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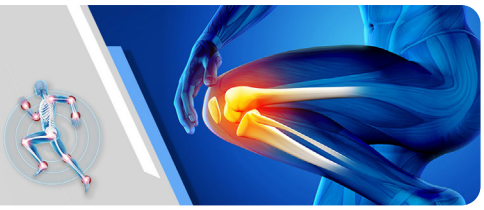

Results of Arthroscopic Repair of Bankart Lesion in Chronic Anterior Instability of the Shoulder

Halder RC[1*], Rahaman SK[1], Khan MMR[3], Mamun MBA[1], Faruqe O[1], Islam MS[2], Hoque M[1], Rashid MMO[2], Hossain GMJ[2]

Abstract

Background: The shoulder is the most commonly dislocated major joint, affecting roughly 2% of the general population. Long-term studies have demonstrated a correlation between the number of instability episodes and the risk of degenerative arthritis. In an effort to treat the unstable shoulder, orthopedic surgeons have described several different operations that may help to prevent recurrent subluxation or dislocation in chronic instability cases. This study has been undertaken to assess the short-term functional outcome of Arthroscopic repair of Bankart's Lesion in patients with Chronic Anterior Instability of the Shoulder using Constant Murley's Score.

Material and Method: This prospective observational study was carried out at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), from July 2017 to June 2019. Twenty cases of chronic anterior shoulder dislocation meeting the inclusion and exclusion criteria were taken in this study and underwent arthroscopic repair of bankart lesion. Here, 3 or 4 anchors were used. Cases were followed up for 6 months. The outcome was assessed with Constant Murley Scoring.

Results: The mean age was 26.716.83 years with a male predominance (95%). Most cases were students (50%) and the main cause of injury was sports (50%). The mean recurrence number was 10.65 ± 4.75 times and was significantly associated with decreasing age. The mean interval between 1 injury and surgery was 3 ± 1.89 years. Bankart lesions were found in 20% of cases in pre-operative imaging. At the final follow-up, 2 (10%) cases of limited movement were found. In 18 (90%) cases, 3 anchors were used. Finally, there was significant improvement regarding pain status, activity of daily living, forward flexion, abduction, external rotation, internal rotation and power of shoulder muscle. In the last follow-up, 2 (10%) cases of limited movement were found. The mean CMS pre-operatively and post-operatively were 63.05 ± 5.23 and 88.25 6.29 respectively ($p<0.05$). In the final outcome, 16 (80%) scored excellent, 3 (15%) were found good and 1 (5%) was found poor.

Conclusion: It may be concluded that arthroscopic Repair of Bankart Lesion with suture anchors in chronic anterior instability of the shoulder is a safe surgery regardless of shoulder function or range of motion.

