

Functional Outcome of Arthroscopic Bankart and Remplissage for Recurrent Anterior Shoulder Dislocation in a Tertiary Care Trauma Center

Sudeep Khanal,¹ Bijay Bhujel,¹ Sijan Bhattachan,¹ Rajram Maharjan,¹

¹Department of Orthopaedics and Traumatic Surgery, National Trauma Center, Mahankal, Kathmandu, Nepal

Correspondence:

Dr. Bijay Bhujel
Department of Orthopaedics and Trauma Surgery,
National Trauma Center, Mahankal, Kathmandu, Nepal
Email: bijaybhujel142@gmail.com
Phone: +9779849183464



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ABSTRACT

Introduction: Arthroscopic Bankart repair is treatment of choice for anterior shoulder instability. The bipolar bone loss with involvement of glenoid bone loss and Hill Sach's defect gives rise to the concept of glenoid track (on-track and off-track). Off-track HS lesion can engage with the glenoid margin, compromising the Bankart repair. Therefore the off-track lesion needs remplissage which requires transfers of the posterior capsule and infraspinatus tendon into the Hill-Sachs defect preventing engagement of the lesion thus avoiding recurrence of instability. The objective of this study was to evaluate the functional outcome of Arthroscopic Bankart and Remplissage for recurrent anterior shoulder dislocation.

Methods: This was a descriptive cross-sectional study conducted in a patient admitted with anterior shoulder instability for bankart repair and remplissage from 2021 to 2023 in National Trauma Centre after institutions review board approval. Data were taken from the hospital records. Patient fulfilling the inclusion criteria who underwent arthroscopic Bankart repair and Remplissage were assessed using American Shoulder and Elbow Surgeons score and Rowe score, Range of motion. Statistical analysis was performed using SPSS.

Results: Out of the total 110 patient with anterior shoulder instability, 30 (27.27%) (20.3% to 34.3% at 90% Confidence Interval) patients had bankart lesion. Out of 30 patient, 18 (60%) were male with fall injury being the most common mode of injury 15 (50%). The mean Rowe score and American Shoulder and Elbow Surgeons score were 93.67 ± 2.24 and 88 ± 7.23 respectively at the end of 2 year follow up with decreased external rotation in all patients.

Conclusions: Arthroscopic Bankart repair with Remplissage offer favourable outcome with compromised external rotation.

Keywords: bankart repair; remplissage; shoulder instability.

INTRODUCTION

Arthroscopic Bankart repair is treatment of choice for anterior instability with glenoid bone loss less than 15%.¹ But, there is high chance of recurrence only with bankart repair only.¹ The bipolar bone loss i.e involvement of glenoid bone loss and Hill Sach's (HS) defect gives rise to the concept of glenoid track (on-track and off-track).² Off-track HS lesion can engage with the glenoid margin, jeopardizing the Bankart repair and thus resulting in recurrent instability. Therefore the off-track lesion needs remplissage.³ This remplissage technique transfers the posterior capsule and infraspinatus tendon into the HS lesion to prevent engagement of the lesion on the glenoid rim.⁴

There are limited studies in our settings which also underscores the importance of this study in contributing to the existing body of knowledge in our local context.

This study aimed to find out the functional outcome of this procedure using American Shoulder and Elbow Surgeons (ASES) and ROWE score.

METHODS

This was a descriptive cross-sectional study conducted in a patient admitted with anterior shoulder instability for Ban-

kart repair and Remplissage from 2021 to 2023 in after ethical approval from National Academy of Medical Sciences institutions review board (IRB) (ref:1448/2081/82) and the informed consent of the patient. Inclusion criteria included traumatic unidirectional recurrent anterior instability, anterior glenoid bone defect of less than 20% confirmed by computed tomographic (CT) scan with off-track HS lesion, patients that have undergone the standard rehabilitation protocol with a minimum follow up of 2 years. Exclusion criteria included dislocation of shoulder other than anterior type, patients with habitual dislocations, Patients with multidirectional instability, associated rotator cuff pathology, associated SLAP lesions, Anterior glenoid bone loss exceeding 25%, humeral avulsion of glenohumeral ligament (HAGL) or reverse HAGL lesion, History of epilepsy or psychological disorder on treatment, revision cases of bankart repair with or without remplissage. The hospital data were taken for the study.

