# A study of management of recurrent dislocation of shoulder by arthroscopic bankart's repair

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## ABSTRACT

**Aim:** Descriptive, Retrospective and Prospective study of surgical and functional outcome following, arthroscopic repair of the Bankart lesion of the shoulder with suture anchors. **Materials and Methods:** This is a study of surgical and functional outcome of Arthroscopic Bankart Repair in recurrent anterior shoulder dislocation with suture anchors. Most patients are in the age group between 21-25 years. 90% of the patients were males 10% were females. 60% of the patients were involved in occupation of high demand. Majority of patients had symptoms for a period ranging from 1 to 2 years. 14 (70%) patients had their Right shoulder involved 6 (30%) patients had their left shoulder involved.10 patients (50%) patients had 1- 4 recurrent dislocation episodes preoperatively. Necessary radiological investigations and hematology have been done on admission. Details of the surgery will be noted. The immediate post-operative x-rays have been evaluated. The post-operative rehabilitation evaluation done at 3 weeks, 6 weeks, 12 weeks, 6 months and 1 year, for any recurrence of symptoms and morbidity. **Results:** In our study of 20 patients, with the mean follow up period of 12 months, the mean Rowe score post-operatively improved to 92.75 from a pre-operative mean score of 45.50, Out of 20 patients none had episodes of recurrent dislocation and anterior translation or apprehension, in the Range of motion-external rotation in 90º of abduction improved in 17 patients (85%). Mean pre operative Rowe score was 45.50. In 12 (60%) patients 3 suture anchors were used and in 8 (40%) patients 2 suture anchors used intra operatively. The mean post-operative Rowe score improved to 92.75. Range of movement – external rotation in 90º of abduction improved in 17 patients (85%). **Conclusion:** We conclude that Arthroscopic Bankart repair in recurrent anterior shoulder dislocation with suture anchors is an effective procedure with respect to shoulder function, rate of recurrence and range of movement.

**Key words:** Bankart repair, Rowe score, Anterior shoulder dislocation.

## Introduction

Glenohumeral dislocation is a common entity affecting 2% of population. Recurrent instability of shoulder is the main complication of traumatic anterior glenohumeral dislocation. The standard procedure used for treatment of anterior glenohumeral dislocation is open Bankart-type treatment for restoring normal anatomy. A shoulder is a joint that provides the largest amount of motion among all the diarthodial joints in the body at the expence of stability and it has the most propensities to instability. The Bankart lesion is an avulsion of the anterior labroligamentous structures from the anterior glenoid rim. Bankart described it as the "lesion of necessity" in anterior shoulder instability and believed that it occurred in 100% of all dislocations. Modern studies estimate that approximately 90% of all anterior dislocations have Bankart lesions. The anterior scapular periosteum is disrupted, and the labrum and attached ligaments are typically found anterior to the glenoid rim. Therefore, the anterior band of the IGHL or MGHL cannot perform their stabilizing functions at the end ranges of

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motion. In addition, the labrum does not function to deepen or stabilize the glenoid socket. With the labrum removed, the force required to translate the shoulder anteriorly is reduced by 50%[1].The Bankart lesion is usually found on the axial cut of the MRI, in the anteroinferior aspect of the glenoid. Gadolinium is visualized between the anterior labrum and glenoid. The ultimate aim of the surgical treatment of Bankart's lesion is reattachment of the labrum to the glenoid rim, deepen the glenoid concavity, restore the capsular ligamentous constraint. The purpose of present study is to evaluate functional outcome of the patients with recurrent dislocation of shoulder with Bankart lesion, treated with arthroscopic stabilization with suture anchors.

**Materials and methods**

Study population includes the patients reporting to Gandhi Medical College and Gandhi Hospital, Hyderabad, Telangana, India from July 2012 to June 2014 with recurrent dislocations of shoulders due to Bankart lesions operated with arthroscopic suture anchor stabilization technique. A sample population of 20 patients was enrolled in this study following radiological investigations and hematology and a written informed consent was taken from individual patient before enrollment.Various physical examinations including range of movement, instability test, apprehension test, relocations tests and patients were rated on Bankart scale.Patients with unidirectional anterior instability of shoulder with soft tissue Bankart's lesion with feeling of looseness and slipping were selected. Radiological investigations were performed to assess the glenohumeral instability and patients with at least three dislocations of the shoulder were included in the study.

