and sports activity including type and sports participation level according to Calvo et al[9]) (Table 1) and dislocation-related features (age at first episode, number of dislocations, time elapsed between first dislocation and surgery, and degree of instability according to Manta et al[23]) (Table 2).

The primary outcome was recurrence at the time of follow-up, set as subluxation or dislocation. The secondary outcome was revision surgery rate. Intraoperative and postoperative complications were also recorded. Loss of range of motion was defined as loss of $>10^\circ$ in external rotation with the arm at the side or forward elevation.

Postoperative clinical and functional status were assessed at the final follow-up. Objective clinical and functional performance were defined as the degree of instability[23] and the Rowe score.[32] Subjective patient-reported outcomes measures included the validated Spanish version of the Western Ontario Shoulder Instability Index (WOSI)[39] and the Subjective Shoulder Value (SSV). were used. The WOSI was utilized as it is disease specific, widely used, and has the best rating of psychometric properties.

The number of dislocations and subluxations, the time elapsed since surgery, and the recurrence mechanism were also recorded in those cases with postoperative instability. In addition, return-to-sport rate was determined, including the overall return to sport and the return to preinjury level and to specific type or sports participation level. The return-to-sports rate was classified as 0 for no return whatsoever to sports activity, 1 for partial recovery, 2 for subtotal recovery, and 3 for complete recovery.

Statistical Analysis

Statistical analysis was performed using SPSS software Version 26 (SPSS Inc) and Prims 5.0 (GraphPad). Normal distribution of data was analyzed using the Kolmogorov-Smirnov test. Quantitative variables were reported as means with standard deviations or medians with interquartile ranges. Quantitative data were compared using the Student t test for parametric data and the Mann-Whitney U test for nonparametric data. Categorical variables were reported as frequencies with percentages and compared using the chi-square test. In addition, a Kaplan-Meier survival analysis was performed to evaluate recurrence-free time. The log-rank test was used to compare survival times. Multivariate logistic regression analysis was performed to investigate significant associations between preoperative features and recurrence.

Power analysis was performed before data collection. A preoperative-to-postoperative difference of ≥ 9.7 points in the Rowe score and ≥ 151.9 points in the WOSI score has been demonstrated to be clinically relevant.[21,28] Based on these data and accepting an alpha risk of .05 and beta risk of 0.2 on a 2-sided test, 17 participants were necessary

TABLE 1
Classification of Sports Activity Type and Sports Participation Level According to Calvo et al[9]

Type of Athletic Activity	Level of Sports Participation
0 = Sedentary life	0 = None
1 = Noncontact sports	1 = Occasional sports
2 = Contact sports without overhead use of the arm	2 = Regular sports
3 = Overhead activities without forced abduction or external rotation	3 = Amateur
4 = Activities that include overhead hitting movements	4 = Professional competition

TABLE 2
Instability Classification According to Manta et al[23]

Degree of Instability
0 = No instability
1 = Occasional instability
2 = Recurrent instability with sports activity
3 = Instability with everyday activities
4 = Spontaneous instability or instability during sleep

in each group to detect a statistically significant difference of ≥9.7 points on the Rowe score and 151.9 points on WOSI score. The significance level was established at $P < .05$.

RESULTS

Overall, 158 anterior instability stabilization procedures were performed that met inclusion criteria, 75 arthroscopic Latarjet and 83 arthroscopic Bankart. Of these, 19 patients were excluded (15 because the surgery was performed as a revision surgery and in 4 cases because an additional lesion requiring repair was found), 11 declined to participate, and 42 were unable to complete the questionnaires or follow-up visit and were lost to follow-up (follow-up rate, 57%). After analysis, 40 patients who underwent an arthroscopic Latarjet procedure were matched with 40 patients managed with an arthroscopic Bankart repair (Figure 2). Thus, the final sample size comprised 80 patients (mean age, 26.5 ± 15.4 years). Baseline demographic features overall and according to the procedure are summarized in Table 3.

