

## A Retrospective Evaluation of the Functional Outcome of Open Latarjet Procedure for Recurrent Anterior Shoulder Instability

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### Abstract

**Aim:** The aim of the study to determine the Functional outcome of open Latarjet procedure for recurrent anterior shoulder instability. **Methods:** 50 patients with Bony Bankart's lesion representing  $\geq 25\%$  of glenoid lesion, Hill Sach lesion, on track lesion with glenoid bone loss of  $\geq 25\%$ , Off track lesion with glenoid bone loss  $< 25\%$ , Lesions requiring Remplissage correction along with Latarjet procedure were included in this study. Functional scoring of the patient was determined by ASES (The American Shoulder and Elbow Surgeons) score, Quick DASH (The Disabilities of Arm, Shoulder and Hand) score, Rowe score, ISIS (Injury Severity Index Score score) and Visual analogue scale (VAS) for pain to get a baseline reference. The case was treated with open Latarjet repair after the criteria were met. In which coracoid process along with the conjoint tendon is transferred and fixed with screws to the margin of glenoid. **Results:** Of total 50 patients 48 were male (96%) with a female (4%). Among 50 patients, 31(62%) patients had their dominant shoulder affected and remaining 19 (38%) had recurrent instability in their non-dominant shoulder. Pre-operative Injury Severity Index Score (ISIS) of the patients were determined. It was found that mean pre-operative ISIS score was 4.01. 2 (4%), 21 (42%), 14 (28%), 7 (14%), 6 (12%) patients had an ISIS score of 2, 3, 4, 5, and 6 respectively. An ISIS score of  $< 3$ , 3 – 6 and  $> 6$  predicts a recurrence rate of 5%, 12%, and 72%, respectively. Mean VAS (Visual analogue scale) for pain among the patients in the study also reduced from pre-op value of 5.1 to 2.5, 1 and almost 0 at 1 month, 3 months and 6 months post-op respectively and this reduction in pain was found to be highly significant. ROWE score which takes into account the stability, motion and function of the patient was found to have a highly significant improvement with follow ups at 1 month, 3 months and 6 months with scores of 54.68 (+/- 9.43), 69.59 (+/- 7.83) and 91.59 (+/- 7.2.) respectively. Majority of the patients (N-46; 92%) had excellent functional outcome and 4 patients (8%) had fair outcome. **Conclusion:** The Open Latarjet repair for anterior shoulder instability is a useful and successful procedure for patients with significant glenoid bone loss and heavy work demand such as contact athletes and manual labourers. Added to this even though Open Latarjet procedure is a non-anatomical repair it provides excellent functional results and patient satisfaction.

**Keywords:** functional outcome, open Latarjet, anterior shoulder

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## Introduction

Anterior shoulder instability has been reported to occur at one of the highest rates (0.12 per 1000 exposures) in athletes[1]. It occurs most frequently in the 20 – 40 years of age. It is a difficult clinical problem and is treated by a variety of open and arthroscopic methods with good results. Glenoid bone loss is commonly observed in anterior instability and varies greatly in both its extent and significance[2,3]. Nonoperative management of glenohumeral instability has been associated with high rates of recurrence with recurrence rates ranging from 37% to 85% [3-7]. Arthroscopic stabilization procedures have been similarly associated with recurrent instability, with recurrence rates ranging from 10.8% to 21.1% [8-11]. Bankart repair remains a popular option, but it addresses only soft tissue deficiency using suture anchors. However, the situations involving irreparable ligamentous damage or bony deficiency, this technique may be insufficient to stabilize the shoulder. The Latarjet procedure is a reliable method of treatment for anterior instability, with good results reported in many studies[12-14]. It is effective in situations in which soft-tissue reconstruction is not a reasonable option[15]. The use of the coracoid process to stabilise the shoulder was first described by Oudard[16] in 1923. The screwing of the coracoid process on to the antero-inferior side of the glenoid at the level of the anterior glenoid rim was described by Latarjet[17] in 1954. Helfet[18] in 1958 described the Bristow procedure in which the coracoid process was merely sutured to the anterior part of the scapular neck through a transversally sectioned subscapularis muscle. Mead and Sweeney[19] in 1964, and May[20] in 1970, described a modification of the Bristow Helfet procedure that consisted of fixing the bone block to the anterior

