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Functional outcome of Latarjet's procedure for recurrent shoulder dislocation

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Abstract

Background: Recurrence of anterior shoulder instability is disabling condition for which treatment options have been insufficiently studied. Our patients don't seek definitive treatment initially, hence they tend to have engaging Hill-Sachs with or without bony Bankart's defect. Coracoid transfer as described by Latarjet and modified by Joe De Beer is one surgery which is suited for recurrent shoulder dislocations. There are various papers mentioning different results. Hence the purpose of this study was to know the functional outcome at two years duration in our set of patients with variable age and occupation.

Methods: A cohort formed the basis of retrospective series study was done in tertiary care medical college hospital in Mangalore, Karnataka, India involving twenty-seven patients who underwent Latarjet procedure with congruent arc modification for recurrent anterior glenohumeral instability by a single Orthopaedic surgeon in our Institute during July 2015 and Jan 2018. Twenty-four patients were available for follow-up. Clinical outcomes at a mean of three, twelve and twenty-four months postoperatively assessed by the Rowe and SPADI (Shoulder Pain and Disability Index) scores. Standardized anteroposterior and axial radiographs were used to assess the graft position and union.

Results: No shoulder dislocations or subluxations observed post-surgery. Unspecified shoulder symptoms of pain were present in two patients. We noticed that there was significant increase in the functional outcome between the 3rd, 12th and the 24th month follow up. At the end of 24 months follow up sixteen patients had excellent and remaining eight had good results in terms of Rowe scoring.

Conclusions: Latarjet procedure with congruent arc modification and adequate rehab can effectively restore anterior glenohumeral shoulder stability with good functional results.

Keywords: Anterior shoulder instability, functional outcome, glenoid bone loss, Latarjet's procedure.

Introduction

Multiple types of surgical repairs are available for the recurrent shoulder dislocations. However, soft-tissue repair alone does not seem to be an effective procedure in all cases of recurrent shoulder dislocation [1]. It was concluded by Itoi *et al.*, [2] that in cadavers, bone defects of the glenoid cavity greater than 21% provide the conditions for the force needed for shoulder dislocation to be considerably lower. Application of a bone graft to such defects increases the stability of the joint. Patients with high risk of recurrent dislocation, transposition of the coracoid process to the antero-inferior border of the glenoid cavity is an effective option [1]. First this procedure was described by Latarjet [3] in 1954 and Helfet [4] in 1958. Helfet described this technique that was taught to him by Rowley Bristow approximately 19 years before he published procedure in Bristow's name. Balg and Boileau [1] had provided the instability severity index score for decision making process as to who would benefit from Latarjet procedure. A score of 3 or less associated with a recurrence rate of 5% with arthroscopic stabilization and 6 or less with a 10% recurrence rate; with a score greater than 6, the recurrence rate escalates to 70%. There is an inverse relationship between the amount of bone loss tolerated and the demands placed on the shoulder (i.e., the higher the demand, the less bone loss that is tolerated) Joe F. de Beer [5] put forth the concept of congruent arc modification where the concavity of the coracoid is lined up with the joint surface. Here the coracoid must be secured flush and slightly medial to the glenoid rim.

Anterior dislocation of the shoulder is more common in the younger age group. It's been

Observed the patients visiting our hospital tend to seek consultation for definite treatment after couple of dislocations. These recurrent shoulder dislocating patients had undergone Later jet's procedure using the concept of congruent ark at our institute. The outcome following Later jet surgery can be divided into primary pertaining to the instability symptoms like subluxations, persistent apprehension and recurrent dislocation events persisting and Secondary outcomes include functional scoring like Rowe score ^[6] radiographic osteoarthritis and complication rate. Radiographic osteoarthritis was defined using the Samilson–Prieto classification, ^[7] Grading is done on basis of mild, moderate and severe osteoarthritis. Outcomes reported by patient are increasingly used to objectively assess subjective data and provide a sense of responsiveness to treatment.

