



ORIGINAL RESEARCH PAPER

Orthopaedics

A PROSPECTIVE STUDY ON OUTCOME OF RECURRENT TRAUMATIC ANTERIOR DISLOCATION TREATED WITH BRISTOW-LATERJET PROCEDURE

KEY WORDS: Bristow-Latarjet procedure, recurrent anterior dislocation, hill-sachs lesion, coracoid graft.

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ABSTRACT

The shoulder by virtue of its anatomy and biomechanics is one of the most unstable and frequently dislocated joints in the body, accounting for more than 50% of all dislocations. Since the beginning of century more than 150 surgical procedures were described in treating recurrent dislocation of the shoulder with varying results and success. Most of the operative techniques described for the treatment of recurrent anterior dislocation or subluxation of the shoulder have 2 distinct disadvantages need to immobilize the shoulder for several weeks and loss of external rotation. These can be overcome by Bristow-Latarjet procedure. We analysed Bristow-Latarjet procedure in the treatment of recurrent traumatic anterior dislocation of shoulder at department of Orthopaedics, Chengalpattu Medical College Hospital, Chengalpattu, Tamil Nadu, India.

INTRODUCTION

MATERIALS AND METHODS

We in the Department of orthopaedics came across 34 patients (2 patients had bilateral dislocation) during February 2016 to February 2018 out of which 32 were Male and 2 were female.

Inclusion Criteria

- All traumatic recurrent anterior dislocation.
- Pre-op Stryker Notch view showing only mild degree of Hill Sachs lesion.
- All patients without any fracture of the proximal humerus.
- All patients without any ligamentous laxity

Based on the inclusion criteria, 2 patients (both male) who had generalized ligamentous laxity were excluded from the study thus leaving 32 patients in our study. All the patients were in the age group of 18 to 26 years with mean age of 24.8 years, average age at the time of index dislocation being 19. All the patients were evaluated clinically and radiologically. Clinically all the patients had positive apprehension sign, full ROM, no associated posterior instability and no previous surgery for shoulder instability.

Radiologically all the patients were evaluated by taking AP view of the shoulder, True AP view of the shoulder, internal rotation (45 deg) AP view of the shoulder, Stryker Notch view of the shoulder. 29 shoulders had mild degree of Hill Sachs lesion and 3 shoulders had no Hill Sachs lesion. All the patients underwent Bristow-Latarjet procedure

Operative Technique

Under GA, through a deltopectoral approach, cephalic vein is identified and retracted medially with a cuff of muscle. Then going through the interval between the deltoid and pectoralis major, coracobrachialis and short head of biceps. In none of the cases the musculocutaneous nerve was affected. The upper and lower limits of subscapularis muscle were identified. Split the subscapularis muscle in line with its fibre from lateral to medial. Once the subscapularis muscle was split, periosteal elevator was used to reflect it from the outer surface of the shoulder capsule to expose the anterior capsule. The anterior capsule was split in a similar manner to subscapularis muscle. The joint is explored for intra-articular pathology.

Medial exposure of the anterior scapular neck is necessary for proper placement of the transferred coracoids. The anterior scapular neck was exposed by subperiosteal dissection. It is important that this transfer site be inferior to the equator of the glenoid and if possible less than 1 cm from its rim. At this position

on the anteroinferior portion of the scapular neck, drill a 3.2 mm hole through the posterior cortex of the scapular neck. The surface of scapular neck where the screw has to be fixed was roughened with an osteotome. Position the transferred coracoid tip with its muscle attachment through the horizontal slit in the subscapularis onto the neck of scapula. Then fix the coracoids tip with a 4.5 mm malleolar screw with washer to avoid fragmentation of the coracoids. Then close the subscapular, longitudinal split. Then after attaining the hemostasis, wound closed in layers. All the patients were given I. V. Antibiotics.

