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Original Research Article

Comparative study between open and arthroscopic surgical techniques in the management of recurrent anterior instability of the shoulder

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ABSTRACT

Background: Present study was done to compare the effectiveness i.e. range of motion and incidence of failure rates, recurrence and pain of arthroscopic repair versus open surgical techniques for the management of recurrent anterior shoulder instability.
Materials and Methods: Institution based open-label, comparative clinical study was done at Medical College and Hospital, Kolkata between March 2016 to August 2017 (1.5 years). Based on the result of a similar previous study, a sample size of 15 in each group was calculated. Therefore, 15 cases of anterior shoulder instability treated by arthroscopic method and 15 cases treated by open surgery have been selected for study. Inclusion criteria were patient with soft tissue Bankart's lesion, bony Bankart's lesion, humeral avulsion of glenohumeral ligament (HAGL), anterior labral posterior sleeve avulsion (ALPSA), glenoidlabrum and articular disruption and capsular stretch and injury. Study tools were used like Modified Rowe score, ASES (American Shoulder and Elbow Society) score and Goniometer. Operative techniques were used like arthroscopic capsulolabral repair and latarjet procedure.
Results: About 14 (93.3%) patients were negative in bony apprehension test in arthroscopic technique. Approximately 15 (93.8%) patients were positive in bony apprehension test in Open technique. Association between bony apprehension test in two groups was not statistically significant ($p<0.00001$). No significant difference was found between according to CT scan report in two groups ($p=0.30910$). Mean Rowe pain was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period. Mean Rowe stability was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period.
Conclusion: Both arthroscopic and open surgical methods are utilized for management of anterior glenohumeral instability. The use of arthroscopy has increased significantly in today's practice and has begun to replace the traditional open methods with the benefit of small incision, less restriction of motion, quicker return to sports and higher patient's satisfaction.

1. Introduction

The shoulder is a ball and socket joint made up of the humeral head (ball) from the upper arm, and the glenoid (socket) from the shoulder blade (scapula). This allows to freely move arm in all directions. However, because it so mobile, it is also one of the most commonly dislocated joints in the human body. Dislocation occurs when the ball is wrenched out of its socket. The force required to do this can also tear or partially tear the muscles, ligaments and/or shoulder capsule surrounding the joint. The shoulder can become dislocated during any significant injury where the

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force is great enough to overcome the stabilising structures of the shoulder joint. This can be from a fall, on the sporting field, or during a car accident. Occasionally it can occur with minimal force in someone with inherently lax joints. Recurrent shoulder dislocation is defined as more than or equal to three documented dislocations in a year.[1,2]

There are many structures in the shoulder (bony and soft tissue) that help stabilise it. Some of these are injured during a dislocation and puts it at risk of further dislocations.There is a thick ring of fibrous cartilage (the labrum) that covers the rim of the socket (glenoid) of the shoulder joint. The labrum that helps deepen the socket is one of the most important stabilisers of the shoulder joint. The labrum is damaged after just one dislocation in over 90% of patients and is usually torn at antero-inferior portion. This torn labrum is also called a 'Bankart tear'.Humeral head can be damaged during a dislocation on its postero superior aspect as an indentation.This is often called a 'Hill-Sachs deformity'. Sometimes, there can also have bone damage to the bony rim of the socket called as 'bony Bankart'.[3]

Symptomatic instability following dislocation is common, especially in young, active people.[4] Recurrent instability, occurring in 50% to 96% of patients who first dislocate under the age of 20 years and in 40% to 74% of patients between the ages of 20 and 40 years, limits range of movement of the joint, requires multiple hospital and emergency department admissions for treatment, and often calls for surgical procedures to prevent further dislocation.[5–8]

Lenters TR et al., revealed that arthroscopic approaches are not as effective as open approaches in preventing recurrent instability or enabling patients to return to work. Arthroscopic approaches resulted in better function as reflected by the Rowe scores in the randomized clinical trials.[9] But there is limited Indian study published to compare the effectiveness between open and arthroscopic approaches. Present study was done to compare the effectiveness i.e. range of motion and incidence of failure rates, recurrence and pain of arthroscopic repair versus open surgical techniques for the management of recurrent anterior shoulder instability.

