Original Article

Similar functional outcome using single anterior portal and standard two portals technique in recurrent dislocation of shoulder

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Purpose: Recurrent dislocation of shoulder (RDS) is a common injury in high demand professionals, like athletes and military personnel. The treatment for the patients with Bankart lesion is the arthroscopic repair. This present study compares the outcomes of two different techniques of arthroscopic Bankart repair i.e. a standard two anterior portals technique and a single anterior portal technique in patients with RDS.

Methods: Patients with traumatic RDS met the inclusion criteria were managed with Bankart repair using either two anterior portals (Group A) or a single anterior portal (Group B) technique. Patients were evaluated before the intervention and at the mean follow-up of approximately two years using Rowe score, Oxford shoulder score and Tegner activity scale.

Results: The mean age of the patients in Groups A (n = 34) and B (n = 37) was 29.64 years and 29.05 years respectively (p = 0.66). The dominant shoulder was involved in 27 patients in Group A and 22 patients in Group B (p = 0.069). The operative time in Group A and B was 68.52 min and 46.35 min, respectively (p < 0.001). The complications at follow-up, the mean Rowe score and Oxford score improved significantly in both groups compared with the pre-operative values. However, the final outcome scores were not significantly different between the both groups. The median Tegner’s score preoperatively and at follow-up was 7 and 6, respectively in Groups A and B.

Conclusions: Single anterior portal technique is an effective treatment modality, yielding a similar outcome as two anterior portals technique in the management of RDS.

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Introduction

The shoulder joint is one of the most mobile joints in the body, which is more commonly associated with dislocation as compared to any other joints. Recurrent dislocation of shoulder (RDS) is a common phenomenon especially in young age group, athletes and military personnel. Bankart lesion which is a tear of the labrum from the anterior-inferior aspect of the glenoid is considered to be the most common lesion seen in RDS followed by the Hill-Sachs lesion. The best treatment modality to prevent reoccurrence and return to pre-injury status is to repair the underlying pathology. There are various treatment modalities for RDS. It has evolved from open repair to arthroscopic management of the underlying defect. With the advent of arthroscopy technique, the treatment of choice shifted to keyhole arthroscopic surgeries. However, in the recent past, the type of treatment is found to be associated not only with the type of lesion but also upon the amount of bone loss on the glenoid and humerus side (off-track or on-track lesion). The standard treatment for the Bankart lesion or the lesion with minimal bone loss is arthroscopic Bankart repair using one posterior and two anterior portals. However, the creation of two anterior portals is sometimes challenging in small size shoulders especially in the Asian population. Further, it can lead to iatrogenic nerve injuries and breaking of the cannula owing to overcrowding in the portals. In the last 5 years, we have been using a single anterior portal instead of the two anterior portals for the Bankart repair. There is limited data available about the arthroscopic...
Bankart repair using a single anterior portal. Further, in PubMed, we could only find one technical note and one case series of a similar kind. \(^{15,16}\) The present work is a comparative study to evaluate the functional outcomes using Rowe score and Oxford score of patients with RDS using the standard two anterior portal and a single anterior portal for Bankart repair.

**Methods**

**Study design**

The comparative study was carried out at a tertiary care military hospital. The ethical committee approval was obtained (No.05/09). All the patients with RDS were assessed clinically and radiologically using computer tomography and magnetic resonance imaging. Patients who met the inclusion criteria and willing to join in were included in the study. These patients were operated by a team of surgeons trained in arthroscopy and had more than 10 years experiences of performing shoulder arthroscopy.

The inclusion criteria were: patients diagnosed clinically with traumatic recurrent (anterior) dislocation of the shoulder with Bankart lesion with no or minimal Hill-Sach’s lesion requiring Bankart repair, age between 20 and 45 years. The exclusion criteria were: patients with RDS requiring additional procedures like Remplissage or open surgical procedure, associated with Rotator cuff tears or superior labrum anterior posterior lesions, atraumatic multidirectional instabilities, revision instability shoulder surgery, patients operated earlier for any shoulder pathology.