Keywords: Arthroscopic; Repair; Chronic Anterior Instability; Bankart Lesion

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Introduction

Shoulder instability and its treatment were described even in ancient times by Greek and Egyptian physicians. Evidence of shoulder dislocation has been found in archaeological examinations of human shoulders several thousand years old [1]. This problem can be particularly troubling to patients by causing them pain, weakness and shoulder dysfunction. The shoulder is considered the most commonly dislocated joint in the human body accounting for almost half of all joint dislocations with a reported incidence of 17 per 100000 per year [2-4]. Bankart published a paper in 1920 noting that dislocations cause the humeral head to press anteriorly out of the glenoid cavity, tearing the fibro cartilaginous labrum as well as the capsule and periosteum from the anterior aspect of the neck of the scapula [5]. This traumatic detachment of the glenoid labrum has been called the Bankart's lesion. Bankart described the detachment of the anterior inferior labrum from the glenoid rim as a cause of anterior instability [5]. The shoulder is the most commonly dislocated major joint, affecting roughly 2% of the general population. Eighty percent of shoulder dislocations are anterior, with 10% posterior and 10% multidirectional. Males are affected to a higher degree than females, at a ratio of 3:1 [6,7]. The young athletic population makes up the largest portion of patients with shoulder instability, and when treated non-operatively, has a recurrent dislocation rate approaching 71% [8-11]. Long-term studies have demonstrated a correlation between the number of instability episodes and the risk of degenerative arthritis [12-14]. Shoulders with recurrent instability that are not treated have a higher prevalence of moderate and severe arthropathy than those that are treated surgically [13]. Thus, definitive treatment of instability is crucial not only in ensuring a return to function but as a means of decreasing the incidence of degenerative arthropathies. Early surgical treatment reduces recurrence rates and improves functional outcomes in young adults engaged in physical activities [15-17]. The overall goal of treatment is to repair the capsulolabral ligamentous complex to restore glenohumeral stability and surgical intervention reduces the risk of recurrence to only 6% to 23% [18-20]. In an effort to treat the unstable shoulder, orthopedic surgeons have described several different operations that may help to prevent recurrent subluxation or dislocation. But the optimal surgical treatment of recurrent traumatic anterior shoulder instability remains a debated topic. Numerous studies have demonstrated the functional importance of the anterior-inferior capsular labral structures in maintaining glenohumeral joint stability across a wide range of motion [21-24]. These findings highlight the relevance of the Inferior Glenohumeral Ligament/ Labral Complex (IGLLC) in delivering a stabilizing force, particularly when the knee is abducted and externally rotated. Several procedures have emerged as viable options for treating chronic anterior shoulder instability. In this country, the Bristow Latarjet, Bankart, Putti-Platt, and Magnuson-Stack processes are prevalent, with a regional predilection for a specific technique. The Bristow-Latarjet procedure has been modified multiple times; yet, the recurrence rate in two major series has been between 8.5 and 13 percent [25-27]. Other problems with this repair have been limitations in external rotation and muscle weakness [26]. The Putti-Platt procedure has a reported recurrence rate ranging from 0% to 12.5%, and a recent report by Hawkins revealed that glenohumeral osteoarthrosis can develop as a late complication in patients undergoing this procedure [27,28]. The functional results of the Magnuson-Stack procedure have been less satisfactory, a common complaint being the loss of external rotation, and thus, limitations in returning to overhead activities [29]. Bankart repair, also known as anatomic repair, is currently the treatment of choice according to various surveys of surgeons, with >90% of surgeons choosing the Bankart procedure as the initial repair for recurrent instability [30-32]. Repair of Bankart Lesion procedures has greatly advanced in the 90 years since Bankart first characterized this lesion. For years, open Repair of Bankart Lesionwas the gold standard, with success rates ranging from 75% to 100%; however, postoperative complications such as restriction to external rotation and secondary osteoarthritis were concerns [33-36]. The popularity of the open Repair of Bankart Lesion has evolved into the development of arthroscopic Bankart repair. It gained popularity since it began almost 30 years ago because of improved arthroscopic equipment and increased experience of surgeons [37-39]. Compared with open Bankart repair, arthroscopic Repair of Bankart Lesion gives the potential advantages of smaller skin incisions, more complete inspection of the Glenohumeral joint with access to all areas of the joint for repair, shorter surgical times, less postoperative pain, decreased blood loss, decreased narcotic usage, reduced hospitalization time, improved shoulder motion and a decreased risk of complications with maximum preservation of external rotation [40-46]. However, several early studies comparing open Repair of Bankart Lesions and arthroscopic procedures suggest a poorer prognosis in the arthroscopic groups, with recurrence rates of up to 34% [47]. These initial studies are based on older methods of fixation including staple capsulorrhaphy and transglenoid suturing. Arthroscopic techniques have advanced with techniques that more closely resemble the open procedure. The primary modification of the arthroscopic technique, accurate placement of suture anchors, has resulted in a significant decrease in recurrence after arthroscopic stabilization. Recent papers have indicated steadily decreasing rates of recurrence with the arthroscopic repair of Bankart lesions, ranging from 4% to 17% when suture anchors are used [48-53]. This study has been undertaken to assess the functional outcome of Arthroscopic repair of Bankart's Lesion in patients with anterior recurrent shoulder dislocation using Constant Murley's Score (1987) (CMS).

