

Comparative study of arthroscopic Bankart repair versus open Latarjet procedure for recurrent shoulder dislocation

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Abstract

Objectives: The primary aim of this study was to compare the clinical outcomes of patients undergoing arthroscopic Bankart repair and the open Latarjet procedure for recurrent dislocation of the shoulder. The secondary aims were to assess and compare the surgical cost, patient satisfaction, and complications, including recurrence and infection.

Methods: We retrospectively compared the clinical outcomes of all consecutive patients undergoing either arthroscopic Bankart repair or the open Latarjet procedure from May 2015 to May 2018 with a minimum 2-year follow-up. Forty-one patients (32 men, 9 women) in the Bankart group and 40 patients (34 men, 6 women) in the Latarjet group were available for the final follow-up.

Results: There were no statistically significant differences in the demographic parameters or clinical outcomes between the two groups. Functional satisfaction was higher with the Latarjet procedure. Bankart repair had a significantly higher operating cost than the Latarjet procedure. Three patients in the Bankart group and no patients in the Latarjet group developed recurrence.

Conclusion: Both procedures provided satisfactory clinical outcomes. However, the Latarjet group had a higher rate of functional satisfaction and lower operating cost, and there was a trend toward higher recurrence in the arthroscopic Bankart group.

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Keywords

Arthroscopy, Bankart repair, Latarjet procedure, clinical outcome, shoulder dislocation, recurrence

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Introduction

Anterior shoulder dislocation is one of the most common dislocations among all joints. It occurs in 2% of the population with an overall incidence rate of 23.9 per 100,000 individuals per year.^{1,2} Surgical stabilization is the only viable option to manage recurrent shoulder dislocation because it provides robust fixation. Nonoperative treatment is reserved only for patients who are unable to tolerate surgery because it is associated with a high rate of recurrence, even in first-time dislocators.^{3,4} Arthroscopic Bankart repair using suture anchors is a minimally invasive treatment method.⁵ The general indication for arthroscopic Bankart repair is a soft tissue Bankart lesion with or without minimal bone loss. An additional remplissage procedure is indicated for patients with a large (>25%) engaging Hill–Sachs defect^{6,7} In contrast, the open Latarjet procedure has been commonly performed for decades. The general indication for the Latarjet procedure is recurrent shoulder dislocation with significant glenoid bone loss. Both of these surgical techniques have advantages and disadvantages that have been debated for years; however, surgical satisfaction depends on the clinical outcomes and recurrence.^{4,5,8–14}

We generally choose arthroscopic Bankart repair for patients with soft tissue Bankart lesions or glenoid bone loss of <20%. The remplissage procedure is added if the Hill–Sachs defect is significantly large (>25%). The open Latarjet

procedure is considered if the patient has $\geq 20\%$ glenoid bone loss or a significant Hill–Sachs lesion. However, in a developing country such as Nepal, patients' financial situation must also be considered.¹⁵ Many of our patients are unable to afford expensive suture anchors for arthroscopic Bankart repair; most of them do not have basic medical insurance, and even if they do have insurance, the cost of the implants is not covered.¹⁶

The primary aim of this study was to compare the clinical outcomes of patients undergoing arthroscopic Bankart repair (Bankart group) and the open Latarjet procedure (Latarjet group) for recurrent dislocation of the shoulder. The secondary aims were to assess and compare the surgical cost, patient satisfaction, and complications, including recurrence and infection.

Methods

We retrospectively compared the postoperative outcomes of all consecutive patients who underwent either arthroscopic Bankart repair or the open Latarjet procedure from May 2015 to May 2018. Ethical approval was obtained from the Ethical Review Committee of the National Academy of Medical Sciences, Kathmandu, Nepal (Ref. No. 499/2077/78). Written informed consent was obtained from all the patients before surgery. The patients' preoperative data, including their demographic details, date of surgery, type of surgical procedure, and any

perioperative complications, were collected from the hospital records. Postoperative data, including clinical outcomes and complications, were collected during the follow-up visit.