**Methodology**

Consecutive patients were included in the study and assigned in two groups alternatively. The demographic profile of these patients was listed in Table 1. In Group A, all patients were operated using two standard anterior portals while in Group B patients were operated using one anterior portal technique. The patients were assessed pre-operatively and at the final follow-up using Rowe score,\(^{17}\) Oxford shoulder score,\(^{18}\) and Tegner’s activity level.\(^{19}\) Also, these patients were assessed in terms of surgical time and complications in both groups.

**Surgical technique**

After obtaining informed consent, the patients received operation under general anesthesia in the lateral position. A standard posterior portal was used to visualize the shoulder joint. In Group A, two standard anterior portals were made while in Group B patients were operated using one anterior portal technique. The patients were assessed pre-operatively and at the final follow-up using Rowe score,\(^{17}\) Oxford shoulder score,\(^{18}\) and Tegner’s activity level.\(^{19}\) Also, these patients were assessed in terms of surgical time and complications in both groups.

In Group B, the basic procedure remained the same, yet only one anterior portal was made which was 1 cm lateral to the medial portal of two anterior portals technique. After preparing the glenoid and labrum in a similar fashion, the suture anchors were placed. A 45° angled suture shuttle was used to pierce the capsule-labrum complex. Further, an ample amount of the suture shuttle was left in the joint and suture shuttle is removed from the cannula (Fig. 2B). The sutures of anchors were passed through the suture

Table 1

| Items                                      | Group A (n = 34) | Group B (n = 37) | p value |
|-------------------------------------------|------------------|------------------|---------|
| Mean age (year)                           | 29.65 ± 6.16     | 29.05 ± 5.43     | 0.66    |
| Gender                                    |                  |                  |         |
| Male                                      | 34               | 36               | 1.000   |
| Female                                    | 0                | 1                |         |
| Side involved                             |                  |                  |         |
| Right                                     | 21               | 20               | 0.362   |
| Left                                      | 13               | 17               |         |
| Dominant side                             | 27               | 22               | 0.069   |
| Non-dominant side                         | 7                | 15               |         |
| Mean number of dislocations               | 4                | 4.08             | 0.369   |
| Mode of injury                            |                  |                  |         |
| Training                                  | 16               | 21               |         |
| Sports                                    | 15               | 13               | 0.715   |
| Fall                                      | 1                | 2                |         |
| Road side accident                        | 2                | 1                |         |
| Type of lesion                            |                  |                  |         |
| Banklart lesion                           | 34               | 37               | 1.000   |
| Hill Sach’s lesion                        | 20               | 25               | 0.445   |

Fig. 1. Lateral position of the patient with one anterior portal and one posterior portal.
and were made by Mann-Whitney test. Comparison of pre-operative parameters included in Group B. Thirty-four patients were included in Group A while thirty-seven patients were evaluated in the present study. Thirty-four patients of the shoulder joint.

Rehabilitation

The patients in both groups received similar rehabilitation protocol to keep the shoulder in the shoulder immobilizer for four weeks. During this phase, patients were advised to do active movements of the elbow, wrist and fingers. Passive-assisted movement followed by active shoulder movements were started after four weeks as per tolerance of the patient. Gradual muscle strengthening exercises were advised after a period of two months. Return to the same level of activity was advised six to eight months post-operatively, depended upon the progress of the strengthening of the shoulder joint.

Statistical analysis

The statistical analysis was conducted using IBM SPSS Statistics (version 22.0). The categorical variables (gender, side involved, dominant side, mode of injury) were reported as counts and percentages. While the continuous data were given as mean ± SD & range or median and interquartile range, as appropriate. Normality of quantitative data was checked by measures of Kolmogorov-Smirnov tests. Independent t-test was applied to compare age. The data in the study were skewed data so comparisons for two groups were made by Mann-Whitney test. Comparison of pre-operative and final follow-up was done by Wilcoxon signed rank test. A p value < 0.05 was considered significant.