The Rowe score was considerably more responsive than the ASES and Constant scores scoring to assess the shoulder function with regards to stability. On the contrary, the VAS-pain was the least responsive ^[8]. Since Rowe did not have specific evaluation for pain, SPADI scoring ^[9] is being used to measure shoulder pain and disability. Hence this study was designed to assess the functionality by Rowe and SPADI scoring correlating with the radiographic findings.

Materials and Methods

A Cohort formed on the basis of post operated Laterjet cases was done in tertiary care medical college hospital in Mangalore, Karnataka, India involving 27 patients who underwent LaserJet's procedure with Joe De Beer's modification for recurrent anterior glenohumeral instability by a single Orthopaedic surgeon in our Institute during July 2015 and Jan 2018. Ethical clearance was obtained from the Institutional Ethics committee. The indication for the later jet procedure was defined with preoperative clinical findings proving recurrence of anterior shoulder instability and confirming the cause of dislocations with radiographs and MRI scans. Patients with recurrent shoulder dislocation having bony Bank art's lesion (gloiboid bone loss \square 20%) or soft tissue bank arts lesion with engaging Hillsach's lesion, degenerative bank arts or deformed glenoid formed the inclusion criteria. Patients with associated rotator cuff tears / multidirectional shoulder instability/ injury to the operated limb / previous surgery to the same shoulder or re-surgeries during the follow up were excluded from the study. Patient who could not come for follow-up was excluded from the study. Out of the twenty-seven patients twenty-four (23 male and 1 female) were available for follow up. Three patients

were exempted from study as one of them had a distal humerus fracture and the other had been lost for follow-up. Third patient had a fracture of coracoid graft on second postop day as a result of external rotating the operated limb during sleep. He underwent second surgery where the coracoid was secured with single screw. These patients after an informed consent, underwent the intended surgical procedure.

The patient was positioned in 15 to 30 degrees on head end inclination under General anaesthesia. With the arm slightly abducted, a low bra-strap incision was made with a wide subcutaneous dissection to the base of the coracoid. The conjoint tendon was exposed through the delto-pectoral interval.

The coraco-acromial ligament and the pectoralis minor was then removed from the lateral and medial side of the coracoid respectively. A sharp curved osteotome was used for taking the coracoids process from its base. The coracoid was then predrilled with 2 parallel k wires and 3.2-mm cannulated drill holes. A split was then made through the subscapularis at the junction of its superior and middle thirds. A lever retractor was placed medial to the glenoid rim. The capsulotomy done. The exposure was completed by inserting a humeral head retractor into the joint. The bed of the glenoid bone loss made flat and decorticated. The coracoid was then rotated about its long axis. The concavity of the coracoid was lined up with the joint surface. It was placed flush with or slightly medial to the glenoid rim using a bone holder, ensuring that the inferior part of the graft also overlies bone and is not placed too inferior. The glenoid was secured with two 4-mm distally threaded screws after drilling the glenoid with 3.2 mm cannulated drill. The screws were then alternately tightened. Washers may or may not be used. Two sutures were placed on the edge of the original glenoid around the screws and used to repair the capsule. The skin was closed in layers maintaining haemostasis throughout the procedure.

Postoperative rehabilitation was aimed at protecting the construct and allowing osseous healing. After surgery, a shoulder immobilizer was maintained for 3 weeks. Active motion of the fingers, hand, and elbow was encouraged, but shoulder range of motion was restricted to pendulum exercises. Resisted elbow flexion and external rotation was allowed after 6 weeks. Serial radiographs were taken to assess osseous healing. Once radiographic healing of the coracoid graft was visualized, active strengthening was allowed. Radiographs were taken and scoring was done on 12th and 24th month follow up.