At a mean follow-up of 13.2 years (range, 10-17 years), there were 14 (35%) cases of recurrence in the Bankart group, 10 dislocation and 4 subluxations, and 4 (10%) in the Latarjet group (2 dislocations and 2 subluxations) (P = .009). The mean time to recurrent instability was 1.56 ± 1.4 years. Recurrence occurred in the first postoperative year in 57.1% (8/14) of patients in the Bankart group and in 75% (3/4) of patients who underwent an arthroscopic Latarjet. The multiple regression analysis showed no association between preoperative features and recurrence. No significant differences in revision surgeries rates were found between groups (P = .41). Eight (20%) revision surgeries were necessary in the Bankart group because of instability. A Latarjet procedure was performed in 6 of these patients, whereas in 2 patients a new Bankart repair with associated anterior and posterior capsular plication was carried out. In the Latarjet group, revision surgery because of recurrent instability became necessary in 2 (5%) patients, in whom an Eden-Hybinette procedure was performed. Five patients with recurrent postoperative instability in the Bankart group and 1 in the Latarjet group had an isolated postoperative instability episode or reported that they felt their shoulder stable enough as to not interfere with their activities and therefore did not request revision surgery (Table 4). Of the remaining 2 patients, 1 refused revision surgery for personal reasons and the other due to associated medical pathology.

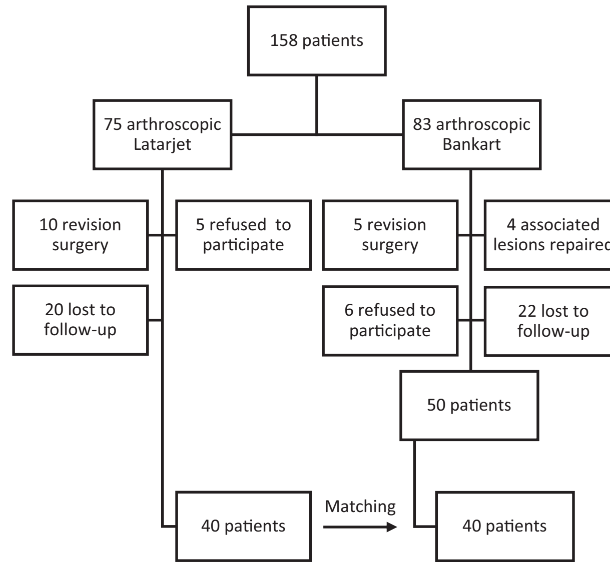

Figure 2. Strengthening the reporting of observational studies in epidemiology (STROBE) flowchart of participant enrollment.

The Kaplan-Meier curve for recurrence-free survival is shown in Figure 3. The mean estimate for the cumulative proportion of stable shoulders at 15-year follow-up was 64.4% in the Bankart group and 89.6% in the Latarjet group (P = .008).

No intraoperative complications occurred. At the final follow-up CT scan, the Latarjet procedure restored the glenoid track in 35 out of 40 patients (87.5%). There were no statistically significant differences between groups in the rate of postoperative complications (15% in the Bankart group vs 17.5% in the Latarjet group; P = .48). Loss of external rotation range of movement was noted in 5 patients (12.5%) in both the Bankart and the Latarjet groups. Screw irritation in 1 patient (2.5%) and musculocutaneous transient neurapraxia in 1 patient (2.5%) were also reported complications in the Latarjet group.

Postoperative subjective and objective outcomes are summarized in Table 4. The WOSI score was significantly

TABLE 3
Comparison of Baseline Characteristics Between Arthroscopic Bankart and Arthroscopic Latarjet[a]