Results

Seventy-one patients with RDS requiring arthroscopic Bankart’s repair were evaluated in the present study. Thirty-four patients were included in Group A while thirty-seven patients were included in Group B.

Demographic profile

The mean age of the patients was approximately 29 years in both groups (range 20–45 years) (Table 1). All the patients were male in Group A while one female and 36 male in Group B (p = 1.000). In both groups, the involvement of the right shoulder was more common than the left shoulder. Further, the dominant shoulder was more commonly involved as compared to non-dominant side in both groups.

The patients in Group A who were managed at mean of 27.85 (range 13–56) months from date of 1st episode, while patients in Group B were managed at mean of 29.64 (range 09–51) months from date of 1st episode (p = 0.700). The mean number of episode of dislocation before surgery, mode of injury and the type of lesions seen arthroscopically are as shown in Table 1. There is no statistical difference in preoperative data between the two groups.

Surgical details

The operative time (min) in Group A and B was 68.52 ± 9.47 (range 55–90) and 46.35 ± 7.42 (range 35–65), respectively. The operative time was significantly lower in Group B (p < 0.001). The mean number of anchors used in Group A and B were 3.11 (range 2–4) and 3.24 (range 2–4) respectively (p = 0.168). In Group A, one patient had broken cannula intra-operatively which was removed during surgery, one had traction neuropraxia which was improved with conservative treatment and one patient had dislocation at 36 months during sporting activity. In Group B, two patients had redislocation after the surgery in sporting activity. There was no significant differences regarding complications in both groups (p = 0.665).

Outcome

The mean follow-up was 28.5 ± 10.73 (range 16–47) months and 29.24 ± 11.02 (16–48) months in Group A and B, respectively (p = 0.858). The range of movements of shoulder pre-operatively and at final follow-up is shown in Table 2. At final follow-up, the mean Rowe score improved significantly from pre-operative value of 26.02 ± 4.22 (20–35) to 90.88 ± 11.96 (35–100) in Group A (p < 0.001) while in Group B improved significantly from mean pre-operative value of 24.10 ± 5.21 (15–35) to 91.89 ± 12.43 (40–100) (p < 0.001) (Table 3). The mean Oxford score in Group A improved significantly from 25.29 ± 2.08 (22–29) to 42.02 ± 4.31 (28–48)

Table 2
Mean pre-operative and final follow-up range of motion shoulder joint.

| Groups | Shoulder movement, (degree) |
|--------|----------------------------|
|        | Abduction | External rotation |
| Group A |            |                  |
| Pre-operative | 143.7 (130–150) | 84.7 (75–95) |
| Final Follow-up | 141.5 (130–150) | 79.0 (70–90) |
| Group B |            |                  |
| Pre-operative | 140.7 (125–150) | 83.5 (75–95) |
| Final Follow-up | 140.4 (125–150) | 77.8 (60–90) |

Data present as mean (range).
and studies are required. Another disadvantage of two portals technique is the creation of two portals, which may be difficult and bring to chondral or soft tissue injury in small size shoulder especially in Asian population, but one portal technique has an improvement of it. As compared to the two portals technique, we think that one portal technique is faster but requires more efforts and care in terms of suture handling, where sutures are generally retrieved into another portal at the time of piercing the capsulolabral complex. However, both the techniques have similar outcomes in terms of mid-term functional outcome.

In conclusion, arthroscopic single anterior portal technique is a less invasive, and reproducible technique which has a similar functional outcome and Tegner activity level, compared with two anterior portals arthroscopic technique.

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Nil.

### Ethical Statement

Ethical clearance was obtained from the institutional ethics committee of the hospital before the start of the study. Written informed consent was obtained from each patient before the conduct of the study.

### Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cjtee.2019.12.003.

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