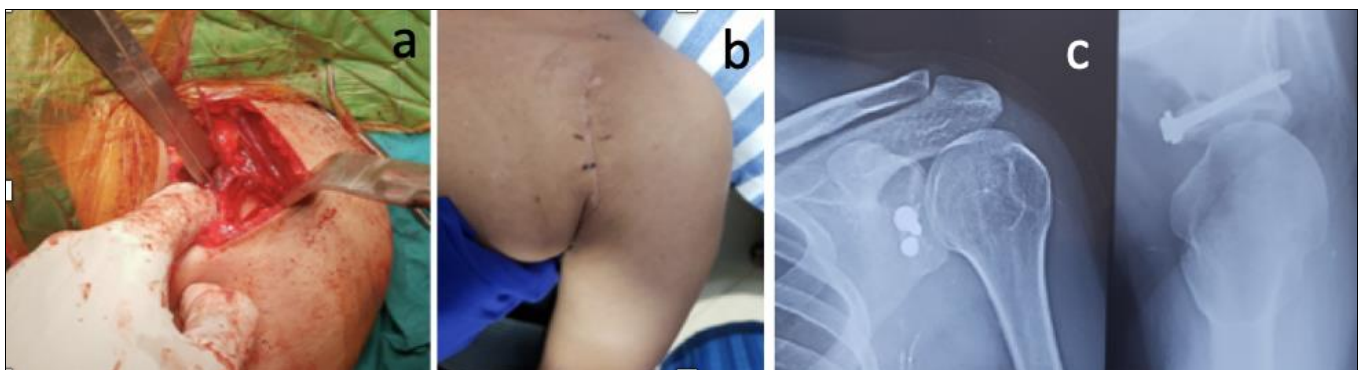


Fig 1(A): Congruent arc maintained while stabilizing the corocoid in a left shoulder. b) Scar post-surgery. c) Postoperative radiograph showing congruent ark maintained with union.

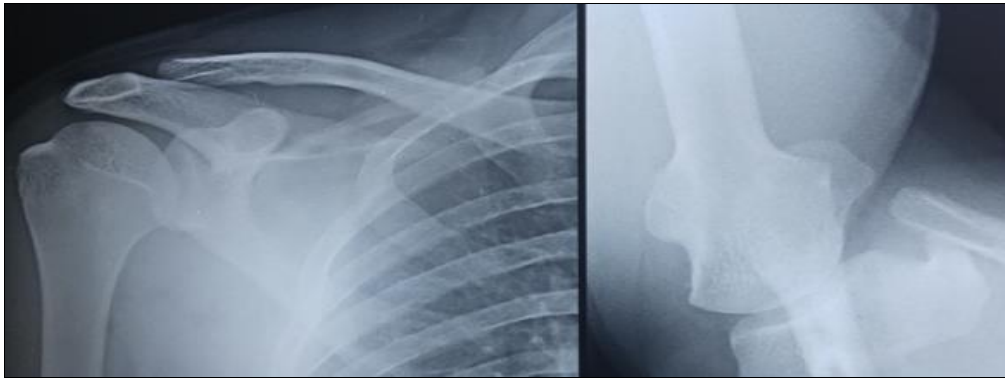


Fig 2: Radiograph of right shoulder anteroposterior and stryker knotch view depicting Hillsach's lesion