Variable	All (N = 80)	Bankart (n = 40)	Latarjet (n = 40)	*P*
Age at surgery, y	27.9 ± 15.4	28.3 ± 9.2	27.5 ± 8.93	.38
Age at first dislocation (years)	21.2 ± 8.65	20.8 ± 10.2	21.3 ± 6.58	.80
Sex				.19
Male	69 (86.3)	33 (82.5)	36 (90)	
Female	11 (13.8)	7 (17.5)	4 (10)	
Side affected				.75
Right	51 (63.8)	26 (65)	25 (62.5)	
Left	29 (36.3)	14 (35)	15 (37.5)	
Dominant side affected				.71
Yes	25 (31.3)	12 (30)	13 (32.5)	
No	55 (68.8)	28 (70)	27 (67.5)	
Number of instability episodes				
Dislocation	10.5 ± 18.5	7.08 ± 10.5	14.7 ± 24.5	.11
Subluxation	28.7 ± 67.2	26.6 ± 27	28.1 ± 30.4	.93
Type of activity[b]				.13
0	12 (15)	5 (12.5)	7 (17.5)	
1	8 (10)	6 (15)	2 (5)	
2	21 (26.3)	10 (25)	11 (27.5)	
3	6 (7.5)	5 (12.5)	1 (2.5)	
4	33 (41.3)	14 (35)	19 (47.5)	
Sport level[c]				.90
0	14 (17.5)	6 (15)	8 (20)	
1	16 (20)	8 (20)	8 (20)	
2	36 (45)	19 (47.5)	17 (42.5)	
3	8 (10)	4 (10)	4 (10)	
4	6 (7.5)	3 (7.5)	3 (7.5)	
Hyperlaxity				.07
Yes	38 (47.5)	15 (37.5)	23 (57.5)	
No	42 (52.5)	25 (62.5)	17 (42.5)	
Degree of instability[d]				.14
0	0 (0.0)	0 (0.0)	0 (0.0)	
1	15 (18.8)	9 (22.5)	6 (15)	
2	10 (12.5)	7 (17.5)	3 (7.5)	
3	20 (25)	11 (27.5)	9 (22.5)	
4	35 (43.8)	13 (32.5)	22 (55)	
Glenoid bone loss, %	8.2 ± 9.9	1.13 ± 0.1	14.8 ± 9.7	**.002**
Glenoid track				**.003**
On-track	52 (65)	36 (90)	16 (40)	
Off-track	28 (35)	4 (10)	24 (60)	

[a]Data are presented as mean ± SD or n (%). Boldface *P* values indicate statistically significant difference between the arthroscopic Bankart and arthroscopic Latarjet groups ($P < .05$).
[b]0 = sedentary; 1 = noncontact sports; 2 = nonoverhead contact sports; 3 = overhead activities without forced abduction or external rotation; 4 = activities with overhead hitting movements.
[c]0 = none; 1 = occasionally; 2 = regularly; 3 = amateur; 4 = professional.
[d]0 = none; 1 = traumatic; 2 = sports; 3 = activities of daily living; 4 = sleeping/spontaneous.

better in patients in the Latarjet group compared with those in the Bankart group (*P* = .004). No significant group differences were found in postoperative degree of instability or Rowe and SSV scores between the 2 groups (*P* = .11, .16, and .26, respectively). Most patients were able to completely return to their previous sport (52.5%), with no significant group differences. However, patients in the Latarjet group achieved higher postoperative activity levels when compared with those in the Bankart group; 22 of 24 patients achieved an activity level ≥2 (91.7%) in the Latarjet group versus 16 of 26 in the Bankart group (*P* = .02).

DISCUSSION

The main finding of this study was that the arthroscopic Latarjet is associated with a significantly lower recurrence

TABLE 4
Comparison of Postoperative Clinical and Functional Outcomes Between Arthroscopic Bankart and Arthroscopic Latarjet[a]

Variable	All (N = 80)	Bankart (n = 40)	Latarjet (n = 40)	*P*
Rowe score	84.4 ± 24.9	80.1 ± 27.5	88.3 ± 21.9	.16
WOSI score	348.9 ± 459.7	408.9 ± 543.8	291.9 ± 357.9	**.004**
SSV score	78.2 ± 25.2	74.6 ± 27.6	81.3 ± 22.4	.26
Degree of instability[b]				.11
0	64 (80.0)	30 (75.0)	34 (85.0)	
1	7 (8.8)	4 (10.0)	3 (7.5)	
2	0 (0.0)	0 (0.0)	0 (0.0)	
3	4 (5.0)	2 (5.0)	2 (5.0)	
4	5 (6.3)	4 (10.0)	1 (2.5)	

[a]Data are presented as mean ± SD or n (%). Boldface *P* value indicates statistically significant difference between the arthroscopic Bankart and arthroscopic Latarjet groups ($P < .05$).