**Inclusion Criteria**

Presence of unidirectional anterior instability of shoulder with soft tissue Bankart's lesion, which interfered with daily living. Description of dislocation or a feeling of looseness and slipping, Pain and / or apprehension when on testing for anterior instability, Radiological evidence of glenohumeral instability, and Each patient had to have suffered at least three dislocations of the shoulder are inclusion criteria.

**Exclusion Criteria**

Posterior, inferior multidirectional instability, Voluntary glenohumeral instability, SLAP (superior labrum anterior to posterior), Humeral avulsion of ligaments and Fractures involving more than 30% of articular surface of glenoid and Rotator cuff tears and damage to biceps tendon are not included in this study.

**Surgical Procedure**

Regional anesthesia was provided with interscalene block combined with general anesthesia. Patient was positioned on lateral decubitus position and arm is then suspended at 40º-50º of abduction and 10º-15º of forward flexion with sterile shoulder traction and rotation sleeve. Joint was inspected for the evidence of substantial articular injury, concomitant injury to biceps origin and rotator cuff tear along with antero-inferior aspect of labrum for the presence of Bankart lesion in all the patients.

**Arthroscopic procedure**

Following anesthesia and positioning of the patient appropriately, a spinal needle was inserted 1cm anterior to the corner of anterior acromin so as to allow it to pass into the joint in the rotator interval just anterior to biceps tendon. A small skin incision was made to insert smooth walled crystal cannula which is fitted with tapper-tip obturator. This 6mm smooth cannula was inserted into the anterior mid glenoid portal (AMGP) and the scope was inserted into the anterior superior portal; (ASP) for the anterior reconstruction. Liberator knife and shaver was used to debride frayed tissues and to mobilize anterior labrum and capsule completely from the neck of glenoid. The anterior glenoid neck was later slightly abraded to expose cancellous bone which becomes bed for the newly attached anterior labral tissues for healing. The first pilot hole for the inferior most anchors was created by inserting a 2mm drill bit with a self-stopper, through the AMGP, on the face of articular cartilage of the glenoid around the 5-o'clock position, down to the horizontal seating line. One to two additional holes were drilled along the edge of the cartilage at 4:30 and 3:30 o'clock positions depending on the extent and size of the detached labral tissue. It is ensured that the suture anchor is completely seated below the subchondral bone without risking breaking it off when inserting it in the hard bone of the glenoid. The anchor was screwed completely below the bone. This ensures that the anchor is 2mm below the subchondral bone. While removing the screw driver care should be taken to not to toggle or change the alignment. A crochet hook was inserted through the posterior cannula to retrieve one strand of the suture that exits the eyelet from the anterior inferior side of the anchor. A 45 degree curved spectrum suture hook loaded with a

shuttle relay of 1 mm prolene was inserted into the anterior mid glenoid portal, and a healthy plication stitch created through the anterior-inferior capsule tissue 1 to 2cm below the anchor 1cm lateral from the labral edge.

## Results

For this prospective study 20 volunteers were enrolled who were among the age group of 15-30 years.

**Table 1: Demographic Distribution**

| Age Group | Frequency | Percentage |
|---|---|---|
| **15-20 years** | 6 | 30% |
| **21-25 years** | 9 | 45% |
| **26-30 years** | 5 | 25% |
| Gender | | |
| **Male** | 18 | 90% |
| **Female** | 2 | 10% |
| Side Involved | | |
| **Right** | 14 | 70% |
| **Left** | 06 | 30% |

Majority of them (45%) being distributed between 21-25 years. Out of the 20 volunteers 90% of them (16 of 20 volunteers) were males and 10% were females (2 of 20 volunteers). Seventy percent of the volunteers who were recruited for this study were found to be injured with right shoulder and rest with the left shoulder

**Table 2: Stability and pain of shoulder**

| Stability | Frequency | Percentage |
|---|---|---|
| **Stable** | 06 | 30% |
| **Unstable** | 14 | 70% |
| Pain | | |
| **Discomfort** | 14 | 70% |
| **Pain** | 04 | 20% |
| **No Pain** | 02 | 10% |

It was observed that thirty percent of the patients had stable shoulders while seventy percent lacked stability in shoulders. Seventy percent of the recruited population had discomfort and twenty percent of them suffered pain while ten percent had no pain.