Forty-one patients in the Bankart group and 40 patients in the Latarjet group were available for the final evaluation. The inclusion criteria for the study were recurrent shoulder dislocation treated by either Bankart repair or the Latarjet procedure with a minimum follow-up of 2 years and the performance of magnetic resonance imaging (MRI) and computed tomography (CT) scans. The exclusion criteria were first-time dislocations, multidirectional instability, revision surgery, unavailable MRI and CT data, follow-up of <2 years, associated rotator cuff tears or superior labral anterior-to-posterior lesions, previous surgery around the shoulder, and neuromuscular disorders or epilepsy.

Preoperative preparation and surgical procedure

All patients underwent routine preoperative imaging, including plain radiographs, MRI, and CT scans. MRI was used to evaluate the soft tissue status, including the Bankart lesion, whereas CT scans were used to evaluate the bony status, including the bony Bankart and Hill–Sachs lesions. All surgeries were performed under general anesthesia with an additional ultrasound-guided interscalene block. The surgeries were performed in a single tertiary hospital by a single surgeon.

Arthroscopic Bankart repair. The surgery was performed in the lateral decubitus position. Possible portal placement sites, including the posterior portal (viewing portal) and anterosuperior and anteroinferior portals (working portals), were drawn with a sterile marker. After portal placement and diagnostic arthroscopy, the anteroinferior

glenoid rim and labrum were debrided and rasped to achieve sufficient bony bleeding.¹⁷ At least two to four suture anchors were placed on the cartilaginous margin of the glenoid rim at the 5:30- to 2-o'clock position. The glenoid labrum with the capsuloligamentous complex was then lifted up and tied with a sliding suture technique. If a significantly large and off-track Hill–Sachs lesion was present, then the remplissage procedure was also performed.

Latarjet procedure. The patient was placed in the beach-chair position with a bolster in the interscapular region. We used a technique similar to the deltopectoral approach, as Edwards and Walch¹⁸ described for the Latarjet procedure. Coracoid graft fixation was performed with two 3.5-mm corticocancellous screws or 4-mm malleolar screws with a washer, ensuring that the screws were parallel to the glenoid surface. After adequate fixation was achieved, the coracoacromial ligament was routinely sutured to the capsule, the subscapularis muscle was repaired, and the wound was closed in layers. However, care was taken to avoid injuring the coracoclavicular ligament.

Rehabilitation. A shoulder immobilizer was used for 4 weeks. Pendulum exercises and passive forward flexion exercises were started immediately after surgery. However, active forward flexion and external rotation were not permitted until 6 weeks after surgery. Active range of motion in all directions was advised at 3 months.

Postoperative assessments

Patients were scheduled for follow-up visits at 6 weeks, 3 months, 6 months, 1 year, and yearly thereafter. Clinical outcomes were assessed using the American Shoulder and Elbow Surgeons (ASES) score,¹⁹ Rowe score,²⁰ and Quick Disabilities of the Arm, Shoulder and Hand (Quick DASH) score.²¹

A self-constructed scale that consisted of “satisfied” and “dissatisfied” was used to measure the level of satisfaction. Regarding operating cost, the patients were asked about the cost of the preoperative investigations, including the MRI and CT scans, surgical costs, and implant costs. Any complications, including infection or redislocation, were recorded at every follow-up visit.

Statistical analysis

The collected data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). The chi-square test or Fisher’s exact test was used for categorical variables, and the independent *t*-test was used for continuous variables. Categorical data are presented as number or percentage, and continuous data are presented as mean \pm standard deviation. A *p*-value of <0.05 was considered statistically significant.

Results

There were no statistically significant differences in the patients’ demographics between the Bankart group and Latarjet group (Table 1). The patients’ average age was 28 years in the Bankart group and 27 years in the Latarjet group. In the Bankart group, 32 (78%) patients were male and the remaining 9 (22%) were female; in the Latarjet group, 34 (85%) patients were male and the remaining 6

(15%) were female. In the Bankart group, 24 (58.5%) patients had right-sided dislocations and 17 (41.5%) had left-sided dislocations; in the Latarjet group, 30 (75%) patients had right-sided dislocations and 10 (25%) had left-sided dislocations. The average number of dislocations was 9 in the Bankart group and 10 in the Latarjet group. The average follow-up period was 32 months in the Bankart group and 35 months in the Latarjet group.