[b]0 = none; 1 = traumatic; 2 = sports; 3 = activities of daily living; 4 = sleeping/spontaneous. SSV, Simple Shoulder Value; WOSI, Western Ontario Shoulder Instability Index.

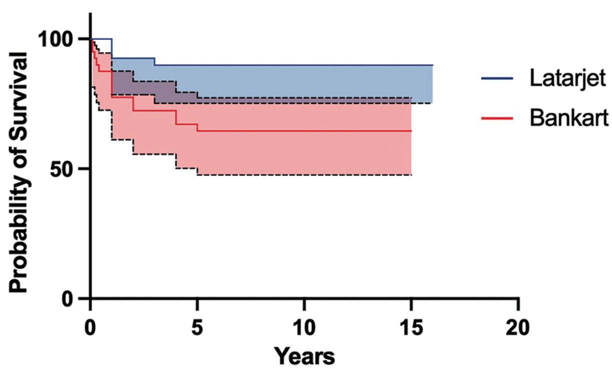

Figure 3. Kaplan-Meier survival curve of recurrences for the Bankart and Latarjet groups over time. The shaded area indicates the 95% CI. The estimates for the cumulative proportion of stable shoulders at 15-year follow-up were 0.64 for Bankart patients and 0.90 for patients with Latarjet. Log-rank test; *P* = .008.

rate at long-term follow-up compared with the arthroscopic Bankart. The Latarjet procedure also obtained better postoperative WOSI scores and sports activity levels. Moreover, the intraoperative and postoperative complication rates were not higher for this group.

There is still lack of agreement regarding the optimal surgical treatment for recurrent instability. The most performed surgical procedure is the arthroscopic Bankart, a minimally invasive procedure that allows an anatomic restoration with a low complication rate.[27] However, when either a significant glenoid or a humeral bone defect is present, a bone block procedure, in which the glenoid arch and surface area are enlarged, may be advisable.[5,19] The coracoid transfer in the Latarjet procedure has proven to be effective in managing bone loss. However, no consensus exists on the amount of bone defect considered significant. Recent studies suggest that functional results of the Bankart repair can be compromised if a 13.5% bone defect is present.[7,33] There is also little agreement regarding the standard treatment for patients with anterior glenohumeral instability without bone loss but associated risk factors[29] (ie, age <20 years at surgery, hyperlaxity, overhead or contact sport, competitive level of sports activity). This lack of agreement regarding the optimal treatment for glenohumeral instability resulted in heterogeneous studies with inconsistent results.

The success of stabilization procedures is multifactorial; clinical and functional outcomes, return to sports, and absence of treatment-related complications should be considered in its evaluation. However, the key factor determining treatment outcome is the maintenance of stability. Both the Bankart and the Latarjet procedure have shown in the literature good short-term outcomes, with a recurrence rate ranging from 10% to 25%[30,35] and 0% to 20%,[13,16] respectively. However, recent literature suggests that a short-term follow-up is insufficient to detect a large proportion of all failures after stabilization procedures.[31] When analyzing the long-term results of the arthroscopic Bankart, Murphy et al[27] in a meta-analysis reported a recurrence rate of 31.2% at a minimum 10-year follow-up. Our recurrence rate of 35% is in line with that reported in the literature. It is important to note that in our study, in the Bankart group 4 patients had an off-track HS lesion, and among 31 cases, ≥1 potential risk factor of failure was identified. Regarding the arthroscopic Latarjet, the recurrent instability rate in our series was 10%, similar to the 7.7% recurrence rate found by Davey et al[11] in their systematic review of the long-term results after open Latarjet. Interestingly, in our series, 75% of all recurrences after arthroscopic Latarjet occurred within the first postoperative year. This is in contrast with the arthroscopic Bankart, where we found that the results declined over time, with 43% of all recurrences happening after the first postoperative year. Overall, the arthroscopic Latarjet resulted in a significantly lower recurrence rate compared with the arthroscopic Bankart (*P* = .009). This finding is supported by previous comparative studies. Zimmermann et al[41] reported recurrence in 11% of the patients in the open Latarjet group and a 41.7% recurrence rate in the arthroscopic Bankart group. Recently, in a randomized multicenter study, Kukkonen et al[20] found a higher redislocation rate in patients undergoing arthroscopic Bankart compared with open Latarjet (21% vs 2%). Our data are consistent with the literature, but it is important to highlight that the present study reported on long-term results and analyzed the arthroscopic Latarjet, whereas previous comparative studies were focused on short- and midterm outcomes and patients were operated on in an open fashion.[1] It should also be noted that, unexpectedly, reinterventions due to instability were not significantly higher in the arthroscopic Bankart group. This could be explained because our criteria for failure were strict; also because the majority of patients in whom the procedure was considered to have failed had improved their level of stability so as not to interfere with their activities, so they declined an additional operation.

