Arthroscopic Coracoid Transfer in the Lateral Decubitus Position is Safe and Effective at Short-Term Follow-Up

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Purpose: To report on operative and clinical outcomes in a series of shoulders treated with arthroscopic Latarjet performed in the lateral decubitus position. **Methods:** Patients with shoulders that underwent arthroscopic Latarjet in the lateral decubitus position were identified. Data were retrospectively collected, including patient demographics, operative times, intra- and postoperative complications, and clinical and functional outcomes. Descriptive statistics were performed. **Results:** Eighteen shoulders in 17 patients were included in the study with a mean follow-up of 14 ± 12.1 months (range, 4-39 months). The mean operative time for all procedures was 132.2 ± 18.0 minutes, and the mean operative time for the first half of the cohort was significantly longer than that of the second half (141.6 ± 14.2 minutes vs 122.8 ± 17.0 minutes, $P = .02$). There were no intraoperative complications, and no patients required a conversion to open surgery. One patient experienced a recurrent dislocation after a traumatic event but was able to be treated nonoperatively. Preoperative and postoperative patient-reported outcome measures (PROMs) were able to be collected on 8 of 18 patients (44.4%). Although all PROMs demonstrated improvements postoperatively, only the Single Assessment Numeric Evaluation score and American Shoulder and Elbow Surgeons Shoulder Index displayed a statistically significant increase ($P < .05$). Five of 8 (62.5%) shoulders demonstrated bony fusion on postoperative computed tomography scan. Of those eligible, 100% of patients returned to sport or felt that they could return if they wanted to. **Conclusions:** The arthroscopic Latarjet is an effective procedure for managing glenohumeral instability and can safely be performed in the lateral decubitus position. **Level of Evidence:** Level IV, therapeutic case series.

Anterior shoulder instability is a common clinical problem, especially in the young, athletic population. The rate of recurrent instability with conservative management varies by age, sex, and activity level but has been reported to be greater than 90% in males under 20 years.[1] Early surgical intervention with arthroscopic Bankart repair is often advocated in athletes; however, recurrent instability with soft tissue surgery may be as high as 17.8% in contact athletes and even greater in the setting of glenoid bone loss.[2] The Latarjet procedure is a well-established surgical option in these cases and has reliably demonstrated a low risk of recurrent instability and return to play rates of nearly 90%.[3]

The Latarjet procedure is traditionally performed through an open approach, but an arthroscopic technique was first described in 2007 by Lafosse et al.[4] The literature has demonstrated safety and efficacy similar to that of the open procedure with potential advantages in graft positioning, surgical dissection, and bleeding and postoperative recovery.[5-9] However, the arthroscopic technique is a technically challenging procedure, and the steep learning curve is well documented.[10-12] In a study by Cunningham et al.,[13] 10 arthroscopic Latarjets were performed before overcoming the need to convert to open surgery, and 20 surgeries were needed to reduce operative time to that of the open technique.

While the learning curve, results, and complications of the arthroscopic Latarjet are well described for the beach-chair position, the literature detailing the operative and clinical results in the lateral decubitus position is limited. A technique for arthroscopic Latarjet using cortical button fixation in the lateral position has previously been published.[14] With this technically complex

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procedure, we believe surgeons accustomed to the lateral decubitus position can become proficient more quickly by positioning the patient the same way they do for standard shoulder arthroscopy. The purpose of this study was to report on operative and clinical outcomes in a series of shoulders treated with arthroscopic Latarjet performed in the lateral decubitus position. Our hypothesis was that the procedure could be safely performed in the lateral position with a low risk of complications and good clinical results.

Methods

Patients who underwent arthroscopic Latarjet between November 2019 and December 2022 by 1 fellowship-trained sports surgeon (M.B.B.) were identified. The inclusion criteria for this series included all patients who underwent arthroscopic Latarjet in the lateral decubitus position during the study period. There were no exclusionary criteria. Institutional research board approval was obtained for this study.

Patients were indicated for surgery based on various factors, including greater than 20% anterior glenoid bone loss or glenoid bone loss with off-track Hill-Sachs lesion, failed prior arthroscopic soft tissue stabilization, and/or collision/contact athlete. Preoperative and postoperative patient-reported outcome measures (PROMs), including American Shoulder and Elbow Surgeons (ASES) Shoulder Score, ASES Shoulder Index, Single Assessment Numeric Evaluation (SANE), visual analog scale for pain, and Patient-Reported Outcomes Measurement Information System Physical and Mental scores were prospectively collected. The remaining information, including patient information, operative time, return to sport, and complications, was collected through retrospective chart review. Patients were routinely indicated for postoperative computed tomography (CT) scan to assess graft healing between 4 and 6 months prior to permitting full return to sport if they were still following up in clinic.