The average ASES score was 85 points in the Bankart group and 87 points in the Latarjet group. The average Rowe score was 84 points in the Bankart group and 89 points in the Latarjet group. The average Quick DASH score was 10 points in the Bankart group and 9 points in the Latarjet group. The average external rotation was 83 degrees in the Bankart group and 85 degrees in the Latarjet group. In the Bankart group, 35 (85.4%) patients were functionally satisfied and 6 (14.6%) were dissatisfied; in the Latarjet group, 37 (92.5%) patients were functionally satisfied and 3 (7.5%) were dissatisfied (Table 2).

The mean operating cost was significantly higher for arthroscopic Bankart repair (1059.46 ± 191.30 USD (range, 785–1488 USD)) than for the open Latarjet procedure (622.52 ± 93.34 USD (range, 455–826)) ($p < 0.001$).

Recurrence and complications

Three patients in the Bankart group developed recurrence; two of them underwent a

Table 1. Demographic details of the patients.

Parameters	Bankart group (n = 41)	Latarjet group (n = 40)	p-value
Age, years	28.76 \pm 10.35 (16–48)	27.10 \pm 7.00 (18–68)	0.401
Sex, male/female	32/9	34/6	0.569
Side, right/left	24/17	30/10	0.158
Number of dislocations	9.02 \pm 4.30 (3–19)	10.86 \pm 4.20 (5–23)	0.085
Follow-up, months	32.66 \pm 7.49 (24–48)	35.83 \pm 7.47(24–53)	0.061

Data are presented as mean \pm standard deviation (range) or n.

Table 2. Clinical and functional outcomes of the patients.

Parameters	Bankart group (n = 41)	Latarjet group (n = 40)	p-value
ASES score	85.37 ± 10.83 (60–100)	87.43 ± 10.31 (66–100)	0.388
Rowe score	84.15 ± 19.55 (20–100)	89.23 ± 16.24 (35–100)	0.211
Quick DASH score	10.20 ± 8.05 (0–32)	9.50 ± 8.88 (0–30)	0.713
External rotation	83.05 ± 8.20 (65–95)	85.88 ± 8.83 (65–90)	0.140
Functional satisfaction			0.482
Satisfied	35 (85.4)	37 (92.5)	
Dissatisfied	6 (14.6)	3 (7.5)	

Data are presented as mean ± standard deviation (range) or n (%).

ASES, American Shoulder and Elbow Surgeons; DASH, Disabilities of the Arm, Shoulder and Hand.

revision open Latarjet procedure, and the other did not undergo a second surgery. No recurrence occurred in the Latarjet group. Two patients in the Latarjet group developed superficial wound infection, which completely resolved with regular wound dressings and oral antibiotics. No other complications occurred in either group.

Discussion

The most important findings of our study were that the differences in clinical and functional outcomes between the two groups were not statistically significant. Three patients in the Bankart group developed redislocation, whereas two superficial infections occurred only in the Latarjet group. Arthroscopic Bankart repair was more costly than the open Latarjet procedure.

The Latarjet procedure for recurrent shoulder dislocation is an established method for treating recurrent shoulder dislocation.²² However, trends toward minimally invasive procedures have led surgeons worldwide to choose arthroscopic Bankart repair.^{9,23,24} Thomazeau et al.²⁴ conducted a survey to determine whether shoulder surgeons preferred Latarjet or arthroscopic Bankart repair. They found that irrespective of the patients' status and glenoid bone loss, 72% of French shoulder

surgeons would choose the Latarjet procedure whereas 90% of shoulder surgeons from other countries would choose arthroscopic Bankart repair.²⁴ Several studies have shown that Bankart repair is more anatomically correct and provides better shoulder range of motion, greater stability, and less recurrence.^{9,25–27} In contrast, other reports have suggested that the Latarjet procedure is superior to Bankart repair because it provides a triple-stabilizing effect (anterior glenoid augmentation, capsular repair, and sling effect) that significantly reduces the recurrence rate and allows for a better return to the preinjury status, especially in young and active individuals.^{9,10,12,28} It is even effective in patients with significant glenoid bone loss and patients undergoing revision for failed stabilization procedures.²⁹

