

Original Research Article

Clinical outcome of Bankart repair with remplissage for recurrent shoulder dislocation with less than 20% glenoid bone loss

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ABSTRACT

Background: The goal was to assess the functional result and recurrence rate of anterior shoulder instability after arthroscopic Bankart's surgery with Remplissage.

Methods: This was a prospective study on 30 patients who were operated with arthroscopic Bankart's repair between April 2022 to March 2024. Pre-op scores and regular follow-up scores were taken using ROWE score, ASES score and Quick DASH for minimum duration of 6 months post-op to assess functional outcome.

Results: Mean VAS score improved from pre-op value of 7.2 to post-op value of 1.8 at the end of 6 months follow-up. Mean ROWE score improved from pre-op value of 24.6 to post-op value of 91.1 at the end of 6 months follow-up. Mean Quick DASH score improved from pre-op value of 44 to post-op value of 11.4 at the end of 6 months follow-up.

Conclusions: We conclude that the arthroscopic Bankart repair with Remplissage surgery is a beneficial and efficient remedy for anterior shoulder instability. Identifying and choosing the right patient is still crucial to the repair's effectiveness.

Keywords: Anterior shoulder instability, Arthroscopic repair, Bankart's repair, Quick DASH score, ROWE score, Suture anchors

INTRODUCTION

A broad range of motion is made possible by the shoulder joint, which enables the glenohumeral joint to serve as a stable fulcrum for positioning the upper extremity in three dimensions. The shoulder, which accounts for almost 50% of all dislocations and has a 2% incidence in the general population, is the most unstable and commonly displaced joint in the body due to its anatomy and biomechanics.¹ In particular, among young athletes and the active population, the prevalence of glenohumeral instability is increasing due to the current passion for recreation and athletic pursuits.

Trauma is the most frequent cause, and anterior instability is the most prevalent form. The gold standard for treating recurrent anterior shoulder instability is arthroscopic Bankart repair.² It gets beyond the disadvantages of open Bankart repair, including glenoid fractures, higher blood loss, postoperative discomfort, and restriction of external rotation. Additionally, the arthroscopic repair is more cost-effective, takes less time, and provides a greater range of motion after surgery.³ Numerous arthroscopic methods for shoulder stabilization have been documented, with the primary goal being the rebuilding of the capsulolabral complex with the use of intraarticular sutures and anchors.⁴

This study aimed to assess the shoulder instability recurrence rate and functional result after arthroscopic Bankart surgery.

METHODS

Study design and place

It was a prospective study carried out at KLE Jagadguru Gangadhar Mahaswamigalu Moorsavirmath Medical College and Hospital, Hubli.

Study period

The study took place from April 2022 to March 2024.

Sample size

A total of 30 cases were included for the study.

Inclusion criteria

MRI showing Bankart's lesion of the affected shoulder. All shoulders which had dislocated at least once. Initial traumatic anterior instability in a high-level athlete or high demand work activities.

Exclusion criteria

Associated rotator cuff tear, paresis of deltoid or pericapsular musculature. Large Hill Sachs lesion. Bony Bankart's lesion representing >20% of glenoid lesion. Multidirectional instability. Voluntary dislocators and epileptic patients. Connective disorders such as Ehler-Danlos, Marfan syndrome.

Remplissage procedure

It is performed if the lesion is found to be engaging with the glenoid in abduction and external rotation. Glenoid was prepared and suture anchors placed along the Bankart's lesion were retrieved and left untied. With the camera placed in the anterosuperior portal, the Hill Sachs lesion was eburnated through the posterior portal removing minimal amount of bone. A suture anchor is first placed on the inferior aspect of the Hill Sachs lesion. A grasper was passed through infraspinatus tendon and posterior capsule approximately 1 cm inferior to the initial entry site of the portal to retrieve 1 suture limb. Second anchor was then inserted onto the superior aspect of the lesion and suture was retrieved in identical fashion. Inferior sutures were tied first followed by superior sutures; this ensured that the posterior capsule and infraspinatus get sunken down into the humeral defect via mattress sutures making the lesion extra articular. This was then followed by tying the respective sutures of the Bankart lesion after tensioning, which ensures proper bipolar stabilization of both lesions.