glenoid rim with a screw. In mini-open technique incision is limited to 4- 5 cm and when it is possible to 3 cm. In this technique we do not cut the subscapularis tendon, but we split the tendon at its distal edge in order to place the bone block in right position. This allows a fast recovery without any post-operative immobilization.

## Materials and methods

A retrospective study was conducted in the Department of Orthopaedics, Nalanda Medical College and Hospital, Patna, Bihar, India for 1 year, after taking the approval of the protocol review committee and institutional ethics committee.

## Methodology

50 patients with Bony Bankart's lesion representing  $\geq 25\%$  of glenoid lesion, Hill Sacs lesion, on track lesion with glenoid bone loss of  $\geq 25\%$ , Off track lesion with glenoid bone loss  $< 25\%$ , Lesions requiring Remplisage correction along with Latarjet procedure were included in this study. Posterior instability of shoulder, any anterior dislocation along with any associated fracture, Recurrent anterior instability associated with irreparable rotator cuff lesions, Voluntary anterior dislocators or subluxators, Patients with uncontrolled epilepsy, Prosthetic anterior instability, Connective tissue disorders such as Ehlers Danlos, Marfans syndrome were excluded from this study.

Functional scoring of the patient was determined by ASES (The American Shoulder and Elbow Surgeons) score, Quick DASH (The Disabilities of Arm, Shoulder and Hand) score, Rowe score, ISIS (Injury Severity Index Score score) and Visual analogue scale (VAS) for pain to get a baseline reference[21]. The case was treated with open Latarjet repair after the criteria were met. In which coracoid process along with the conjoint tendon is

transferred and fixed with screws to the margin of glenoid. This procedure provides stability by Bony effect, Bankart effect and dynamic sling effect. Rehabilitation is always customised based on the tissue quality, stability of the repair. Phased rehabilitation is followed[22]. Follow up scores will be taken at weeks 2,1-month,3 months and 6 months to assess functional outcome of the repair. Results were analysed and interpreted using appropriate statistical analysis by using SPSS software.

## Results

A total of 50 patients were evaluated in the study whose mean age was 34.22 (+/-9.12) years. 19 patients were less than 25 years (38%); 28 were between 25-40 years (56%) who were the majority and 3 were above 40 years (6%). table 1 All the patients in my study were males except for 2 females. Of total 50 patients 48 were male (96%) with a female (4%). Among 50 patients, 31(62%) patients had their dominant shoulder affected and remaining 19 (38%) had recurrent instability in their non-dominant shoulder. The majority of the patients were involved in some form of sports activity with 20 patients (40%) playing contact sports (mostly kabaddi) and 21 patients (42%) playing recreational sports (badminton, volleyball, cricket). 9 patients (18%) had no history of any sporting activity. Majority of the patients in the study had a minimum of 4 dislocations prior (N-13, 26%); Ranging from minimum of one to maximum of ten dislocations prior. With 5 (10%), 3 (6%), 9 (18%), 9(18%), 4 (8%), 4 (8%), 3 (6%) patients having had 1,2, 3, 4, 6, 7 and 10 dislocations prior to reporting respectively. Pre-operative Injury Severity Index Score (ISIS) of the patients were determined. It was found that mean pre-operative ISIS score was 4.01. 2 (4%), 21 (42%), 14 (28%), 7 (14%), 6 (12%) patients had an ISIS score of 2, 3, 4, 5, and 6 respectively. An ISIS score of < 3, 3 – 6 and > 6 predicts a recurrence rate of 5%, 12%, and 72%, respectively.