In their systematic review and meta-analysis, An et al.¹⁰ concluded that the Latarjet procedure is superior to Bankart repair because it provides better patient-reported outcomes, does not restrict external rotation, and provides better stability without increasing complications. Our results showed that the open Latarjet procedure produced better patient-reported outcomes than the arthroscopic Bankart procedure; additionally, external rotation was not reduced in the Latarjet group. Our results add to the literature showing that the Latarjet procedure is a viable

option with satisfactory clinical and functional outcomes.^{8,9,11,12,28}

Patient-reported outcomes following surgical stabilization are solely dependent upon postoperative function, pain, and recurrence.^{8,11,12} These factors also determine functional satisfaction. Surgery for recurrent shoulder dislocation is mainly indicated in young and active individuals, who not only require high function but also often have aesthetic concerns. This is one reason for high-activity patients choosing arthroscopic Bankart repair. However, the functional satisfaction rate was higher in the Latarjet group than in the Bankart group (92% vs. 85%, respectively). These results resemble previous findings that most patients are satisfied with the surgery; however, some are not.^{8,11,12,28} Another reason for choosing an arthroscopic procedure is the surgeon's discretion. Because of its aesthetic effects, surgeons often insist on performing arthroscopic Bankart repair even in patients with significant glenoid bone loss or Hill-Sachs lesions.

In the study by An et al.,¹⁰ the overall recurrence rate was 21% in the Bankart group and 11% in the Latarjet group. In our study, three (7.3%) cases of recurrence occurred in the Bankart group. One redislocation occurred in a 24-year-old man during a gang fight; this patient had undergone arthroscopic Bankart repair 27 months before. He developed more than five redislocations and finally underwent an open Latarjet procedure. Another male patient developed recurrence while playing volleyball, and he also underwent a successful Latarjet procedure. The last recurrence occurred in a patient who developed a sudden-onset seizure disorder associated with a different medical condition. This patient did not undergo a further surgical procedure. No patients developed recurrence in the Latarjet group. However, 41% of the patients in the Bankart group and 25% of the patients in the Latarjet

group had a positive apprehension sign. Such patients were not confident enough to perform overhead activities postoperatively. The persistent apprehension may have occurred for various reasons, including the presence of hyperlaxity, a high activity level, lack of adequate postoperative rehabilitation, and an inadequate fixation technique. These results indicate the risk of future recurrence because our follow-up period was only 2 years; additionally, further dislocations may occur if the patients had performed preinjury activities (most of our patients avoided such activities postoperatively).

The cost-effectiveness of both surgeries is controversial. Min et al.³⁰ found that arthroscopic Bankart repair was more cost-effective: the actual cost of an open Latarjet procedure was 21,398 USD, whereas that for arthroscopic Bankart repair was 20,385 USD.³⁰ However, they still mentioned that the recurrence rate of the arthroscopic Bankart procedure was higher than that of the open Latarjet procedure, and they recommended the open Latarjet procedure for a selected group of patients with high-demand activities.³⁰ In contrast, Makhni et al.³¹ found that arthroscopic Bankart repair was more expensive than the open Latarjet procedure, leading the Latarjet procedure to be more dominant because it was more effective and less costly. The surgical cost in a developing country such as Nepal is a major burden for many people, especially those who do not have basic medical insurance; even if patients do have insurance, implant costs are not covered.¹⁵ This is why many patients undergo an open Latarjet procedure that is less expensive than the arthroscopic Bankart procedure. In our study, the average cost of the Latarjet procedure was significantly lower than that of the Bankart procedure, even when we reused arthroscopic instruments multiple times that were supposed to be single-use only.

Although this is not a novel study for the Western population, it represents the scenario of patients and surgeons from countries with limited resources such as Nepal. Despite being a comparative study, it has the inherent biases of a retrospective non-randomized study with a relatively small sample size and short follow-up. A larger sample size and longer follow-up period would have resulted in different recurrence rates because many of our patients had a positive apprehension sign and avoided pre-injury activities. There also might be an institutional bias because this study was performed in a single government hospital where most economically deprived patients come for treatment. Our study also had selection bias because we considered the arthroscopic Bankart procedure even for patients with large Hill–Sachs lesions and the open Latarjet procedure for minimal bone loss considering the high operating cost.

Conclusion

Both procedures provided satisfactory clinical outcomes. The Latarjet group had a higher rate of functional satisfaction and lower operating cost, and there was a trend toward more recurrence in the arthroscopic Bankart group. These results indicate that although arthroscopic Bankart repair is an aesthetic and minimally invasive procedure, the Latarjet procedure may still be a priority in a developing country such as Nepal where financial cost is an extremely large burden.

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Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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