Original article

Open Latarjet procedure for failed arthroscopic Bankart repair

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ABSTRACT

Introduction: This retrospective study assessed the functional results of open Latarjet operation for recurrence of instability after arthroscopic Bankart repair in a consecutive series of patients.

Materials and methods: Fifty two patients (mean age 28.4 [range 17–62] years, 45 men) were operated on using open Latarjet operation after one (n = 46) or two (n = 6) failed arthroscopic Bankart repairs. The indication for revision surgery was recurrent dislocation or subluxation. Fifty patients had a Hill-Sachs lesion and 32 patients had glenoid bone lesions on plain radiographs. No attempt was made to grade the severity of bony pathology. Functional outcome and stability of 49 shoulders were assessed after an average follow-up of 38 (range 24–85) months using Western Ontario Shoulder Instability (WOSI) score, Oxford shoulder instability score, and subjective shoulder value (SSV).

Results: Forty-two patients had a stable shoulder at follow-up. Seven of 49 (14%) had symptoms of instability; one patient had recurrent dislocation, and six patients had subluxations. Mean WOSI, Oxford, and SSV scores were 83.9, 19.9, and 84.9, respectively. All scores were significantly better in patients who had a stable shoulder compared with those who had an unstable shoulder (WOSI 86.8 vs. 64.3; Oxford 18.2 vs. 30.8; and SSV 88.3 vs. 61.7; P < 0.01). One patient needed a reoperation. There were no intraoperative or postoperative complications.

Conclusions: Open Latarjet operation is a good option for failed arthroscopic Bankart repair. The instability recurrence rate is acceptable and the reoperation rate was low.

Level of evidence: Level IV, retrospective case series.

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1. Introduction

Arthroscopic Bankart operation using suture anchors has become the most common surgical method to treat post-traumatic anteroinferior instability of the shoulder joint. The results are usually good, but several recent studies have suggested that recurrence of the instability may be higher than previously thought at up to 35–40% in patients aged <25 years, and the results tend to get worse after long-term follow-up [1–4]. Most patients with failed Bankart operation are active young persons, and revision stabilization surgery is often needed. Open Bankart operation, revision arthroscopic Bankart, Latarjet operation, or glenoid rim reconstruction with iliac crest bone grafting can be used to restore stability [5–8]. Despite several studies, the optimal revision technique is poorly defined in the literature.

Risk factors for failure of arthroscopic Bankart repair include young age, male sex, bony defects, contact sports, hyperlaxity, and poor quality capsule [9]. According to biomechanical and clinical data, the critical size of glenoid erosion is estimated to be 20–30% of the glenoid width, and unrecognised glenoid or humeral bony defects are considered the most common reasons for recurrence after Bankart repair [10–12]. Additionally, increasing knowledge of the interplay between the glenoid and humeral side bony lesions (engaging of non-engaging Hill-Sachs lesion, glenoid track) is increasing [11,13]. Several studies have proposed techniques to measure bony defects, but the optimal method to quantify these defects is poorly understood and it is very difficult to reproducibly assess all bony pathology in routine clinical practice [14,15]. The variety and combination of soft tissue and bony pathology makes it even more difficult to choose the appropriate method for each case needing revision surgery.

Several studies have reported results of arthroscopic revision Bankart operation, but all have excluded patients with bone defects or increased laxity [6]. Glenoid bony defects are regarded as the most important indication for Latarjet operation [16]. Additionally, some authors have also recommended Latarjet reconstruction in cases of engaging Hill-Sachs lesion, poor capsular quality, or in cases of hyperlaxity, making it an ideal operation to treat both bony and soft tissue pathology after failed capsulolabral reconstructions.
Although several papers have reported the clinical outcomes of Latarjet operation as primary surgery, only a few papers have reported on Latarjet operations after failed arthroscopic stabilization [7,18,19].

The aim of this study was to assess the functional results of open Latarjet operation as a revision surgery for recurrent instability after arthroscopic Bankart repair in a consecutive series of patients.

2. Materials and methods

2.1. Patients

Our hospital’s administration approved (institutional approval 52/2014) the study plan and the review of the medical records and radiographs. A computer search of electronic medical files at our hospital resulted in 66 consecutive patients with a shoulder stabilization revision operation performed between January 1, 2007 and December 31, 2011. All patients had a failure (recurrent dislocation or subluxation) after surgical treatment of post-traumatic anteroinferior shoulder instability. Fourteen patients were excluded; five patients with an arthroscopic revision Bankart repair and nine with an open Latarjet operation after open Bankart repair. The remaining 52 patients (mean age at surgery 28.4 [range 17–62] years, 45 men, 24 right shoulders) had a revision open Latarjet operation after one (n = 46) or two (n = 6) failed arthroscopic suture anchor Bankart repairs. All patients had recurrent subluxation or dislocation and positive anterior apprehension sign as an indication for revision surgery. All patients were examined preoperatively with plain radiographs (anteroposterior [AP], Y and axillary views). Fifty patients had a Hill-Sachs lesion in AP or axillary radiographs, and two had no signs of a Hill-Sachs lesion. Eighteen patients had normal contour of the anterior glenoid, 28 had signs of glenoid erosion, and four patients had a visible bone fragment (bony Bankart lesion). No attempt was made to grade the size of the bony defects, and all patients had an open Latarjet operation regardless of bony or soft tissue pathology. The medical files were reviewed retrospectively. The data for the primary operation, details of revision surgery, complications, and reoperations were recorded. Four patients had epilepsy, and their shoulder instability was a result of a seizure.