Despite this high risk of recurrence, some authors still consider the arthroscopic Bankart the preferred technique for anterior instability repair owing to the higher complication rate associated with the open Latarjet procedure.[25] In the present study, we demonstrated no significant difference in any treatment-related complications between the arthroscopic Latarjet and arthroscopic Bankart procedures, which is in contrast to previous analysis. Bokshan et al[4] reported on a cohort of 63 patients treated with open Latarjet and 2291 patients who underwent arthroscopic Bankart. In their study, the authors found a 30-day complication rate significantly higher in patients who underwent the open Latarjet procedure compared with those in the arthroscopic Bankart group (5.5% vs 0.6%). In our series, the overall complication rate, noted at 15%, was slightly higher than that reported in previously mentioned studies. This could be related to the fact that we considered stiffness a complication, which occurred in 12.5% of the patients in both groups. In fact, only 1 major complication occurred in a patient in the arthroscopic Latarjet group, a transient musculocutaneous nerve palsy. Moreover, no revision surgery due to complications was required. This low risk of complications may be related to the arthroscopic approach. However, to our knowledge, this is the first study reporting the long-term results of the arthroscopic Latarjet procedure. Thus, further studies are needed to support this hypothesis.

On the other hand, Warth et al[37] considered that one of the greatest concerns in patients undergoing surgery for anterior shoulder instability is the ability to return to sports. In our series, >50% of the patients returned to their previous sport in both techniques. However, the level of competition at which they returned was significantly better in the Latarjet group: of patients initially enrolled in a sports activity level $\geq$2, 22 out of 24 patients (91.7%) in the Latarjet group and 16 out of 26 patients (61.5%) in the Bankart group returned to activity level $\geq$2 at the final follow-up. Several studies have compared return-to-play outcomes between the Latarjet and Bankart procedures, showing inconsistent results. Kukkonen et al[20] found in a multicenter randomized study that only 9% of patients were able to return to previous sport after arthroscopic Bankart, whereas 56% of patients were able to return to play after open Latarjet. In contrast to these findings, a matched-cohort study performed by Blonna et al[3] found that return to sports and postoperative activity level was better in the arthroscopic Bankart group compared with the open Latarjet group, although an overall return-to-sports rate of 80% was observed. This discrepancy may be related to the fact that heterogeneous populations are usually analyzed, encompassing patients enrolled in different types of sports and sports categories, from amateur to professional. In a recent comparative study performed exclusively in athletes, Hurley et al[18] found no significant differences in return to sports between patients after arthroscopic Bankart versus open Latarjet (88.3% vs 93.5%). However, as shown in our study, a trend toward a higher return-to-sport rate was found in patients who underwent arthroscopic Latarjet. An alternative explanation to the disparity in return-to-sport rates is the fact that different approaches can be used when performing a Latarjet. More specifically, our series reports for the first time the return-to-sports rate after an arthroscopic Latarjet procedure, and it cannot be dismissed that conducting the procedure arthroscopically may have influenced the final results. In addition, most of our patients were not professionals. Therefore, willing rates of return to sport may be lower than those in professional athletes and, with that, the number of patients going back to sports.