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Objectives

General Objective:

- To evaluate the outcome of Arthroscopic Repair of Bankart Lesion for the treatment of chronic anterior instability of the shoulder joint

Specific Objectives:

- To evaluate the clinical improvement regarding anterior instability of the shoulder
- To see the functional outcome
- To observe the complications of the procedure

Methodology and Materials

This prospective observational study was carried out at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), from July 2017 to June 2019. Twenty cases of chronic anterior shoulder dislocation meeting the inclusion and exclusion criteria were taken in this study and underwent arthroscopic repair of bankart lesion. Here, 3 or 4 anchors were used. Cases were followed up for 6 months. For statistical analysis, SPSS version 20 was used as a statistical tool. The final outcome was assessed using the Constant Murley's Score (CMS).

Inclusion criteria

- Patients aged 17-45 years old
- Clinically diagnosed chronic anterior dislocation or subluxation of the shoulder joint.
- Instability severity index score <6
- MRI and other imaging showing Ant or Ant-inferior capsulolabral injury or Hill-sacks lesion <20%

Exclusion criteria

- Revision Bankart's
- Habitual or voluntary anterior instability
- Recurrent dislocation with osteoarthritis and rotator cuff tear.
- Previous history of shoulder surgery
- Large glenoid fracture or Hill Sachs lesion.
- Patients with MDI (multi-directional instability).
- Patients with neuromuscular disorders.

Results

During this study, a total number of 20 patients with chronic anterior shoulder dislocation who fulfilled the inclusion criteria for this thesis were selected (Figure 1-6). Patients were treated operatively by arthroscopic Repair of Bankart Lesion. All patients were followed up for 6 months. In this series, the following results were obtained (Table 1-3).

Table 1: Distribution of cases according to Age in year (N=20).

Characteristic	Frequency	Percentage (%)
Age in year		
16-22	6	30
23-29	9	45
30-36	3	15
37-43	2	10
Total	20	100
Mean ± SD	26.7 ± 6.83	100

Figure 1: Distribution of the participants by Gender.

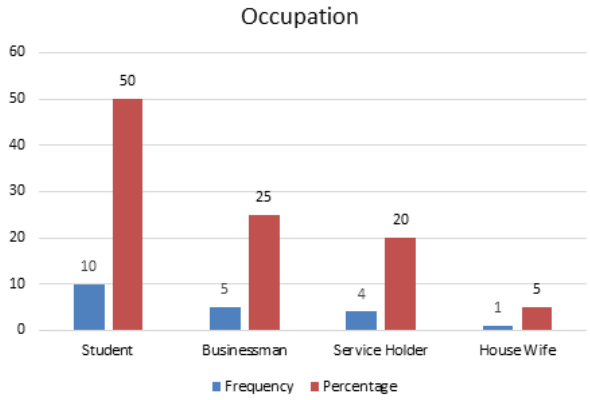

Figure 2: Distribution of the participants by occupation.

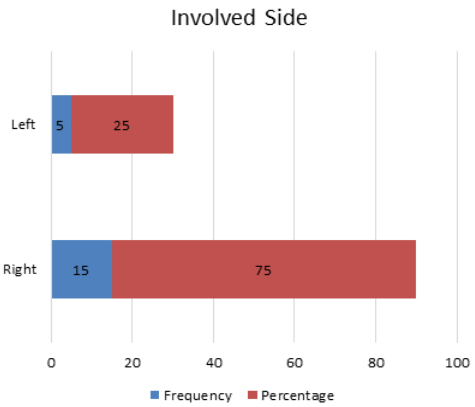

Figure 3: Distribution of Participants by involved side (N=20).

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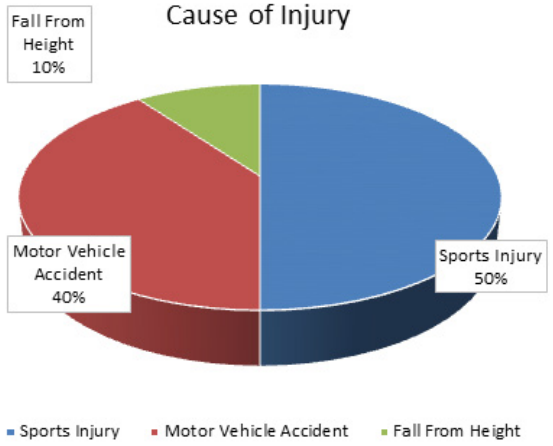

Figure 4: Distribution of participants by cause of injury (N=20).