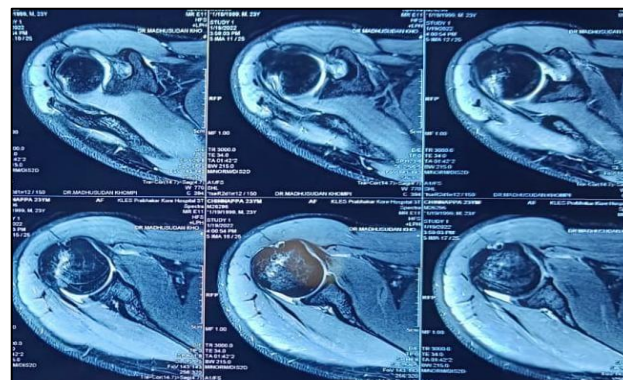


Figure 1: MRI showing Bankart with Hill-Sach tear.



Figure 2: Intra operative picture of Bankart's tear.



Figure 3: Intra operative picture of Bankart's repair.

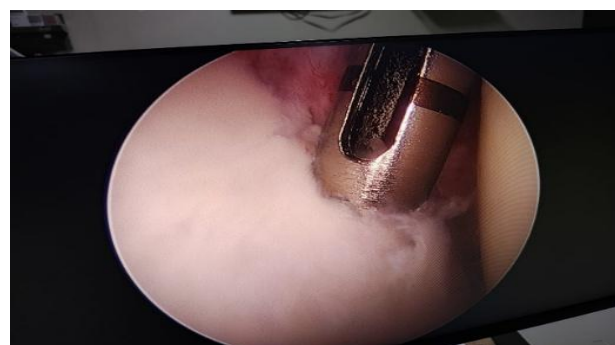


Figure 4: Bankart anchor placement at 5 o'clock position.

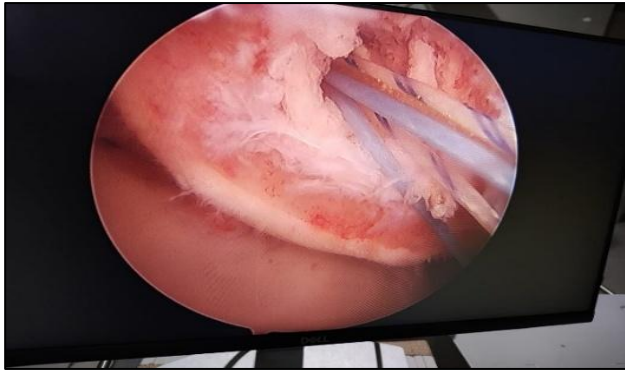


Figure 5: Remplissage procedure for Hill-Sachs lesion.



Figure 6: 6 months post operative follow up range of motion of patient 1.

Post operative rehabilitation protocol

Rehabilitation is always customized based on tissue quality, stability of repair and varies depending on individual capability. The arm was supported in a shoulder immobilizer for a period of 2 weeks.

Two weeks post-surgery main emphasis was on regaining flexion range of movement. External rotation was restricted. 1) Wean out of sling- mainly passive pendulum exercises. 2) Mobility exercises- mainly flexion. 3) Progress to active assisted movements. 4) Start isometric cuff work in neutral (pain- free and scapula stable). 5) Avoid passive stretch external rotation beyond 20°. 6) Avoid combined abduction and external rotation.

If appears to be regaining full range of movement very quickly- stop mobility work and concentrate on cuff rehabilitation.