The sample size was calculated by using formula:

$$n = Z^2 \times p \times q / e^2$$

$$= 1.64^2 \times 0.5 \times 0.5 / 0.07^2$$

$$= 96$$

Where,

n= required sample size

Z= 1.96 at 95% Confidence Interval

p= prevalence of patient with anterior shoulder instability

q= 1-p

e= margin of error

The calculated sample size is 96. However, 110 sample were taken for the study.

All patients who met the inclusion criteria that were operated for anterior shoulder instability with Bankart repair and Remplissage from 2021 to 2023 were followed up in the study duration. Patients' data was taken from hospital record. The preoperative X-ray, records, MRI and CT scan were evaluated. The clinical data were recorded in a standardized shoulder proforma, which remained in the inpatient medical record and was accessed for the demographic and clinical details of the patient during the study.

All the surgeries were performed by a single senior surgeon. After appropriate anesthesia (general or scalene block or both), the patient was positioned in the sloppy lateral position. After standard preparation and draping, diagnostic arthroscopy was performed from the posterior portal. The anterior labral lesion, glenoid bone defect,

and HS lesion were noted. Following the diagnostic arthroscopy, the scope was shifted to the anterosuperior portal. If remplissage was planned for patients with the off-track lesion, another posterolateral portal was made adjacent to the standard posterior portal using a 16-gauge cannula needle that was aimed over the HS lesion to determine the correct entry point for trans-infraspinatus tendon insertion of the anchor. A rasp followed by a burr was used to gently decorticate the surface of the HS lesion. Mostly one or rarely two 3.5-mm double loaded anchor were inserted adjacent to the medial margin of the HS lesion through the posterolateral portal. With 45° bird beak tissue penetrator through the posterolateral portal, mattress bites were taken penetrating the infraspinatus tendon for each pair of the suture. After the bites were taken, the sutures were left untied. Then, the focus was shifted to the anterior labral lesion. After the standard elevation of the labrum and glenoid margin preparation, a standard Bankart repair was performed using 3-4 anchors depending on the extent of the lesion. Once the labral repair was completed, the remplissage sutures were tied from the posterolateral portal. The portals were closed, and the dressing was applied.

The shoulder was kept in an arm sling for a month. Gentle passive shoulder mobilization was initiated on postoperative day 1 along with cuff and scapular isometric strengthening exercises. The sling was discarded at the end of 4 weeks followed by active mobilization of the shoulder and was continued till the end of 12 weeks. Advanced shoulder girdle strengthening with resistance band was initiated from 13th week onward and terminal stretching by 16 weeks. The return to sports was allowed only after 10 to 12 months once the physiotherapist gave a clearance regarding the return of ROM and strength of the shoulder.

The outcome was assessed using ASES score, Rowe score only at last follow-up, which was at a minimum of 2 years. Range of motion. Preoperative physical examination conducted. Shoulder function was evaluated by American Shoulder and Elbow Surgeons (ASES) score, and Rowe score.^{5,6} The percentage of the glenoid bony defect or glenoid rim fracture was calculated using the method described in the study done in 2005 on the "en face" view, which was reconstructed by preoperative 3-dimensional CT.⁷

The statistical analysis was done by using SPSS (Statistical Package for Social Sciences, version 20). Descriptive statistics like frequency, percentage, mean, standard deviation was used to assess the parameters such as age, gender, mechanism of injury, frequency of dislocations, and recurrence. Functional outcome was measured by using Rowe score and ASES score

RESULTS

Out of the total 110 patient with anterior shoulder instability, 30 (27.27%) (20.3% to 34.3% at 90% Confidence Interval) patients had bankart lesion. Thirty-four patient had undergone arthroscopic Bankart repair with or without Remplissage during the study period however four patient lost to follow up hence only thirty patient were included in this study.