2.2. Operative technique

Two experienced shoulder surgeons carried out all operations. Arthroscopy was not performed before surgery. The operative techniques were based on those described by Edwards and Walch [20]. Screws of 3.5 mm or 4.5 mm were used depending on the dimensions of the coracoid. Additionally, the capsule was repaired to the glenoid rim using suture anchors (Bio-Suture Tak, Arthrex, Naples, Fl, USA). Postoperative treatment was a simple sling for three weeks. Afterward, range of motion exercises were prescribed as tolerated. The mean time interval from primary stabilization to Latarjet operation was 38 (range 7–116) months.

2.3. Outcome measures

The main outcome measures were recurrence of instability, Western Ontario Shoulder Instability (WOSI) score (100 points maximum, indicating a normal shoulder) [21], Oxford Shoulder Instability score [22], and subjective shoulder value (SSV) [23]. Questionnaires including these forms and questions about possible recurrence and reoperations were mailed to the patients. Forty-seven patients returned the completed questionnaires and two patients were interviewed by telephone. One patient had died, and two patients were considered as lost to follow-up as they did not respond to repeated mailings and their telephone numbers were unknown. According to our hospital’s medical files, they had had no contact with our hospital after their 2-month control visit at the outpatient clinic. The length of follow-up was an average of 50 (range 24–85) months.

2.4. Statistical methods

Summary data are presented as the mean and standard deviation (SD) with the range unless otherwise stated. Independent samples t-tests were used to compare differences in means of continuous data. Categorical data were analyzed using Fisher’s exact test. Pearson correlation was used to assess correlations between patient age, delay from the primary operation, length of follow-up, and functional scores. A value of P < 0.05 was considered statistically significant.

3. Results

3.1. Stability

Forty-two patients had a stable shoulder at follow-up. Seven of 49 (14%) patients had symptoms of instability. One patient had recurrent dislocations; three patients reported that they had experienced 1–2 subluxations during past 6 months, two patients had had 1–2 subluxations during the past month and one patient had 1–2 subluxations during the past week. The recurrence rate was 4/24 (17%) in patients aged < 25 years and 3/26 (12%) in patients aged > 25 years (P = 0.70, Fisher’s exact test). Two of the patients who experienced subluxations had epilepsy, but the instability episodes were not related to seizures.

3.2. Functional results

The mean WOSI, Oxford, and SSV scores were 83.9 (SD 15.6, range 40–100), 19.9 (SD 7.5, range 12–40) and 84.9 (SD 14.8, range 35–100), respectively. All measured scores were better in patients with a stable shoulder compared with those with an unstable shoulder (WOSI 86.8 vs. 64.3, P < 0.01; Oxford 18.2 vs. 30.8, P < 0.01; SSV 88.3 vs. 61.7, P < 0.01; independent samples t-test). The number of previous arthroscopic stabilizations, age or sex, delay from the primary operation, length of follow-up, the presence of a Hill-Sachs–lesion or glenoid rim lesions on plain radiographs did not have any effect on stability, WOSI, Oxford, or SSV scores (Tables 1 and 2).

3.3. Reoperations and complications

The patient with a recurrent dislocation required further surgery and arthroscopy and an open capsular shift was performed; however, the operation failed to stabilize the joint. The six patients with subluxations did not find their symptoms severe enough to consider revision operations. There were no intraoperative or postoperative complications.

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>WOSI</th>
<th>OSS</th>
<th>SSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.06 (P = 0.68)</td>
<td>0.03 (P = 0.84)</td>
<td>0.02 (P = 0.88)</td>
</tr>
<tr>
<td>Delay</td>
<td>0.01 (P = 0.97)</td>
<td>0.05 (P = 0.58)</td>
<td>-0.15 (P = 0.93)</td>
</tr>
<tr>
<td>Length of FU</td>
<td>0.2 (P = 0.13)</td>
<td>-0.19 (P = 0.21)</td>
<td>0.2 (P = 0.14)</td>
</tr>
</tbody>
</table>

WOSI: Western Ontario Shoulder Instability score; OSS: Oxford shoulder instability score; SSV: subjective shoulder value; FU: follow-up.
Table 2
The effect of sex, bony pathology, and previous operation on Western Ontario Shoulder Instability score (WOSI), Oxford shoulder instability score (OSIS), and subjective shoulder value (SSV).