Six weeks post-surgery

Main emphasis was on increasing muscle activity (cuff and scapula) with optimal movement patterning. 1) Range of movement should be about 75% flexion of contralateral side. 2) External rotation should be restricted still (50%

contralateral shoulder). 3) Progress cuff activity. 4) Progress scapula muscle activity. 5) Proprioceptive muscle work. 6) Not to try working or stretching shoulder into combined abduction/lateral rotation.

Three months post-surgery

Main emphasis was on power, endurance and proprioceptive muscle work aiming towards functional activities. 1) Progress resistance through range. 2) To achieve 5/5 muscle power in rotator cuff muscles and shoulder girdle muscles. 3) Stretches if necessary for functional activities, but external rotation range should remain tighter. 4) Function specific training.

Statistical analysis

The variables were tested for normal distribution using the Kolmogorov-Smirnov test following the analysis of exploratory data. Non-parametric tests were employed since not all variables satisfied the requirements for a normal distribution. The Mann-Whitney-U test was used to compare continuous variables between groups, while the chi-square test was used to compare dichotomous variables. P values were considered statistically significant if they were less than 0.05, IBM SPSS software was utilized for data recording and analysis.

RESULTS

This study was conducted to determine the functional outcome of arthroscopic Bankart repair with remplissage in anterior shoulder instability in 30 patients using suture anchors.

Table 1: Demographic details.

Variables	Numbers
Number of shoulder	30
Side (R:L)	18:12
Gender (F:M)	6:24
Age (years) ^a	28.60±08.18 (20-37)
Body mass index (kg/m ²) ^a	24.98±1.38 (22.6-27.3)

^aValues are expressed as mean±standard deviation and range in parentheses

Table 2: Quick DASH score.

Quick DASH score	Mean	SD	P value
Pre op	44	7.2	
Post op 1 month	30.4	6.4	<0.001
Post op 3 month	18.7	6.7	<0.001
Post op 6 month	11.4	5.8	<0.001

Most patients were in the age group less than 28 years. 80% of the patient were males.

18 (60%) patients had Bankart's lesion on the right side.

04 (13.3%) patients played contact sports and 20 (66.6%) patients played recreational sports.

Majority of the patients had dislocations prior to reporting.

Mean VAS score improved from pre-op value of 7.2 to post-op value of 1.8 at the end of 6 months follow-up.

Mean ROWE score improved from pre-op value of 24.6 to post-op value of 91.1 at the end of 6 months follow-up.

Mean Quick DASH score improved from pre-op value of 44 to post-op value of 11.4 at the end of 6 months follow-up.

Table 3: Modified UCLSA score.

Variables	Mean and SD before surgery	Mean and SD at 6 months from surgery	P value
Pain	4.8±1.5	8.6±1.2	<0.05
Function	5.2±2.3	8.8±1.8	<0.05
Active forward flexion	4.2±0.4	5.2±0.4	<0.05
Strength of forward flexion	4.6±0.6	5.4±0.6	<0.05
Satisfaction of patient	0	4.2±0.8	<0.001
Total	18.8±4.8	32.2±4.8	<0.001

Table 4: Complications post operatively.

Complications	Number of patients	Percentage
Superficial wound infection	1	3.3
Instability after repair	3	10
Breakage of bio screw	1	3.3
Limitation of range of motion	5	16.6
Scar dysesthesia	2	6.6

The study showed that functional outcome following Bankart's repair does not depend on number of suture anchors used but rather on adequate positioning and meticulous surgical technique of positioning the anchors along with proper patient selection.

By appropriate selection of patients along with optimum suture anchor positioning we can reduce the economic burden of the patients by reducing number of suture anchors without compromising on the final functional outcome.

According to our findings, arthroscopic Bankart repair combined with remplissage surgery is a useful and effective treatment for anterior shoulder instability. Identifying and choosing the right patient is still crucial to the repair's effectiveness.