Surgical Technique

The surgical technique for the arthroscopic Latarjet was adopted from the technique published by Boileau et al.[15] but adapted for the lateral decubitus position. After a standard arthroscopic diagnostic examination and confirmation of pathology, an anterolateral portal (northwest) is established for intra-articular work, and 4 additional anterior portals are established on each side of the coracoid (north, east, south, west) throughout the procedure. The subcoracoid space and rotator interval are dissected and debrided, and the coracoacromial ligament is released through the northwest portal. The pectoralis minor tendon is released through the north portal directly over the coracoid, taking care to avoid the musculocutaneous nerve. The coracoid is then drilled bicortically with 5-mm margins using a specialized guide, and an Endobutton device (Smith & Nephew) is shuttled onto the superior aspect of the coracoid. A high-speed oscillating saw is then used to perform the coracoid osteotomy, aiming to harvest 15 to 20 mm of bone. The anterior glenoid is prepared using an ablation device to elevate the anterior capsulolabral tissue and a high-speed oscillating rasp to abrade the bone between 3- and 6-o'clock. Two drill holes are placed in the anteroinferior quadrant of the glenoid for later capsulolabral repair.

The arthroscope is moved to the northwest portal, positioning the arm in relative abduction and internal rotation to maximize glenohumeral joint space, and the glenoid drill guide (Smith & Nephew) is inserted through the posterior portal and placed flush against the glenoid. The glenoid is drilled from posterior to anterior, and the drill sleeve is left in place for shuttling the Endobutton sutures. The arm is repositioned into adduction, internal rotation, and forward flexion to increase the anterior subdeltoid space, and the low-profile subscapularis spreader (Smith & Nephew) is inserted through the posterior portal. Through the west and south portals, a subscapularis bursectomy is performed, and the anterior circumflex vessels and axillary and musculocutaneous nerves are identified. The east portal medial to the coracoid is established, and a second subscapularis spreader is placed from anterior to posterior, meeting the jaws of the first spreader and separating the muscle in line with the fibers. The Endobutton sutures are passed through the glenoid drill sleeve, and the coracoid is seated on the face of the glenoid through the window created by the subscapularis spreaders. A suture tensioner (Smith & Nephew) is then used through the posterior portal to seat the cortical button and tension the graft. Finally, the capsulolabral tissue is repaired to the previously drilled holes with knotless suture anchors, creating a superior shift and making the coracoid graft extra-articular.

Data Analysis

Descriptive statistics were performed on patient demographics and preoperative variables. Unpaired *t* tests were performed to compare continuous data, including operative times and PROMs.

Results

A total of 18 shoulders in 17 patients underwent arthroscopic Latarjet between 2019 and 2022. The cohort had a mean age of 23.8 ± 7.7 years, and 17 out of 18 were male. The mean duration of follow-up was 14 ± 12.1 months (range, 4-39 months). Seven of the shoulders had failed previous surgery, all of which were arthroscopic soft tissue stabilization surgeries. Most shoulders had sustained between 2 and 5 dislocations (61.1%), while 5 shoulders (27.8%) had sustained

Table 1. Descriptive Statistics on 18 Shoulders Undergoing Arthroscopic Latarjet in the Lateral Decubitus Position (N = 18)

Characteristic	Value
Age, mean ± standard deviation, y	23.8 ± 7.7
Male	17 (94.4)
Laterality, right	8 (44.4)
Failed previous surgery	7 (38.9)
Number of dislocations	
1	2 (11.1)
2-5	11 (61.1)
>5	5 (27.8)
Preoperative glenoid bone loss	
<5%	3 (18.8)
6%-20%	10 (62.5)
>20%	3 (18.8)

NOTE. Values are presented as number (%) unless otherwise indicated.

Table 3. Patient-Reported Outcome Measures for Arthroscopic Latarjet in the Lateral Decubitus Position

Characteristic	Preoperative Value	Postoperative Value	*P* Value
ASES Shoulder Score	19.1	25.1	.100
ASES Shoulder Index	75.1	91.7	.049
SANE	35.2	81.1	<.001
VAS pain	2.77	0.844	.130
PROMIS Physical	49.1	58.2	.095
PROMIS Mental	51.9	54.8	.631

ASES, American Shoulder and Elbow Surgeons; PROMIS, Patient-Reported Outcomes Measurement Information System; SANE, Single Assessment Numeric Evaluation; VAS, visual analog scale.

greater than 5 dislocations. Most shoulders had between 6% and 20% glenoid bone loss (62.5%), while 3 shoulders (18.8%) had greater than 20% bone loss (Table 1).