Table 2: Distribution of cases according to Length of immobilization after 1st dislocation, Frequency of recurrence and MRI findings of study patients (N=20).

Characteristic	Frequency	Percentage (%)
Length of immobilization after 1st dislocation (in days)		
0-5	7	35
45205	13	65
Total	20	100
Mean ± SD	5.55 ± 3.12	
Frequency of recurrence		
4-9	9	45
42278	7	35
16-21	4	20
Total	20	100
Mean ± SD	10.65 ± 4.75	
MRI findings		
Hill Sachs	12	60
Bankart	8	40

Table 3: Distribution of cases according to complications and anchor used of study patients (N=20).

Characteristic	Frequency	Percentage (%)
Complications		
No Complication	18	90
Limited movement	2	10
Total	20	100
Number of anchors used		
3	18	90
4	2	10
Total	20	100

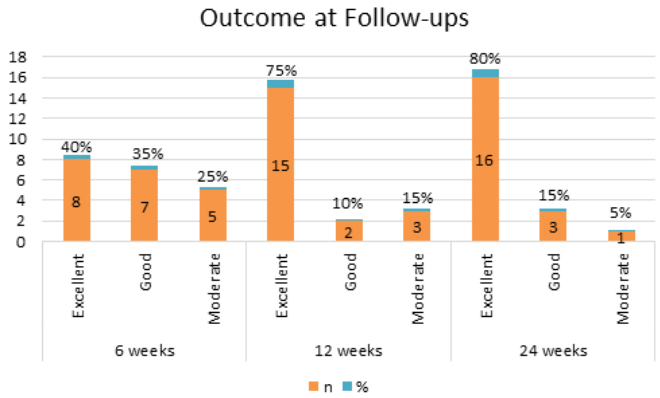

Figure 5: Outcome of patients according to CMS score at different follow-ups (N=20).

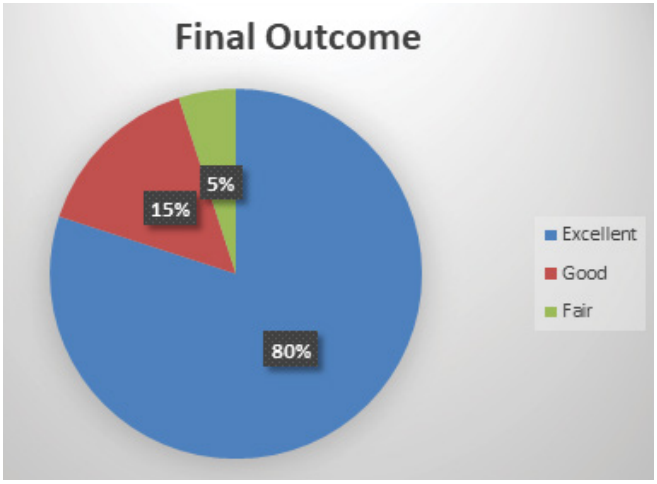

Figure 6: Final outcome at the last follow-up (N=20).

Discussion

Recurrent dislocation is the most common complication of traumatic anterior instability of the shoulder joint. The incidence of the recurrence rate in most reported literature was high in the young age group which was up to 71% [8-11]. In case of Multi-Directional Instability (MDI), multidirectional support is needed which cannot be repaired by arthroscopic procedure. So, this was excluded from the present study. In the present study, the mean age was 26.74 ± 6.83 years, ranging from 17 to 42 years. Maximum age incidence was found in 23-29 years of age (45%, n-9). Six cases (30%) in the 16-22 years age group. 3 (15%) in the 30-36 age group and 2 (10%) cases were found in the 37-43 age groups [54,55]. In another study by Jiang et al. [56] a total of 50 cases of chronic anterior shoulder dislocation were studied where the mean age of the cases was 27.6 years ranging from 16 to 50 years [54]. Also supported by the study of Itoi et al. [8]. where they concluded that the young athletic population makes up the largest portion of patients with shoulder instability. Out of 20 patients 19 (95%) were male and only 1 (5%) was female, with a male-female ratio of 19:1. So, male patients were predominant in this study. This