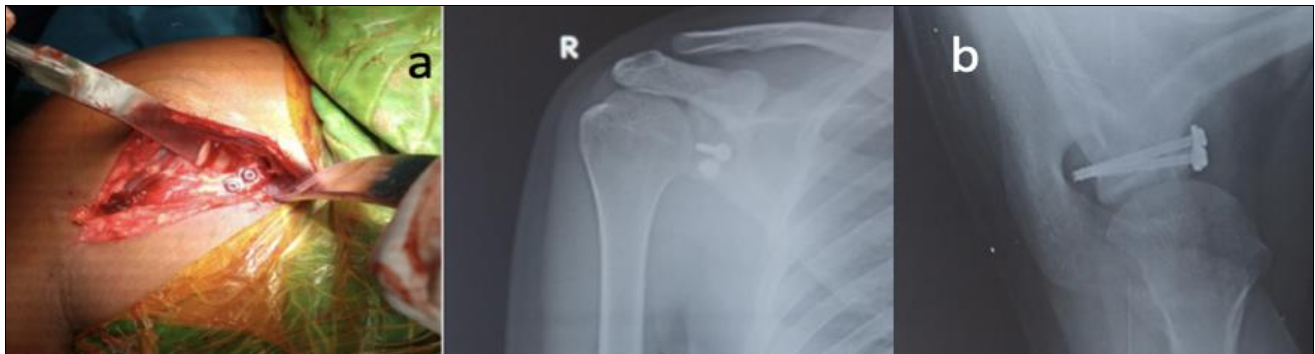


Fig 3 (A): Congruent arc maintained in right shoulder b) Radiographs showing union of graft in the patient with engaging Hillsach's lesion

Quantitative statistical analysis was performed using Chi-Squared test with SPSS 22.0 software.

Results

The mean age of the patients was 33 years in the age group of 21-52 years and the follow up was for 24 months. The reason for the first dislocation was a traumatic/sporting/ fall on outstretched hand in all the cases except one person who was an epileptic. Seventeen patients had their dominant hand (15

right, 2 left side) affected.

None of the twenty-four patients who underwent the surgery had dislocation post-surgery. No patients reported having subluxations, or apprehension. In relation to shoulder mobility, we observed that the external rotation of the operated limb was restricted by 5 to 10 degrees than those of the uninjured limb. Pain was the most common complain but bearable without medications by the end of 3 weeks



Fig 4: Range of movements at twenty-four-months post-operative- a) External rotations in abduction b) External rotation with adduction of limb c) Reaching behind the head

According to Rowe score, 16 patients (66.6%) had excellent result and the remaining 8 patients had good result at the end

of 24 months. There was significant statistical difference in the Rowe scoring in all the follow ups.

Table 1: Rowe and SPADI score following 3, 12 and 24 months post Laterjet procedure

Scoring	Follow-up			P value
	3 months	12 months	24 months	
Rowe score	46.042, 9.205	83.125, 5.675	90, 4.1703	0.001
Spadi score	68.774, 7.862	15.579, 3.046	11.471, 1.956	0.006

The improvement in both scales were statistically significant ($p > 0.006$) (Table1). We noted that the patients had high SPADI score (68.77%) at the three months follow up. They were attributed to pain on lying on the involved side and disability regarding washing hair and carrying heavy object of

4.5kgs.

One male patient who was an epileptic was free from epileptic attack for the last 6 months based on history and was on regular medications before the surgery. The patient continued the antiepileptic drugs post operatively as advised by

neurologist. Intra operatively it was noted that his coracoid was smaller than the rest operated cases. He had Rowe score of 80 hence the size of the graft did not correlate to the functional outcome.

Following the procedure all patients resumed their day to day activities by 3 months. Four patients were students out of which three had resumed their sports activities in the college

by the end of 10 months. At the final follow-up showed minimal backing out of one of the screw in one of the patients who was a student. This patient was asymptomatic. Despite the high rate of satisfaction, some degree of residual pain was found in two patients, who were above 46 years of age. Both these patients had grade 1 osteoarthritis at the glenohumeral joint