Forward Elevation (FE), Cross-Body Adduction (CBA), External Rotation with arm in adduction (ER1), External Rotation with arm in 90-degree abduction (ER2) and Internal 6 months follow up – Rotation (IR) movements were calculated pre-op, follow-ups at 1 month, 3 months and 6 months. There was a significant improvement post-surgery and explained in table 1 table 4.

Mean VAS (Visual analogue scale) for pain among the patients in the study also reduced from pre-op value of 5.1 to 2.5, 1 and almost 0 at 1 month, 3 months and 6 months post- op respectively and this reduction in pain was found to be highly significant. Table 2

ROWE score which takes into account the stability, motion and function of the patient was found to have a highly significant improvement with follow ups at 1 month, 3 months and 6 months with scores of 54.68 (+/- 9.43), 69.59 (+/- 7.83) and 91.59 (+/- 7.2.) respectively. Majority of the patients (N-46; 92%) had excellent functional outcome and 4 patients (8%) had fair outcome.

The American Shoulder and Elbow Surgeons (ASES) Shoulder Score which is both a physician-rated and patient- rated scoring system showed a significant improvement at post-op follow ups. The post-op scores at 1 month, 3 months and 6 months were 66.9 (+/-8.1), 81.4 (+/-5.1), and 91.3 (+/- 5.3) respectively. The mean pre-op ASES score was 45.6 (+/- 5). table 3.

The Quick DASH (The Disabilities of Arm, Shoulder and Hand) score also showed good improvement in patient satisfaction and ROM, with postop scores at 1 month, 3 months and 6 months being 30.8 (+/-8), 19.1 (+/-7.3), and 11.5 (+/- 6.9) respectively. The mean pre-op Quick DASHscore was 43.2 (+/-9.6).

**Table 1: gender and age distribution**

Gender	Number	Percentage
Male	48	96
Female	2	4
Age in years		
Below 25	19	38
25-40	28	56
Above 40	3	6

**Table 2: Visual Analogue Score**

VAS parameter	Mean
PRE OP	5.1
POST OP 1 MONTH	2.5
POST OP 3 MONTH	1.1
POST OP 6 MONTH	0

**Table 3: Mean ASES Score**

ASES Score parameter	Mean
PRE OP	45.6
POST OP 1 MONTH	66.9
POST OP 3 MONTH	81.4
POST OP 6 MONTH	91.3

**Table 4: Range of movements (Forward Elevation-FE, Cross-Body Adduction-CBA, External Rotation with arm in adduction-ER, External Rotation with arm in 90-degree abduction-ER2 and Internal Rotation-IR, SD-Standard deviation, Sig – Significant)**

Range of Movements	FE			CBA			ER1			ER 2			IR		
	Mean	SD	p	Mean	SD	P	Mean	SD	p	Mean	SD	p	Mean	SD	p
Pre-Op	145.3	13.5		46.4	5.6		55.2	9.1		76	4.6		54.2	7.62	
Post OP 1 Month	150.7	9.8	Sig	47.2	4.8	Sig	61.5	7	Sig	79.8	3.7	Sig	59.2	3.4	Sig
Post OP 3 Months	152.1	7.4	Sig	51	-	Sig	66.8	5.3	Sig	89.2	8.1	Sig	67.3	3.5	Sig
Post OP 6 Months	157.7	8.2	Sig	51	-	Sig	70.1	3.2	Sig	92.1	7.4	Sig	70.2	2.8	Sig

## Discussion

Anterior glenohumeral dislocation followed by chronic anterior instability is the most common form of glenohumeral instability[23]. This is one of the most common situations in our orthopaedic practice. Rowe *et al* reported a 95.6% rate of anterior dislocation was caused due to trauma in their study of 500 patients[24]. Though the most common type of lesion involved is Bankart's lesion[25]. The prevalence of fracture or erosion of the glenoid rim in shoulders with recurrent anterior dislocation has been reported to range from 8% to 95%[26-37] and cases

are on rise as time fleets due to recent enthusiasm for recreational and sporting activities, especially among young and active population.