Post-operative Protocol

1st week

Shoulder immobilization

1 to 3 week

Shoulder in arm sling

- Circumduction exercises (Pendulum exercises) started.
- It is aimed to achieve shoulder flexion, adduction and external rotation of 60 deg each.
- Shoulder extension is not allowed
- Elbow flexion is allowed but neither active or passive elbow extension is allowed.

3 to 6 weeks

Sling discarded

- Increasing range of movements at the shoulder
- Isometric strengthening of shoulder muscles (especially of the rotator cuff).
- It is aimed to achieve 90 degrees each of shoulder flexion, external rotation and abduction

6 to 12 weeks

- Gradual weight bearing is allowed in the shoulder.
- Elbow extension is allowed.
- Patient should be able to get full ROM in the shoulder

3 to 6 months

- Normal day to day activities allowed
- Non-contact sports are allowed.

Complications

In our study series till the latest follow up none of the patients had neurovascular complications, screw loosening, screw penetration or glenohumeral arthritis. None of the patients had recurrence of dislocation or subluxation. We have not encountered any complication such as nonunion of coracoid or problem with the screw.

RESULTS

All the patients were followed up periodically both clinically and radiologically till their shoulder regained full range of movements and radiological bony union of the coracoid graft. All the patients were thoroughly examined and evaluated subjectively and objectively and outcome was assessed by Rowe's scoring system.

Subjective Evaluation

Based on the ability return to work to their pre-dislocation level, satisfaction, any shoulder instability or pain. All the patients were satisfied with the surgery. They were able to return to their pre-dislocation level activity. None of the patients had pain or episodes of shoulder instability.

Objective evaluation (by clinical examination and Rowe scoring system)

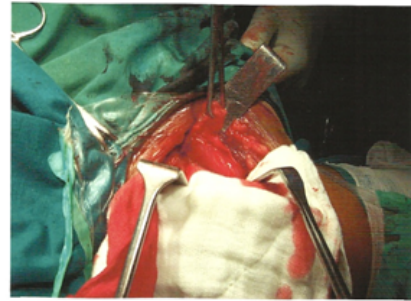
In all the patients apprehension sign was negative. All the patients had regained full shoulder flexion, abduction, internal rotation. Although patients were not aware the terminal 5 to 20 deg of external rotation (average) was uniformly restricted in all the patients.

Radiological Evaluation

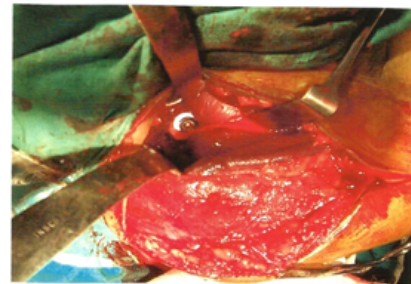
All the patients were evaluated by True AP view and True lateral view of the shoulder to assess the bony union of the transferred coracoid graft and to assess any screw loosening or screw breakage. In all the patients there was bony union and there is no evidence of screw loosening.

Outcome assessment by Rowe's scoring system

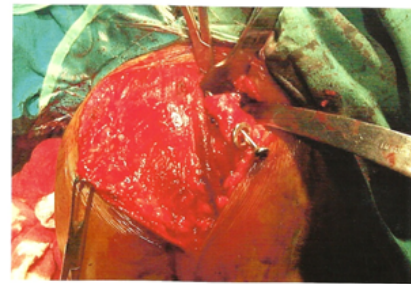
It includes a maximum potential score of 100 points which were subdivided into stability (50 points), motion (20 points) and function (30 points). The rating scale is heavily weighed to the recurrence of instability (50 points). Results according to this system were excellent in 22 shoulders and good in 10 shoulders.