**Table 3: Pre op Dislocations and Number of Anchors used**

| Pre op Dislocations | Frequency | Percentage |
|---|---|---|
| **1 to 4** | 14 | 50% |
| **5 to 7** | 06 | 30% |
| **More than 7** | 04 | 20% |
| No. of Anchors used | | |
| **2 Anchors** | 08 | 40% |
| **3 Anchors** | 12 | 60% |

Patients with multiple dislocations were recruited for the current study and it was found that fifty percent of the patients suffered 1 to 4 dislocations while thirty percent of the patients had 5 to 7 dislocations and twenty percent of the patients suffered more than 7 dislocations before surgery (pre-operative). Anchors were used to stabilize the shoulder joint during surgery. Two to three anchors were used depending upon the tear of the muscle and surgical requirements.

**Table 4: Range of Motion**

| Range of Motion | Pre op | Post op |
|---|---|---|
| **ER in Adduction** | 20 | 18 |
| **ER in 90º Abduction** | 13 | 17 |
| **Cross Body Adduction** | 20 | 19 |
| **Forward Elevation** | 20 | 20 |

Range of motion was assessed in all the patients before undergoing surgical procedure and after performing the surgery. Preoperatively, 65 % (13 patients) had limitation of external rotation in 90º of abduction. Postoperatively, 17 (85%) of the 20 patients achieved full range by 1 year post surgery external rotation in 90º of abduction. 2 patients (10%) had terminal restriction of ER1 .

**Table 5: ROWE Scores**

| | ROWE Scores |
|---|---|
| **Pre op** | 46 |
| **3rd Post op Week** | 70 |
| **6th Post op Week** | 72.5 |
| **12th Post op Week** | 76 |
| **6 Months Post op** | 83 |
| **1 Year Post op** | 92 |

Total ROWE scores were assessed pre operatively and then after periodically following surgical procedure on third week, sixth week, twelfth week, six months and one year. A gradual and steady improvement in the ROWE scores was observed. Pre-operative ROWE score of 46, improved on periodic rehabilitation, to a ROWE score of 92 by the end of 1 year.