The primary goal of any stabilisation procedure is to prevent recurrent instability with the goal of improving function, return to preinjury levels and to reduce long term sequelae. It is obvious that anatomic repair of the underlying pathology is the preferred procedure in anterior shoulder instabilities with Bankart lesion[37]. But, Bankart procedure is not the ideal surgery in conditions like contact or competitive sports athletes, significant bone loss or

fracture of glenoid or humeral head, chronic erosion of glenoid rim, mid substance complete tear of glenohumeral ligament, humeral avulsion of glenohumeral ligament, deficient capsule, and complete radial tear of labrum[38-42]. So, bony procedures should be performed in these patients. Here in this study, we review our experience with one such bony procedure – Open Latarjet procedure in chronic anterior glenohumeral instability meeting our criteria which was originally described in 1954. This short-term study highlights the importance of screening of patients for bone deficiency, treating them with open Latarjet procedure and evaluating their functional outcome.

Latarjet surgery is reported as good or excellent satisfied procedure in preventing the future instability because low post-operative recurrence rates of shoulder dislocation rates. According to Allain *et al.*, in their 56 patients treated with an open Latarjet procedure for a mean of 14.3 years, none of them had a recurrent dislocation and only 1 patient reported a feeling of persistent instability and occasional subluxation[43]. Cassagnaud in his series of 106 Latarjet procedures with 7.5 years of follow up reported only one re-dislocation[44]. Whereas Collin in his 69 patients with mean follow up of 50 months had 4 recurrences and 2 subluxations[45]. According to Hovelius in his prospective study of 118 patients over 15 years follow up had subluxation in 11 and recurrences in 3 patients[46]. Our study similarly had no recurrences or re-dislocations post operatively. According to Banas *et al.*, their cases showed 97% satisfaction during 8.6 years[47]. Hovelius *et al.*[46] in their 15 years follow-up and Schroder *et al.*[48] during 24.6 years showed 98 and 70% satisfaction, respectively. Most interestingly, Omid-Kashani *et al.*[49] expressed 100% satisfaction in their study with mean follow up of 24.6 months which was in comparison with our study showing excellent satisfaction in about 92% and

only 4 patients (8%) had fair outcome with Rowe scores. Showing that the outcome of this study is not far from other studies. Though many studies have reported shoulder stiffness and significant loss of external rotation after this procedure[50,51,52] we did not encounter significant joint stiffness or limitation of external rotation. According to Hovelius *et al.*[53] there was 8° mean loss of external rotation whereas Young and Walch[54] did not find any significant loss of external rotation. With 9° and 5° mean reduction in external rotation by Banas *et al.*[47] and Burkhart *et al.*[50] respectively post operatively. All these were similar to our study with mean external rotation limitation was 5° postoperatively without affecting the activities of their daily living. Moreover, this limitation can be corrected with proper rehabilitation protocols and regular follow up. Other complications encountered as neurologic injuries – such as Suprascapular, Axillary and Musculocutaneous nerve injuries, infections, post-operative arthritis, revision surgeries and complications related to screw such as – screw break down and non-union. Fortunately, our study did not have any of those complications. Minimally attributed to small group and shorter duration of study and follow up which can be considered as limitation of our study.

### Conclusion

In conclusion, this study shows that Open Latarjet repair for anterior shoulder instability is a useful and successful procedure for patients with significant glenoid bone loss and heavy work demand such as contact athletes and manual labourers. Added to this even though open Latarjet procedure is a non-anatomical repair it provides excellent functional results and patient satisfaction. Patient screening, identification and selection remains the key in determining the success of the repair and thus makes the patient to return to preinjury levels. Meticulous surgical technique and correct positioning

of graft play a crucial role in determining the final functional outcome and thereby reducing the recurrences.

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