Showing coracoid process being osteotomised with its attached muscles - coracobrachialis and short head of biceps



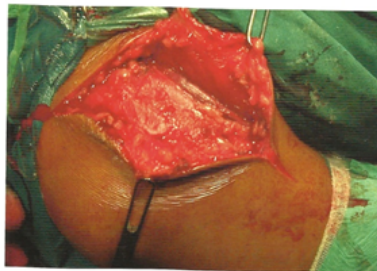
Coracoid fragment fixed in the anterior inferior quadrant within 1 cm from the rim just below the equator through the split in the subscapularis muscle (M 1/3 - L1/3 junction)



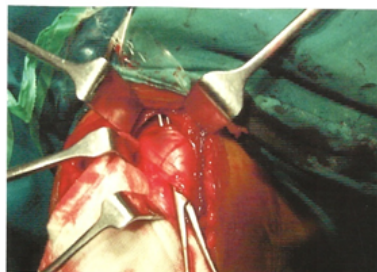
Coracoid fragment with a 4.5 mm malleolar screw and washer



Skin incision - deltopectoral approach



Showing cephalic vein on the deltopectoral groove



Showing coracoid process with its attached conjoint muscles

CASE 1



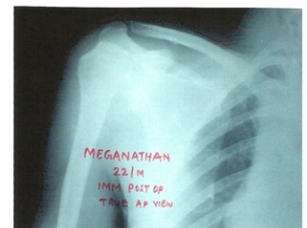
Pre-op Stryker notch view showing mild defect in the posterolateral aspect of the humeral head



True lateral view Imm. Post. Op. showing Bicortical screw fixation



True AP view - 12 months Post Op. follow up showing screw in situ without any loosening



AP view Imm. Post. Op. showing the screw in the Anteriorinferior quadrant of the glenoid within 1 cm from the rim just below the equator



12 months Post Op. follow up showing both shoulders in internal rotation
 12 months Post Op. follow up showing Abduction and external rotation
 12 months Post Op. follow up showing full Abduction

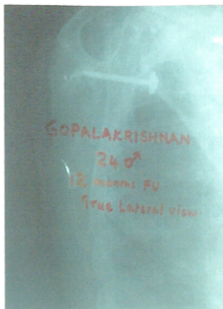
CASE 2



AP view right side Imm. Post. Op. showing screw in the Anteroinferior quadrant of the glenoid within 1 cm from the rim just below the equator



Pre. Op. Stryker notch view showing mild defect in the posterolateral aspect of humeral head



True lateral view Right side 12 months Post Op. follow up screw in situ with bicortical screw purchase without any loosening



True AP view right side - 12 months Post Op. follow up - screw in situ with good bony union



3 years post op follow up left side and 12 months follow up on right side - shoulder flexion



3 year post op follow up left side and 12 months follow up on right side - shoulder external rotation



3 years Post Op. follow Up Left side - shoulder Abduction



3 year post op follow up left side and 12 months follow up on right side - shoulder internal rotation

Discussion

In our series all the patients were in the age group of 19 to 26 years. In all patients, the index dislocations occurred at the age of 19 years.

In all of the patients, the index dislocation was due to fall on the outstretched hand (low-velocity injury). This is in comparison with the study of Rowe [2,3] that lesser the trauma needed to produce the index dislocation, more is the chance of recurrent dislocation.

In our series, 30 out of 32 patients were male (93.75%) which also agrees with study of Rowe [2], Hovelius et al [1] that male dominates in the scenario of recurrence of shoulder dislocation.

In our series 26 out of 32 patients (72.22%), underwent proper treatment in our institution during their index dislocation and subsequently with closed manipulation and reduction and immobilization for 3 to 4 weeks (average 3.5 weeks). The remaining 6 patients underwent native treatment with 3 to 6 weeks of immobilization (average of 4.5 weeks). In all the patients, although they were immobilized for a sufficient time following their index dislocation, the dislocation recurred which is in comparable with the study that the initial mode of treatment and duration of immobilization does not alter the recurrence rate. In 29 out of 32 shoulders, Hill Sachs lesion-mild defect in the posterolateral aspect of humeral head was found in the Stryker Notch view i.e. in 90.62% of the shoulder had mild Hill Sachs lesion.