The mean operative time for the 18 arthroscopic Latarjets was 132.2 ± 18.0 minutes. When divided into first and second halves, the first 9 surgeries took a mean time of 141.6 ± 14.2 minutes, which was significantly longer than the mean time of 122.8 ± 17.0 minutes for the second 9 surgeries ($P = .02$) (Table 2). There were no intraoperative complications, and no patients required a conversion to open surgery. One patient experienced mild postoperative numbness in the hand in a distribution not consistent with a peripheral nerve injury that resolved by 6 months. One patient (5.6%) experienced a recurrent dislocation 9 months postoperatively after a fall off his dirt bike that was successfully treated nonoperatively. There was 1 case of radiographic progression of arthritis, although the patient was clinically asymptomatic.

Preoperative and postoperative PROMs were able to be collected on 8 of 18 patients (44.4%). All PROMs demonstrated improvements postoperatively, but only the SANE score and ASES Shoulder Index displayed a statistically significant increase ($P < .05$) (Table 3). Of those eligible, 10 of 13 patients (76.9%) returned to sport, while the remaining 3 patients felt that they could return if they wanted to. Postoperative CTs were performed on 8 shoulders at a mean duration of 8 months (range, 5-23 months) after surgery. Five of 8 (62.5%) shoulders demonstrated bony fusion, while the remainder demonstrated no significant bony healing with presumed fibrous union.

Table 2. Operative Times for Arthroscopic Latarjet in the Lateral Decubitus Position, Divided Into 2 Halves (N = 18)

Characteristic	Mean, min	*P* Value
Time	132.2	
First 9 shoulders	141.6	.02
Last 9 shoulders	122.8	

Discussion

The results suggest that arthroscopic Latarjet can be safely and efficiently performed in the lateral decubitus position. Clearly, it is a surgery associated with a steep learning curve, but our results demonstrate a significant decrease in operative time of almost 20 minutes after only 9 cases. In our cohort, we had no intraoperative or significant early complications and no conversions to open surgery. SANE scores and ASES Shoulder Index demonstrated significant improvements postoperatively, and 100% of eligible patients returned to sport or felt that they could return if they chose to. There was a 5.6% instability recurrence rate, and 62.5% of bone blocks demonstrated fusion on postoperative CT.

Lewington et al.[16] first described instrumentation and preference for the arthroscopic Latarjet in the lateral decubitus position. We believe this technique has distinct advantages. Similar to the arthroscopic Bankart, we believe lateral decubitus positioning with a traction device affords improved visualization of the glenoid and bone block positioning and makes labral repair at the end of the procedure simple and easy. Using the arm holder with this technique allows the position of the arm to be changed to take tension off the brachial plexus and decrease the risk of injury. Additionally, given the greater length of the procedure, especially during the first few cases, lateral positioning also minimizes risk of cerebral hypoperfusion, hypotension, and bradycardia compared to the beach-chair position.[17] Finally, with the complexity of this procedure, we believe surgeons can flatten the learning curve by positioning lateral decubitus if this is what they are accustomed to doing for shoulder arthroscopy.

The mean operative time for the second half of our patients was significantly reduced to 122.8 minutes from 141.6 minutes for the first half of patients. This trend is well documented in the literature, with Castricini et al.[18] reporting a decrease in mean operative times from 132 to 99 minutes in a cohort of 30 consecutive patients divided in to 2 groups, and Bonnevialle et al.[19] reporting an even more dramatic improvement with surgical time dropping from up to 193 minutes to a mean of 76 minutes in 88 patients. It is also important to note that once facile with the technique, surgical times between open and arthroscopic Latarjet are similar, with multiple studies showing no difference between the two.[11,13] Cunningham et al.[13] showed that 20 surgeries were necessary to match the surgical time of the arthroscopic technique to that of the open procedure. They also reported converting from arthroscopic to open surgery for 3 of their first 10 cases due to intraoperative issues but none of their next 18 cases.[13] Notably, there were no conversions to open surgery in the present study.

The reported rate of neurologic injury for open Latarjet has been reported as 2% to 10%.[20-22] The most vulnerable nerves during surgery are the musculocutaneous and axillary nerves. The musculocutaneous nerve is most at risk during coracoid preparation as exteriorization of the graft from the wound can lead to a traction nerve palsy, while axillary nerve injuries are most common during glenoid exposure or coracoid transfer. Interestingly, a neuromonitoring study of the open Latarjet procedure demonstrated an intraoperative nerve alert rate of 76.5%, presumably from excessive traction during these steps.[23] The arthroscopic approach mitigates these risks by obviating the need for graft exteriorization during preparation and providing clear visualization of the axillary nerve to facilitate protection during glenoid exposure. There are numerous studies confirming the low rate of intraoperative neurologic injury for the arthroscopic technique.[15,24-26] In a cohort of 105 arthroscopic Latarjet procedures, Kany et al.[26] identified 1 (0.9%) transient axillary nerve palsy. Similarly, in another series of 68 shoulders, the authors had 1 case (1.5%) of axillary nerve palsy that resolved at 3 months.[25] In the current study, only 1 patient complained of postoperative nerve symptoms with numbness and tingling in the small and middle fingers that resolved by 6 months, although these symptoms do not correlate with a specific peripheral nerve.