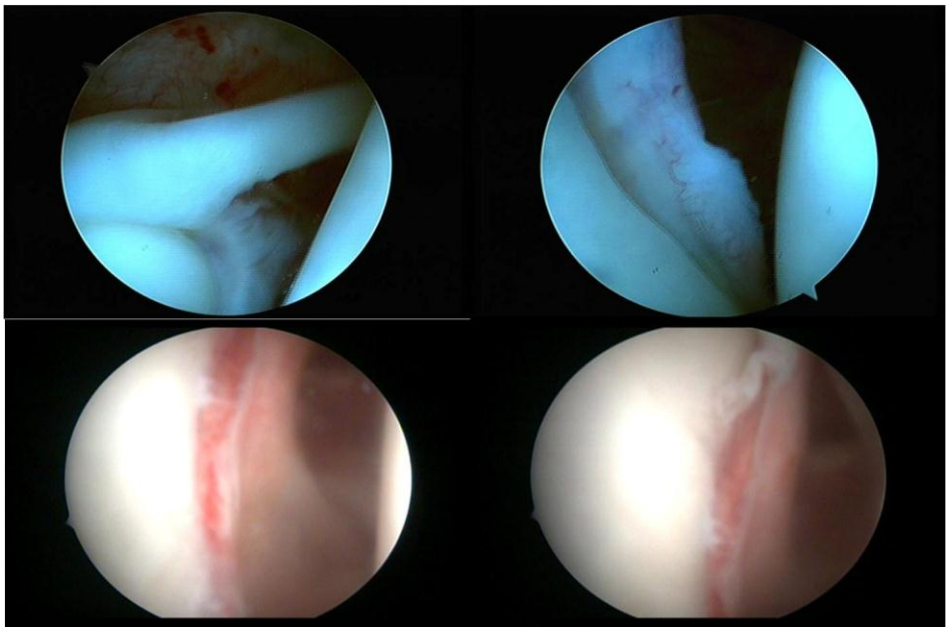

**Fig 2: Identifying Bankart's lesion**

## Discussion

Study is descriptive, retrospective and prospective study of surgical and functional outcome following, arthroscopic repair of the Bankart lesion of the shoulder with suture anchors for a period of 2 years

with recurrent dislocations of shoulders due to Bankart lesions. A sample population of 20 patients was enrolled in this study.Majority of patients were in the age group between 21 to 25 years, with mean age of 22.7 years. Most of the patients were males, 18 males (90%), and 2 (10%) females. Eleven patients were students one of the patient was house wife and eight patients were businessmen. 12 of 20 (60%) patients have occupation of high demand and 8 of 20 (40%) patients have occupation of low demand. 30% of the patients had duration less than 1 year, 50% of the patients had duration. 1-2 years and 20% of the patients had duration 2 - 3 years. Among 20 patients, 14 (70%) patients had their Right shoulder involved, rest 6 (30%) patients had Left shoulder involved. Among 20 patients, 14 patients (70%) had discomfort, 4 patients had pain (20%) and 2 patients had no pain and discomfort (10%). Among 20 patients, 14 patients (70%) had unstable shoulder joint on the . involved side and 6 patients had stable shoulder joint (30%). 50% of the patients had 1 to 4 dislocations 30% of the patients had 5-7 dislocations and 20% of the patients had more than 7 dislocations. In a study by Adla et al[2] the average age of patients at surgery was 24 (18-28) and average numbers of dislocations per patient were three**.** In a study by Daniel et al[3] recurrent episodes of dislocation were following a traumatic anterior dislocation of shoulder with an average of 4.8 episodes (range 2 to 30). In 8 of 20 (40%) of the patients 2 sutures anchors were used and in 12 of 20 (60%) of the patients 3 suture anchors. The two suture strands tied together using a. Duncan Loop sliding locking knot and the knot reinforced with multiple reversing half hitch knots. Mean follow up period was 12 months. One of the 20 patients complained of pain or sense of instability or discomfort .Daniel et al[3] in their study of the forty patients in the study, none complained of any pain or subjective sense of instability post-operatively. The mean post operative Rowe score improved to 92.75 from a pre operative. Rowe score of 45.50, with excellent in 17 patients, good in 2 and fair in 1 patient. Lenters et al[4], demonstrated that arthroscopic treatment led to a better functional result. According to Rowe score all the 20 patients had full range of motion . 19 patients out of 20 patients had full range of abduction .External Rotation in adduction (ER1) 18 of the 20 patients achieved full range by 1 year post surgery .External rotation in 90ºabduction(ER 2) 17 of the 20 patients achieved full range by 1 year post surgery . Internal rotation all the 20 patients had full range of motion Cross body adduction (CBA) all the 20 patients had full range of motion None of the 20 patients postoperatively experienced apprehension .There was no recurrence of dislocation or subluxation reported among 20 patients, during their periodical follow up to 1 year. No complications were found in study 3 previously published systematic reviews with meta-analyses comparing arthroscopic and open repair for recurrent anterior shoulder instability[4-6]All 3 reviews combined studies with a variety of study designs and outcome measures, which can lead to heterogeneity in results[7] In this review demonstrated no significant difference in recurrence rates between patients treated by open technique and those treated by arthroscopic intervention[8,9] Two studies, Bottoni et al [8] and Fabbriciani et al[9], compared arthroscopic and open repair using suture anchors, which is the current gold standard surgical technique. These studies did not show statistically significant differences in recurrence rates between the 2 treatment groups. Meta-analyses reviewing this clinical question have drawn a different conclusion. Mohtadi et al[6] documented a 2.04 odds ratio ($P$ = 0.0003) of recurrent instability in those treated arthroscopically compared with those treated by open repair. Similarly, Lenters et al[4] noted a 2.27 relative risk (RR; $P < 0.00001$) of recurrent instability, a 2.74 RR of recurrent dislocation ($P < 0.0001$), and a RR of 2.23 ($P$ = 0.002) for reoperation in patients undergoing arthroscopic stabilization compared with those treated by open technique. In a systematic review of 6 studies, Freedman et al reported that arthroscopic Bankart repair using transglenoid sutures or bioabsorbable tacks resulted in a higher rate of recurrence compared with open techniques ($P$ = 0.01)[5]. It is important to note that each of these studies contained studies that are not level I or II evidence. In addition, surgical techniques varied by study, many of which are not currently accepted treatment methods.Bacilla and associates reported on a group of high risk patients who were managed with arthroscopic suture anchor stabilization, concluded with an impressive 7% recurrence rate in a study group that consisted of 40 young athletes and labourers[10]. In a prospective study by Weber, where he compared arthroscopic suture anchor stabilization for the management of traumatic anterior glenohumeral instability compared with open Bankart repair concluded with 8% recurrence rate in the 40 patients who chose arthroscopic stabilization with decreased perioperative morbidity, increased external rotation, and an increased return to throwing sports, compared with 2% recurrence rate in the 92 patients who underwent open repair[11]. Hoffmann et al reported a study of arthroscopic shoulder stabilization using mitek suture anchors in 30 patients followed up for a period of 24 months reported with a recurrence rate of 12% and concluded that increased failure with 10 or more