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was supported by another previous study where they found a male-female ratio of 3:1.6 However, Owens et al. [6] carried out their epidemiological study among the military personnel of the USA; the possibility of selection bias cannot be ruled out. In the study which was carried out among the urban population of Sweden, Kroner et al. [4] found almost similar prevalence among both genders (male 53.7%). Although incidence peaks were detected in the age groups 21-30 years for men and 61-80 years for women. As a result, among the younger population, males are the most likely to suffer from a repeated shoulder dislocation. The higher percentage of male cases in this study is much more than in any other studies, which can be explained by the fact that even in the present century, males were more involved in activities requiring overhead heavy movement of the shoulder in our country. Regarding occupation of the cases, 10 (50%) were students. 5 (25%) were businessmen, 4 (20%) were service holders and the rest 1 (5%) was a housewife. It was expected from the mechanism of injury that manual workers should be the predominant sufferer of this injury [62], though the present study could not include even a single case of the manual worker. The possible explanation is that the higher cost of the used anchors restricts the low-income group of people to choose this procedure. Among 20 patients 5 (25%) had left-sided and 15 (75%) had right-sided chronic shoulder dislocation. the left shoulder involved patients were non-dominant and right-sided patients were dominant. The higher incidence of the dominant side is not known, but suppositions are that direction of violence, and lack of coordination may play a part in the etiology. Regarding the causes of 1 injury, out of 20 patients, 10 (50%) had a sports injury, 8 (40%) had a motor vehicle accident and 2 (10%) had a history of falls from height. This data supports the proposition that young adults engaged in physical activities are the predominant sufferer [15]. In this series, out of 20 cases, during the first incidence, 7 (35%) were immobilized between 0 to 5 days. The rest 13 (65%) were immobilized for between 6 to 10 days. No association between the duration of immobilization and functional outcome is seen in this study. Again, the risk of recurrence was assessed by several authors who found no relation between the duration of the first immobilization and the rate of recurrence [55,56]. In 9 (45%) cases, dislocation recurred 4-9 times before surgery. Seven (35%) cases recurred 10-15 times and the rest 4 (20%) recurred 16-21 times previously. When the age of cases was less or equal to 22 years, the mean number of recurrences was 12.33 ± 3.39 times. But, when the age was greater than 22 years, the mean number of recurrences was 9.93 ± 15.17 times. Their series showed that the age of 20 years was the most important risk factor for recurrence [55]. Randeli et al. [59] also showed in the series that age below 22 years was significantly associated with recurrence. Among 20 cases, most of the cases (55%, n=11) were operated within 1 to 2 years of 1 event. Eight (40%) cases were operated within 3 to 5 years of the event. The remaining 1 (5%) case was operated on after 5 years of the initial event. The mean interval was 3 ± 1.89 years. In the series of Jiang et al. [56] the average time between the first dislocation and surgery was 57.9 months (range, 0.9-290 months) which was quite similar to the current study.54 No association was found between the duration and outcome. After radiological evaluation (X-ray and MRI) evaluation pre-operatively, the Hill Sachs lesion was the predominant lesion (60%, n-12) found among the cases. Bankart lesion was found in 8 (40%) cases. In the series of Voos et al. [60] they found 44% of cases of Hill Sachs lesions. In a systemic review and meta-analysis of 8 studies, found Bankart lesion in 21% of cases of recurrent anterior shoulder dislocation [33]. Though the result is similar to the present study, there are several studies, where Bankart lesions were the predominant lesion in chronic anterior shoulder dislocation. Such as, in the series of Kim et al. [61] they found Bankart lesions in 61% of their cases.58 Again, no difference was found in the outcome between the type of lesions. Regarding complications of the patients, 2 (10%) cases of limited movement were found. The rest 18 (90%) showed no complications. There were no infections, neuropathies, or implant failures. As the follow-up period was only 3 months, no cases of recurrence were found which is the most common complication after surgery [33,57,59] During surgery, in 18 (90%) cases, 3 anchors were used. In the rest 2 (10%) cases, 4 anchors were used. In the study of Voos et al. [60] 7 (10%) were treated with 1 anchor, 18 patients (25%) with 2 anchors, 39 (53%) required 3 anchors, and 9 (12%) required 4 or more anchors. In the present study, the use of 4 anchors was not needed and no cases could be stabilized with 1 anchor. Outcome of the study was reached by using the Constant Murley score [60]. To reach the score, pain status, daily life activity, shoulder movement, and functional ability were assessed both pre-operatively and finally using the Constant