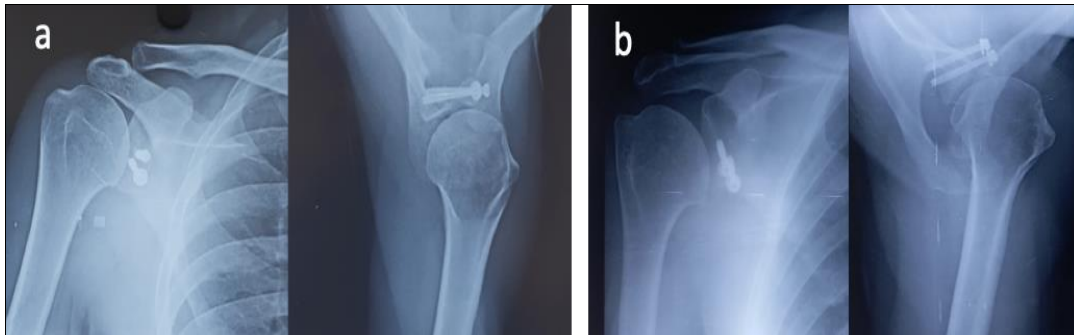


Fig 5: Radiographic images displaying- a) Backing out of one of the screws b) Grade 1 (Mild) osteoarthritis noted at glenohumeral joint

Discussion

This study was conducted to find out the functional outcome following the Latarjet procedure in a tertiary care hospital. Our patients in South India tend to seek consultation following multiple shoulder dislocations. Unpredictability with their shoulder stability is considered as one of the main concerns among these patients. Hence the primary goal was to prevent recurrence of instability, improve functionality and reduce short and long-term complications. LaserJet repair mechanically restores stability by three distinct mechanisms^[10]. The primary stabilizing mechanism, the “sling effect”, provided by the conjoint tendons, the dynamic by the lower subscapularis and glenoid concavity by the coracoid transfer, which contributes a significant portion of glenohumeral stability. In our study none of the patients had dislocation/subluxation or any apprehension when compared to An V Vet.al,^[11] who reported a significantly lower postoperative recurrent instability rate in the Latarjet cohort (11.6%) compared with the Bankart cohort (21.1%). Our patients did not have any immediate complications like infection, hematoma, intraoperative graft fracture, graft malposition, mal-union, non-union, hardware complications like screw breakage and neurovascular injury when compared with Shah *et al.*,^[12] who reported short-term complications. They performed their study at Massachusetts General Hospital/Harvard Medical School, Boston between Jan 2015 and 2010, on 45 patients and all complications resolved except 2 patients who had axillary nerve neuropraxia.

Zhu *et al.*,^[13] reported that some degree of coracoid graft resorption occurred greater than 90% after Latarjet procedures. However, the clinical significance of this finding remains unclear because graft resorption did not correlate with functional outcomes. Natalie c. Rollick *et.al.*,^[14] reported that regardless of surgical procedure, nearly half of patients having surgery for anterior shoulder instability will develop radiographic glenohumeral arthritis.

Bessière *et al.*,^[15] conducted a retrospective study on 186 patients for recurrent post-traumatic anterior instability with Bankart’s arthroscopic repair of the injury versus Latarjet’s operation with a mean follow-up of six years, and concluded that the second group presented better Rowe scores and lower rates of recurrent instability.

Eoghan T. Hurley *et al.*,^[16] from Ireland reviewed 13 studies where Rowe score were used in 6 research papers. The

outcome of Rowe score had a mean average of 88.5 (n = 353) at final follow-up.

In our study, in spite of our patients with various occupations and seeking treatment after multiple dislocations over mean span of about 2 years (ranging from 1 year to 5 years duration), we found that none of them had poor or fair outcome based on Rowe scoring. This mainly contributed to the selection of patients, placement of the coracoid graft and efficient postoperative rehabilitation. Hovelius L *et al.*,^[17] concluded that optimum results are obtained if the bone-block heals to the neck of the glenoid and the position of the bone-block is less than one centimetre medial to the glenoid rim and below the equator of the scapular neck.

The follow up of patients for two years duration may not be adequate to identify long term complications like resorption of coracoid graft and glenohumeral arthritis using radiography. This forms the limitation of our study.

Conclusion

Good and excellent results were attained from Rowe functional outcome scoring following Latarjet procedure in this study. This was due to proper patient selection, proper technique in relation to surgery and adequate postoperative rehabilitation. We feel that the union of the coracoid to the glenoid in an optimal position is the most important reason for the better outcome.

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