dislocations preoperatively[12]. Chin khoon Tan, Linigo Guisasola, Bhuvaneshwar Machani concluded after conducting a prospective study in 130 patients with a follow up of 2 years, Arthroscopic Bankart repair and stabilization with absorbable and non-absorbable suture anchors with redislocation rate of 6% and no significant difference between usage of absorbable suture anchor to non-absorbable suture anchor[13].Nam Su Cho, Jung Chul Hwang, Yong Girl Rhee [14] concluded after conducting a study to compare the results of arthroscopic anterior shoulder stabilization with collision and non-collision athletes with mean follow up period of 62 months, in 14 collision and 15 non collision athletes with recurrence rate of 6.7% in non-collision group compared with collision group with a high recurrence rate of 17.2%.Bjourn Marquardt, Kai-Axel Witt, Christian Gotze et al concluded after studying the results of 18 patients who underwent arthroscopic Bankart repair using[15] bioabsorbable tacks for traumatic anterior shoulder instability followed up for 8 years, that arthroscopic Bankart repair for the treatment of recurrent traumatic anterior shoulder instability repair using bioabsorbable tacks offers reliable results with respect to rate of failure (5.6%), range of motion and shoulder function during a 8 year follow up. Tjoumakaris FP, Abboud JA, Hasan SA, Ramsey ML, Williams GR, [16] compared arthroscopic Bankart repair with open Bankart repair retrospectively in 93patients available for follow up out of 106 patients, with 69 arthroscopic Bankart repair and 24 open repair, following it up for a period of 24-77 months, concluded with 1 patient from each group reporting with recurrence concluded that with the improvements in the techniques of arthroscopic Bankart repair in the modern days no difference in outcomes between the arthroscopic and open groups.J. Hobby, D. Griffin, M. Dunbar, and P. Boileau did a systematic review and metaanalysis of 62 studies including 3044 arthroscopic operations concluded that the failure rates are less in arthroscopic stabilization using suture anchors and bioabsorbable tacs, compared to arthroscopic stabilization with staples and transglenoid suture technique. Arthroscopic anterior stabilization using the most effective techniques has a similar rate of failure to open stabilization after 2 years of follow up [17].

## Conclusion

We conclude that Arthroscopic Bankart's repair in recurrent anterior shoulder dislocation with suture anchors is a reliable procedure with respect to shoulder function, recurrence rate and range of movement.

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