The consequences of these findings may be relevant since we have found that the arthroscopic Latarjet procedure obtains better long-term outcomes without any greater risk of complications. To our knowledge, no studies comparing results of arthroscopic Bankart and Latarjet procedures at a minimum 10-year follow-up exist, and there is no information regarding the long-term outcomes of arthroscopic Latarjet. Moreover, when attempting to compare outcomes between Bankart and Latarjet, most studies are not controlled for preoperative features. This may be related to the fact that the indications for the procedures differed based on bone loss, risk factors, and surgeon preference.[34] Traditionally, the arthroscopic Bankart is chosen for patients with soft tissue lesions without or with minimal bone loss, whereas the Latarjet is indicated in those patients with recurrent shoulder dislocation and significant bone loss or as a revision procedure after a failed Bankart.[10] However, since revision surgery is adverse to clinical outcomes,[14] the first operation should be chosen wisely. Overall, in our series, the arthroscopic Latarjet offered better long-term failure-free survival rates. In addition, despite being a nonanatomic procedure, the arthroscopic Latarjet did not show a higher complication rate. Given the high rates of failure of the arthroscopic Bankart repair, the arthroscopic Latarjet should be considered a primary procedure for recurrent anterior shoulder instability in patients without significant bone loss but associated risk factors.

Limitations and Strengths

This study presents some limitations. First, although this was a retrospective analysis of prospectively collected matched data, the patients were not randomized. Thus, a potential selection bias exists. However, patients with anterior glenoid defect or large HS lesions have a higher risk of recurrence with Bankart repair according to the literature and may be better suited with a glenoid bone augmentation procedure.[12] Therefore, it would be unethical to subject these patients to a randomized trial. In addition, when the recruitment was started, the glenoid track concept had not been described or used as surgical criteria. Thus, we have compared patients who were good candidates for an arthroscopic Bankart repair with patients treated with a Latarjet procedure. In addition, all patients were matched for preoperative features, thus reducing potential selection bias. Moreover, the glenoid track was restored in 87.5% of the patients undergoing a Latarjet procedure, turning preoperative off-track HS into on-track, thus, comparable with those in whom a Bankart procedure was performed.

This study also has strengths. First, 2 matched homogeneous samples were analyzed. In addition, all revision surgeries were excluded, and only primary cases were analyzed, increasing the generalizability of the results. Moreover, all surgeries were performed arthroscopically by the same senior and high-volume Latarjet surgeon, thus reducing potential bias related to experience or learning curve and variability between surgeons. Therefore, external validity may be ensured in terms of both patient population and surgical technique.

CONCLUSION

In this study, the arthroscopic Latarjet was associated with a significantly lower recurrence rate and better postoperative WOSI score and sports activity level at long-term follow-up compared with the arthroscopic Bankart, without any greater risk of complications.

ORCID iDs

Cristina Delgado https://orcid.org/0000-0003-2166-8264
Natalia Martínez-Catalán https://orcid.org/0000-0001-7881-5873
Gonzalo Luengo-Alonso https://orcid.org/0000-0003-3516-5043
Emilio Calvo https://orcid.org/0000-0002-6054-6078