In a systematic review comparing arthroscopic and open Latarjet, the complication rates were 11.9% and revision rates were 5.4% for the arthroscopic procedure and 13.8% and 2.4%, respectively, for the open procedure. The complication rates for the 2 techniques are comparable across the literature, and these overall numbers are representative among other studies depending on how complications are classified. Athwal et al.[27] classified perioperative complications as events that were likely to negatively affect outcomes and problems as unanticipated events that were unlikely to impact outcomes. In 83 patients, they reported a 10% complication rate, most commonly intraoperative graft fracture with delayed failure (2%), hardware complications (3%), and early recurrent instability (4%), and an 18% problem rate, including graft fracture with routine healing and inability to place 2 screws. In this study, there were no early perioperative complications, and no revision surgeries were performed.

While there were no early perioperative complications in our cohort, there was 1 recurrent dislocation (9 months postoperatively) and 1 case of radiographic progression of arthritis. Recurrence rate after open Latarjet has been reported as 2% to 14%, while a recent review of the arthroscopic Latarjet found recurrence rates ranging from 0% to 8.3% with the majority of studies reporting rates <4%.[28,29] Another systematic review demonstrated no statistical difference in recurrence rates or revision surgery due to recurrence between the open and arthroscopic techniques, although they did note a lower rate of persistent apprehension in the open Latarjet group.[11] It is possible that the reduced feelings of apprehension in the open technique can be attributed to the robust capsular repair and scarring from the approach, which may have important implications in functional outcomes and return to sport. Regarding progression of arthritis, a retrospective review of 68 open Latarjet patients with 20-year follow-up reported radiographic arthritis in 23.5% of cases, with most cases categorized as mild.[22] Although this has not been extensively studied in the setting of arthroscopic Latarjet, the potential for improved precision of graft placement may help avoid the lateral overhang associated with progressive degenerative change.

Bony union was noted in 62.5% of patients at a mean of 8 months postoperatively, while 37.5% of shoulders demonstrated fibrous union or nonunion. Historically, the rate of nonunion after Latarjet was reported to be up to 10%, but this was based largely on analysis of radiographs and is likely an underestimation.[21] With the recent widespread use of CT scan to monitor healing postoperatively and help guide return to play, nonunion rates greater than 30% at 6 months postoperatively have been published.[20,30] Healing rates may also improve with increased postoperative time, with 1 study demonstrating graft union of 64% at 3 months and 93% at 1 year.[31] Regarding prognostic factors for nonunion, the same study reported a 12-fold increase in nonunion associated with smoking history. Interestingly, another postulated factor is minimal glenoid bone loss. According to Wolff's law, healing and remodeling require loading of bone, and the absence of bone loss may lead to decreased contact pressure of the humeral head on the graft, ultimately increasing the chances for nonunion and osteolysis.[32] Accordingly, 2 out of the 3 patients in this study who demonstrated no bony union on CT also presented preoperatively with no bone loss and were indicated for Latarjet primarily due to age, participation in contact sports, and/or failed previous soft tissue stabilization. Notably, neither of these patients reported instability or apprehension postoperatively.

Limitations

This study has several limitations, one of which is the retrospective design without a control group. Additionally, this is a relatively small sample size with short-term follow-up. Another limitation is the incompleteness of the radiographic and clinical outcome data. Finally, the data regarding the learning curve are subject to bias based on a surgeon's previous experience. The primary surgeon in this study is an experienced lateral decubitus shoulder arthroscopist who previously performed open Latarjets prior to using the arthroscopic technique. A surgeon with experience performing the arthroscopic Latarjet in the beach-chair position may transition to the lateral position more effectively than a surgeon performing arthroscopic Latarjet for the first time.

Conclusions

The arthroscopic Latarjet is an effective procedure for managing glenohumeral instability and can safely be performed in the lateral decubitus position.

Disclosure

The authors report the following potential conflicts of interest or sources of funding: M.B.B. reports personal fees from Arthrex, Smith & Nephew, and Vericel, outside the submitted work, and is a consultant for Arthrex, Smith & Nephew, and Vericel. V.S. declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

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