The mean age of the participants was thirty five years. Out of total thirty patient, twelve (40%) were female whereas male patient comprised of eighteen (60%) of total cases. (Table 1)

Table 1. The demographic profile of patient with anterior shoulder instability (n=30)

Variables	n (%)
Sex	
Male	18 (60)
Female	12 (40)
Age group	
18-25	6 (20)
26-40	15 (50)
41-55	9 (30)

The most common mechanism of anterior shoulder instability was fall injury fifteen (50%) followed by RTA which compromised eight patient (26.67%) (Table 2)

Table 2. Mechanism of injury of patient with anterior shoulder instability

Mechanism of Injury	n (%)
RTA	8 (26.67)
Fall	15 (50)
Others	7 (23.33)

All patient undergoing arthroscopic Bankart repair and Remplissage had loss of range of motion while two patient (6.67%) had recurrent shoulder dislocation and three patient (10%) had stiffness. No infection was noted following arthroscopic Bankart repair and Remplissage. (Figure 1)

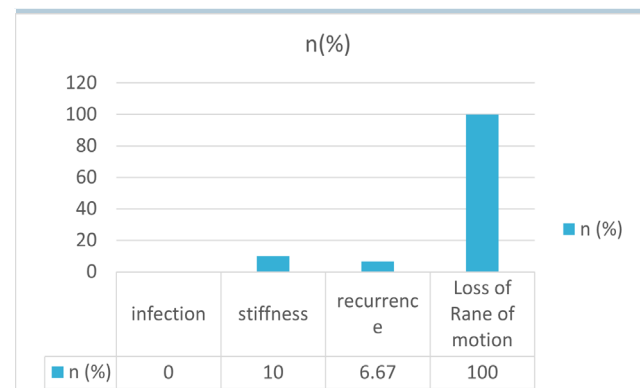


Figure 1. Complication of patient following arthroscopic Bankart repair and Remplissage.

Rowe score of patient undergoing arthroscopic Bankart repair and Remplissage calculated at the end of 2 year follow up was 93.67 ± 2.24 . ASES score of patient undergoing arthroscopic Bankart repair and Remplissage calculated at the end of 2 year follow up was 88 ± 7.23 .

DISCUSSION

Arthroscopic Bankart repair is treatment of choice for anterior shoulder instability. However there are limited studies in our settings. The mean ROWE score calculated in our study was 93.67 ± 2.24 at the end of 2 year follow up which is similar to the study published in 2018 (90.16), 2019 (92.1 ± 6.4) and 2022 (range 70-100).⁸⁻¹⁰ The similarity in our finding is due to involvement of similar age group of patient and in both studies patient underwent Bankart repair along with Remplissage.(not Bankart alone).

However the ROWE score calculated in study published in 2024 was 76.63.¹¹ This discrepancy may be due to their earlier calculation of Rowe score i.e. at the end of three month in contrast to our study which was assessed at the end of 2 year.

The mean ASES score calculated in our study was 88 ± 7.23 at the end of 2 year follow up which matches the finding in study published in 2024 (89.64) and study published in 2019 (range 85-100).^{9,11} However study published in 2011(92.5) showed higher ASES score as compared to our study due to longer duration of follow up as compared to our study.¹²

The mean age of the participants was 35 years with male comprising 60% of total cases. These finding are similar to finding of a study published in 2018, 2022, and 2019 al.^{8,13,14} This similarity in finding is due to involvement of adolescent male patient in manual, sporting activity as compared to female patient.

Most common mode of injury is fall injury and RTA which matches with the finding of other similar study conducted around the globe.

Two patient in our study had recurrent shoulder dislocation because of second injury following RTA and physical assault and they are managed accordingly. While no patient had infection following surgery. Interestingly almost all patient in our study had decreased ROM post operatively this may be attributed to Remplissage procedure which limit external rotation and patient may also be apprehended for external rotation motion resulting in decreased external rotation motion.

Considering other variables, we have found less blood loss, no fluoroscopy, shorter duration of operation and smaller incision in Arthroscopic Bankart repair and Remplissage technique. Radiologically all patient had off track lesion in CT scan finding and had more than 5 episodes of shoulder dislocation prior to Arthroscopic Bankart repair and Remplissage technique.

The limitation of this study is its small sample size. And

also due to presence of technically less demanding and cheaper open surgical procedure like Laterjet procedure many patient underwent Laterjet procedure. And not to forget the COVID pandemic decreasing the patient flow as well as irregular follow up in our study centres. Record keeping of all the patients were not up to date leading to difficulty in assessing the patient as a whole.

CONCLUSIONS

Arthroscopic Bankart repair with Remplissage offer favourable outcome with compromised external rotation.

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Conflict of Interest: None.

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