REFERENCES

1. Bessière C, Trojani C, Carles M, Mehta SS, Boileau P. The open Latarjet procedure is more reliable in terms of shoulder stability than arthroscopic Bankart repair. *Clin Orthop Relat Res*. 2014;472(8): 2345-2351.
2. Bhatia S, Frank RM, Ghodadra NS, et al. The outcomes and surgical techniques of the Latarjet procedure. *Arthroscopy*. 2014;30(2):227-235.
3. Blonna D, Bellato E, Caranzano F, Assom M, Rossi R, Castoldi F. Arthroscopic Bankart repair versus open Bristow-Latarjet for shoulder instability: a matched-pair multicenter study focused on return to sport. *Am J Sports Med*. 2016;44(12):3198-3205.
4. Bokshan SL, DeFroda SF, Owens BD. Comparison of 30-day morbidity and mortality after arthroscopic Bankart, open Bankart, and Latarjet-Bristow procedures: a review of 2864 cases. *Orthop J Sports Med*. 2017;5(7):2325967117713163.
5. Burkhart SS, De Beer JF. Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion. *Arthroscopy*. 2000;16(7):677-694.
6. Butt U, Charalambous CP. Complications associated with open coracoid transfer procedures for shoulder instability. *J Shoulder Elbow Surg*. 2012;21(8):1110-1119.
7. Calvo C, Calvo J, Rojas D, Valencia M, Calvo E. Clinical relevance of persistent off-track Hill-Sachs lesion after arthroscopic Latarjet procedure. *Am J Sports Med*. 2021;49(8):2006-2012.
8. Calvo E, Delgado C. Management of off-track Hill-Sachs lesions in anterior glenohumeral instability. *J Exp Orthop*. 2023;10(1):30.
9. Calvo E, Granizo JJ, Fernandez-Yruegas D. Criteria for arthroscopic treatment of anterior instability of the shoulder: a prospective study. *J Bone Joint Surg Br*. 2005;87(5):677-683.
10. Calvo E, Luengo G, Morcillo D, Foruria AM, Valencia M. Revision arthroscopic Bankart repair versus arthroscopic Latarjet for failed primary arthroscopic stabilization with subcritical bone loss. *Orthop J Sports Med*. 2021;9(5):23259671211001809.
11. Davey MS, Hurley ET, Kilkenny C, Anakwenze OA, Klifto CS, Mullett H. Long-term outcomes of anterior shoulder instability treated with open Latarjet procedure—a systematic review of outcomes at a minimum 15-year follow-up. *Shoulder Elbow*. 2024;16(1):8-14.
12. Di Giacomo G, Itoi E, Burkhart SS. Evolving concept of bipolar bone loss and the Hill-Sachs lesion: from ''engaging/non-engaging'' lesion to ''on-track/off-track'' lesion. *Arthroscopy*. 2014;30(1):90-98.
13. Dumont GD, Fogerty S, Rosso C, Lafosse L. The arthroscopic Latarjet procedure for anterior shoulder instability: 5-year minimum follow-up. *Am J Sports Med*. 2014;42(11):2560-2566.
14. Elamo S, Selänne L, Lehtimäki K, et al. Bankart versus Latarjet operation as a revision procedure after a failed arthroscopic Bankart repair. *JSES Int*. 2020;4(2):292-296.
15. Griesser MJ, Harris JD, McCoy BW, et al. Complications and reoperations after Bristow-Latarjet shoulder stabilization: a systematic review. *J Shoulder Elbow Surg*. 2013;22(2):286-292.
16. Gupta A, Delaney R, Petkin K, Lafosse L. Complications of the Latarjet procedure. *Curr Rev Musculoskelet Med*. 2015;8(1):59-66.
17. Gyftopoulos S, Hasan S, Bencardino J, et al. Diagnostic accuracy of MRI in the measurement of glenoid bone loss. *AJR Am J Roentgenol*. 2012;199(4):873-878.
18. Hurley ET, Davey MS, Montgomery C, et al. Arthroscopic Bankart repair versus open Latarjet for recurrent shoulder instability in athletes. *Orthop J Sports Med*. 2021;9(9):23259671211023801.
19. Kraus TM, Martetschlager F, Graveleau N, et al. CT-based quantitative assessment of the surface size and en-face position of the coracoid block post-Latarjet procedure. *Arch Orthop Trauma Surg*. 2013;133(11):1543-1548.
20. Kukkonen J, Elamo S, Flinkkilä T, et al; Finnish Instability Shoulder Study Investigators. Arthroscopic Bankart versus open Latarjet as a primary operative treatment for traumatic anteroinferior instability in young males: a randomised controlled trial with 2-year follow-up. *Br J Sports Med*. 2022;56(6):327-332.
21. Kukkonen J, Kauko T, Vahlberg T, Joukainen A, Äärimaa V. Investigating minimal clinically important difference for Constant score in patients undergoing rotator cuff surgery. *J Shoulder Elbow Surg*. 2013;22(12):1650-1655.
22. Lafosse L. Latarjet experience. *Shoulder instability system*. Accessed January 28, 2025 http://tagarthro.tag-med.com/TagArthro//userdata/SendFile.asp?DBID=1&LNGID=1&GID=67.