In our series on clinical examination in all the patients apprehension sign was negative and in all the patients, the shoulder flexion, abduction and internal rotation were full. There was uniform restriction of the external rotation-terminal 5 to 20 degrees of external rotation is restricted (average 12.5 degrees) in 5 patients there is restriction of terminal 15 degrees of external rotation. The patients were unaware of this as they had rarely experienced any difficulty with this restriction [12-24].

In follow-up, it was found in all the patients the transferred coracoids graft is well united and none had screw loosening.

Although bony union was not necessary (even fibrous union is enough to hold the graft in situ) [16,17] we achieved bony union in all the cases. Complications cited in the literatures were screw loosening, screw cut through, non-union of the graft, neurovascular complication. We rarely encountered these complications.

Table 1: comparison of rate of redislocation in various procedures

Series	Year	Procedure	No of cases	Rate of redislocation
Torg et al.	1987	Bristow	212	3.8
Miller et al.	1984	Magnusan stack	43	17
Hovelius et al.	1979	Putti platt	68	19
Murray and Jones	1976	Bankart	47	4.1
Our series	2016	Bristow-Latarjet	32	

Result analysis as per function, excellent Rowe's Scoring 22 out of 32 shoulders (68.75%) showed excellent results and the remaining 10 had good results (31.25%).

In our small series none of the patients had recurrence of subluxation or dislocation. Although there was restriction of external rotation 5 to 20 degrees, functionally all the patients had no/mild limitation which did not interfere with their daily activities. Our results are comparable to the result of various authors in Bristow-Latarjet procedure.

CONCLUSION

An ideal surgical procedure for recurrent anterior shoulder dislocation should, Obliterate the anterior glenohumeral rent and Act as a glenoid block to force the humeral head into glenoid cavity in the vulnerable position of abduction and external rotation.

These objectives are achieved by Bristow Latarjet procedure through its dynamic musculotendinous sling mechanism.

The success of the procedure depends upon the correct positioning of the transferred coracoids process (Hovelius et al.) [11, 24], The coracoid process should be less than one cm medial to the glenoid rim. The coracoid is positioned inferior to the transverse equator of the glenoid. There should be bicortical screw purchase, screw should not penetrate the articular surface, bony union develops between the coracoids graft and scapula (anterior aspect of the neck). When the above said technical points are clearly followed, excellent results can be achieved by this procedure.

Putti-Platt procedure is intended to shorten the subscapularis muscle and according to Osmond Clarke [16], results in permanent limitation of external rotation in most case and has a high recurrence rate in younger patients, Glenohumeral Osteoarthritis is also a late complication with this procedure. The Bankart procedure repair of the detached capsule from the glenoid, not only has technical difficulty, but also results in restriction of lateral rotation by approximately 20 deg [19,20]. Magnuson and Stack [21] are of the opinion that the shoulder muscles are the only structures that maintain the head of humerus in contact with the glenoid and in proper position. In their operation, the insertion of the subscapularis tendon into the lesser tuberosity of the humerus is transferred laterally to the greater tuberosity. This overcomes the weakness of the subscapularis due to its overstretching Magnuson and Stack's operation diminishes the range of outward rotation to a considerable extent.

Plain (50%), postoperative instability (22%) and loosening or migration of the staple (12%) were reported after staple capsulorrhaphy in a study conducted by Driscoll et al [22]. In Boytchev [23] technique the coracoids tip was osteotomized with conjoint tendons of coracobrachialis and short head of biceps and pectoralis minor and was re-routed under the subscapularis muscle and was re-attached to its original anatomical position with a screw. Even though no restriction to its original anatomical position with a screw. Even though no restriction of movement was reported with this procedure, injury to the musculocutaneous nerve was an important complication with this procedure [24].

Though open Bristow-Latarjet procedure has shown excellent results in treatment of recurrent anterior dislocation, recent trends show an increase in use arthroscopic repairs. No statistical significance exists between these two methods in terms of redislocation. But arthroscopic repairs remains superior to open procedures in terms of improvement in ROM (especially external rotation), early return to activity and lesser hospital stay [25].

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