Murley tool. In this study, the mean pre-operative pain score was 10.8 ± 2.09. Finally, the pain status improved to a mean score of 13.75 ± 1.74. This improvement is significant (p-value <0.05). Pain status had not decreased even in a single case suggesting that the anchor was not malpositioned as it is the most common cause of pain in arthroscopic repair of bankart lesions [61]. The mean pre-operative activity of daily living score was 15.4 ± 1.31. After 6 months of operation, the activity of daily living status improved to a mean score of 18.25 ± 0.97. This improvement was significant (p-value <0.05). In the series of Jiang et al. [56] the mean post-operative daily living score was 17.87 ± 1.54 which was similar to the present study. The mean forward flexion was 104.25:15.83 degrees. Finally, the forward flexion improved to a mean score of 136.25 ± 19.05 degrees. This improvement is significant (p-value <0.05). Their study showed mean pre-operative forward flexion was 167.6 ± 18.5 degrees which was significantly improved to 1704.7 degrees finally [54]. The mean abduction was 101.5 ± 12.99

degrees. Finally, the abduction improved to a mean score of 140.75 ± 17.64 degrees. This improvement was significant (p-value <0.05). Again, in the series of Leroux et al. [65] they showed significant improvement in shoulder abduction post-operatively [62]. The mean external rotation score was 5.6 ± 1.04. Finally, the external rotation score status improved to a mean score of 8.2 ± 0.89. The mean internal rotation score was 5.9 ± 1.02. Finally, the internal rotation score status improved to a mean score of 8.1 ± 0.79. In both variables, improvement was significant (p-value <0.05) [63,64]. The score was activity-based, not in degree. Other several studies measure external rotation in degrees such as in the series of the mean post-operative external rotation was 56.56 ± 116.6 and degrees [54]. No study is found to measure the external rotation based on activity. But internal rotation was measured in a scoring system in different literature. In the series of Leroux et al. [65] the mean postoperative internal rotation score was 9.3 ± 1.1 [62]. The mean power score was 14.45 ± 4.9. Finally, the power score status improved to a mean score of 22.75 ± 43.99. This improvement was significant (p-value <0.05). Jaju et al. [66] measured the power with UCLA score and found mean post-operative power was 118.33 ± 4.8 which was not significantly improved than its pre-operative status. As in their study, immediate post-operative power was measured instead of measuring it finally, the improvement was not significant. The mean total Constant Murley score was 63.05 ± 5.23. Finally, the power score status improved to a mean score of 88.25 ± 6.29. This improvement is significant (p-value <0.05). The weighted average of the mean Constant Murley score of 3 studies was 78.6 also after a significant improvement.64-66 In the series of Jiang et al. [56] the mean post-operative Constant Murley score was 97.7 ± 42.7.54 The discrepancy in the final score can be explained by the fact that this scoring criterion varies among observers which is a drawback of this criterion [9]. Among the 20 cases, 16 (80%) scored excellent as per Constant Murley criteria finally. Three (15%) were found good and 1 (5%) was found fair. This outcome suggests that in selected cases, arthroscopic repair of bankart lesions is an effective tool to manage chronic anterior shoulder dislocation [66].

Conclusion and Recommendations

It may be stated that arthroscopic Repair of Bankart Lesion with suture anchors in recurrent anterior shoulder dislocation is a safe operation in terms of shoulder function and range of motion. Based on the findings of this study, it is suggested that a long-term study with a high sample size and a longer follow-up period be conducted, as well as a multi-centric study, which is ideal.

Limitations of the study:

The study sample was small to draw a conclusion and long-term outcomes could not be assessed.

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Self

Conflict of interest

None

Ethical approval

Yes

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