23. Manta JP, Organ S, Nirschl RP, Pettrone FA. Arthroscopic transglenoid suture capsulolabral repair: five-year followup. *Am J Sports Med*. 1997;25(5):614-618.
24. Marshall JL, Johanson N, Wickiewicz TL, et al. Joint looseness: a function of the person and the joint. *Med Sci Sports Exerc*. 1980;12(3):189-194.
25. Min K, Fedorka C, Solberg MJ, Shaha SH, Higgins LD. The cost-effectiveness of the arthroscopic Bankart versus open Latarjet in the treatment of primary shoulder instability. *J Shoulder Elbow Surg*. 2018;27(6)(suppl):S2-S9.
26. Mizuno N, Denard PJ, Raiss P, Melis B, Walch G. Long-term results of the Latarjet procedure for anterior instability of the shoulder. *J Shoulder Elbow Surg*. 2014;23(11):1691-1699.
27. Murphy AI, Hurley ET, Hurley DJ, Pauzenberger L, Mullett H. Long-term outcomes of the arthroscopic Bankart repair: a systematic review of studies at 10-year follow-up. *J Shoulder Elbow Surg*. 2019;28(11):2084-2089.
28. Park I, Lee J-H, Hyun H-S, Lee T-K, Shin S-J. Minimal clinically important differences in Rowe and Western Ontario Shoulder Instability Index scores after arthroscopic repair of anterior shoulder instability. *J Shoulder Elbow Surg*. 2018;27(4):579-584.
29. Provencher MT. Editorial commentary: is it time to take a stand? When arthroscopic Bankart repair is no longer a viable option for anterior shoulder instability. *Arthroscopy*. 2018;34(9):2537-2540.
30. Rollick NC, Ono Y, Kurji HM, et al. Long-term outcomes of the Bankart and Latarjet repairs: a systematic review. *Open Access J Sports Med*. 2017;8:97-105.
31. Rossi LA, Pasqualini I, Huespe I, et al. A 2-year follow-up may not be enough to accurately evaluate recurrences after arthroscopic Bankart repair: a long-term assessment of 272 patients with a mean follow-up of 10.5 years. *Am J Sports Med*. 2023;51(2):316-322.
32. Rowe CR, Patel D, Southmayd WW. The Bankart procedure: a long-term end-result study. *J Bone Joint Surg Am*. 1978;60(1):1-16.
33. Shaha JS, Cook JB, Song DJ, et al. Redefining ‘‘critical’’ bone loss in shoulder instability: functional outcomes worsen with ‘‘subcritical’’ bone loss. *Am J Sports Med*. 2015;43(7):1719-1725.
34. Thomazeau H, Courage O, Barth J, et al; French Arthroscopy Society. Can we improve the indication for Bankart arthroscopic repair? A preliminary clinical study using the ISIS score. *Orthop Traumatol Surg Res*. 2010;96(8)(suppl):S77-S83.
35. Tordjman D, Vidal C, Fontès D. Mid-term results of arthroscopic Bankart repair: a review of 31 cases. *Orthop Traumatol Surg Res*. 2016;102(5):541-548.
36. Valencia M, Fernández-Bermejo G, Martín-Ríos MD, et al. Subscapularis structural integrity and function after arthroscopic Latarjet procedure at a minimum 2-year follow-up. *J Shoulder Elbow Surg*. 2020;29(1):104-112.
37. Warth RJ, Briggs KK, Dornan GJ, Horan MP, Millett PJ. Patient expectations before arthroscopic shoulder surgery: correlation with patients' reasons for seeking treatment. *J Shoulder Elbow Surg*. 2013;22(12):1676-1681.
38. Yamamoto N, Itoi E, Abe H, et al. Contact between the glenoid and the humeral head in abduction, external rotation, and horizontal extension: a new concept of glenoid track. *J Shoulder Elbow Surg*. 2007;16(5):649-656.
39. Yuguero M, Huguet J, Griffin S, et al. Transcultural adaptation, validation and assessment of the psychometric properties of the spanish version of the Western Ontario Shoulder Instability Index questionnaire. *Rev Esp Cir Ortop Traumatol*. 2016;60(6):335-345.
40. Zacchilli MA, Owens BD. Epidemiology of shoulder dislocations presenting to emergency departments in the United States. *J Bone Joint Surg Am*. 2010;92(3):542-549.
41. Zimmermann SM, Scheyerer MJ, Farshad M, et al. Long-term restoration of anterior shoulder stability: a retrospective analysis of arthroscopic Bankart repair versus open Latarjet procedure. *J Bone Joint Surg Am*. 2016;98(23):1954-1961.