<table>
<thead>
<tr>
<th>Sex</th>
<th>WOSI (mean)</th>
<th>P</th>
<th>OSIS (mean)</th>
<th>P</th>
<th>SSV (mean)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>84.9</td>
<td>0.46</td>
<td>19.4</td>
<td>0.35</td>
<td>85.5</td>
<td>0.53</td>
</tr>
<tr>
<td>Female</td>
<td>78.1</td>
<td></td>
<td>22.7</td>
<td></td>
<td>81.3</td>
<td></td>
</tr>
<tr>
<td>Hill-Sachs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>91.7</td>
<td>0.62</td>
<td>16.0</td>
<td>0.61</td>
<td>99.0</td>
<td>0.35</td>
</tr>
<tr>
<td>Yes</td>
<td>83.7</td>
<td></td>
<td>20.0</td>
<td></td>
<td>84.7</td>
<td></td>
</tr>
<tr>
<td>Glenoid lesion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>80.4</td>
<td>0.51</td>
<td>20.2</td>
<td>0.72</td>
<td>84.8</td>
<td>0.71</td>
</tr>
<tr>
<td>Erosion</td>
<td>85.3</td>
<td></td>
<td>20.1</td>
<td></td>
<td>84.2</td>
<td></td>
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<tr>
<td>Fragment</td>
<td>89.7</td>
<td></td>
<td>16.3</td>
<td></td>
<td>91.7</td>
<td></td>
</tr>
<tr>
<td>Previous stabilizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>83.7</td>
<td>0.80</td>
<td>19.7</td>
<td>0.62</td>
<td>84.9</td>
<td>0.99</td>
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<tr>
<td>2</td>
<td>85.0</td>
<td></td>
<td>21.7</td>
<td></td>
<td>85.0</td>
<td></td>
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</tbody>
</table>

4. Discussion

In this study, we found that open Latarjet operation after failed arthroscopic Bankart repair resulted in a low recurrence rate and good functional scores after a minimum of 24 months follow-up. The patients with instability symptoms clearly had worse WOSI, Oxford, and SSV scores compared with those with a stable shoulder. Instability symptoms were mild and reoperations were rare. With meticulous surgical techniques, the complication rate was low indicating that Latarjet operation is safe as a revision surgery. Only three studies have been published in the English language literature concerning revision Latarjet operation after failed Bankart stabilization. Schmid et al. reported the results of 49 patients who had undergone Latarjet operation as revision surgery [7]. Prior operations included both open and arthroscopic Bankart stabilizations. After a mean follow-up of 38 months, 14% of patients had symptoms of instability, with a mean SSV of 78.5. No reoperations were needed. Dezayl et al. reported the outcomes of 27 patients treated with an open Latarjet operation after failed arthroscopic Bankart repair [18]. They found recurrent dislocation in 11% and a positive apprehension sign in 40% after an average of 68 months of follow-up. Bonneville et al. compared outcomes of open selective capsular repair (n = 5) and coracoid bone block (n = 6) in recurrent shoulder instability after capsular repair [19]. Both techniques resulted in similar functional outcomes, with no recurrence of instability after a minimum follow-up of 24 months. All previous studies of Latarjet operation as revision surgery have reported higher recurrence rates compared to primary surgery using coracoid transfer techniques [17,20].

Several studies have reported the results of arthroscopic revision Bankart [24–32] and open Bankart repair [33,34] after failed previous surgery. A recent systematic review concluded that in properly selected patients, the recurrence rate of arthroscopic Bankart repair is 12.7%, and that the rate is similar in arthroscopic and open Bankart [6]. Most reports on arthroscopic revision Bankart have included small numbers of patients who had multiple previous surgeries. Furthermore, all studies excluded patients with bony pathology, often cited as 20–30% glenoid loss or as an engaging Hill-Sachs lesion, but only a few studies have described the method used to assess bony pathology in detail.

Recent systematic reviews raised concerns about the short-term complications of coracoid transfer operations [35–37]. The reported complication rates have ranged from 16–30%, including instability, nerve palsies, hardware complications, intraoperative fractures, and infections. According to our experience, recurrent instability is the most common problem, but all other complications are rare if a meticulous surgical technique is used. We did not study the incidence of post-traumatic osteoarthritis because the follow-up time was too short. According to a recent long-term study, up to 36% of patients have signs of mild arthropathy following Latarjet after 16 years of follow-up [38]. However, it is likely that the type of surgery is not responsible for the osteoarthritis since a similar incidence was found in a study comparing Bankart and Latarjet [39].

The strengths of our study are the homogenous patient population, which included arthroscopic Bankart repairs only, a good rate of follow-up, and valid outcome measures. The retrospective design and lack of clinical examination to assess the role of hyperlaxity, and lack of follow-up radiographs to investigate bone block healing are obvious weaknesses of the study. However, all patients had a long history of shoulder instability and previous operations; therefore, we believe that patients can accurately assess and report their symptoms of instability.

The stabilizing mechanisms of Latarjet and Bankart operations are different, and the efficacy of these operations should be compared in a prospective randomised study [40,41]. Preoperative examinations should include computed tomography imaging and measurements of bony defects as well as soft tissue pathology. Preventing failure of the primary operation would be extremely important since these young, active sportspersons lose 4–6 months of the season after each stabilization surgery.

5. Conclusion

Open Latarjet surgery is a good option for failed arthroscopic Bankart repair. Recurrence rates of instability are acceptable and reoperation rates were low.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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References