DISCUSSION

Anterior shoulder instability is the most common form of the glenohumeral instability. Kim et al reported a 95.6% rate of anterior dislocation was caused due to trauma in their study of 500 patients.⁵ Bankart's lesion in patients with anterior instability was found in 85% according to Kim et al, and 97% according to Erkoçak et al.⁶ Similarly, our study showed that all patients with anterior instability had the Bankart lesion.

The high dislocation rate statistics during earlier times of arthroscopic repair, have gradually reduced and have now become comparable to open procedures due to the elopement of newer surgical techniques and better patient selection.⁷ The meta-analytic study conducted by Hobby et al also concluded that arthroscopic surgery using suture anchors is on par with open surgery in terms of long-term failure rate and functional outcome.⁸

The failure rate following arthroscopic Bankart repair was reported to be 7% when combined with thermal capsulorrhaphy according to Cole et al.⁸ Similarly, Tan et al reported failure rate of 7% on performing arthroscopic Bankart repair in young, athletic patient.⁹ Erkoçak et al reported a 2.5% failure rate.⁶ In 2012, Sharma et al reported no dislocations following their procedure which was in comparison with our study where none of the patients had recurrence.¹⁰ Suture anchors must be placed in appropriate number and position. Capsulolabral repair was performed using at least three anchor insertion by Karlsson et al.¹¹ On postop radiographs all suture anchors were in the correct position. Implant failure including migration, loosening and insufficiency (breaking) is not rare during surgery and postoperatively.¹² However, this was not encountered in our study. Mean limitation of external rotation movements of the shoulder post op were found to be reported as 3° by Matthews et al; 4° by Kim et al; 5° by Tjoumakaris et al and Hobby et al.¹² Similarly, mean external rotation limitation in our study was 5° in our

patients postoperatively. The instability severity index score (ISIS) was unable to predict the risk of failure after arthroscopic Bankart repair as none of the patients in the study showed recurrence of instability which was in agreement with other studies conducted by Sharma et al and Sugaya et al.^{14,15}

The addition of remplissage technique to the procedure offers bipolar stability in patients with significant Hill Sachs lesion and may contribute to higher success rates. The success of this procedure lies in choosing patients with less than 20% glenoid bone loss who are found to have an engaging Hill-Sachs lesion intra-op. Nowadays, after the concept of the glenoid track was developed by Kamath et al, a 3D CT scan of the affected shoulder can itself be used to determine whether the Hill-Sachs lesion is “on-track” or “off-track” and helps in determining the need for the remplissage procedure.¹⁶ However, we find that demonstration of an engaging Hill-Sachs lesion under direct visualization using an arthroscope after the patient is induced, is one of the best methods to determine the need for the remplissage procedure. According to Boileau et al the main contraindications of an arthroscopic Bankart repair are patients who have significant bone loss either on the glenoid or the humeral head side and patients with ligamentous hyperlaxity.¹⁷ They also found the number of fixation points to be a factor in determining the success of the repair and recommended a minimum of suture anchors to be used. This was in agreement with the study conducted by Connolly et al who concluded that type of anchors, number of anchors, and presence of bony Bankart lesion did not influence functional outcome.^{18,19} Thus, we hypothesize that proper patient selection and adequate positioning of the anchors with meticulous surgical technique is more important in determining the functional outcome.

It is important to acknowledge the limitations of this study. The findings’ statistical power and generalizability may be constrained by the comparatively small sample size of 30 patients. Furthermore, the six-month follow-up period might not be sufficient to thoroughly assess recurrence rates and long-term functional outcomes. Additionally, it is difficult to evaluate the effectiveness of arthroscopic Bankart repair with remplissage in comparison to other surgical or non-surgical therapy methods due to the lack of a control group.

CONCLUSION

We conclude that the arthroscopic Bankart repair with remplissage surgery is a beneficial and efficient remedy for anterior shoulder instability. Patient identification and selection remains the key in determining the success of the repair.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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