2. Materials and Methods

Institution based open-label, comparative clinical study was done at Medical College and Hospital, Kolkata between March 2016 to August 2017 (1.5 years). Based on the result of a similar previous study,[10]a sample size of 15 in each group was calculated. Therefore, 15 cases of anterior shoulder instability treated by arthroscopic method and 15 cases treated by open surgery have been selected for study. Institutional ethics committee permission was taken. Individual patient's consent was also taken. The patients were selected as per following inclusion and exclusion criteria. Inclusion criteria were patient with soft tissue Bankart's lesion, bony Bankart's lesion, humeral avulsion of glenohumeral ligament (HAGL), anterior labral posterior sleeve avulsion (ALPSA), glenoidlabrum and articular disruption and capsular stretch and injury. Patients having associated rotator cuff tear, habitual dislocators, and high risk groups (bone loss, contact athletes) were excluded. Study tools were used like Modified Rowe score, ASES (American Shoulder and Elbow Society) score and Goniometer. Operative techniques were used like arthroscopic capsulolabral repair and latarjet procedure. General anaesthesia was used.

2.1. Arthroscopic capsulolabral repair

The lateral decubitus position was used. The patient was placed in the lateral decubitus position with theaffected shoulder exposed and was supported by a vacuum beanbag and kidney rest. All pressure points were padded, with a pillow beneath thedown leg protecting the peroneal nerve and lateral malleolus and one or more pillows between the knees and ankles. Gross and Fitzgibbons modified this straight lateral decubitus position by tilting the patient 20 to 30 degrees posteriorly, which places the glenoid surface parallel to the floor. Over distraction was avoided. The principle was "balanced suspension".[11–13]

Fig. 1: Marking all the bony landmarks and reference lines

2.2. Diagnostic Arthroscopyand Evaluation

On entering the joint, the biceps tendon was located and used as a landmark for orientation during the initial arthroscopic procedure. Arthroscopic examination was done be done in a precise, methodical, and reproducible manner. In the lateral decubitus position, systematic examination begins with observation of the superior part of the shoulder joint or biceps tendon and the glenoid articular cartilage. Advancing arthroscope further, the articular cartilages of the glenoid and the humeral head are seen. The humeral head can be seen better by internally and externally rotating the shoulder, observing for chondromalacia or traumatic lesions to the articular surface. As the arthroscope was advanced anteriorly, the superior and inferior surfaces of the biceps tendon, the biceps anchor, and the superior labrum are evaluated carefully for evidence of a partial tear. The bicipital arch formed by the superior glenohumeral ligament and the coraco-humeral ligaments should be carefully evaluated to ensure that the biceps is stable and centered in the arch. The arthroscope is advanced over the anterior labrum, the soft spot that is bound by the biceps tendon proximally, the subscapularis tendon distally, and the articular surface of the glenoid inferiorly. Synovitis or fraying on the anterior capsule, which indicates repeated trauma or an inflammatory condition, was observed. The subscapularis tendon also maybe frayed or damaged. The arthroscope was now directed to view more inferiorly for examination of the anterior band of the IGHL and MGHL. It was important to note the size of rotator interval gap. A gap of more than 1 cm measured adjacent to the glenoid in association with a 2+ to 3+ sulcus sign is surgically repaired when symptomatic. As the arthroscope was passed into the inferior pouch, the glenohumeral ligaments and the labrum was examined by rotating the lens back toward the superior glenoid. If moving scope anteriorly was easy with the arm slightly externally rotated**,** "drive through" sign of Warren indicates generalized ligament laxity that must be corrected during any stabilization procedure.[11–13]

2.3. Debridement and creating raw area over glenoid

While visualizing from the antero-superior portal, an elevator was used to free up the capsule down to the sub-scapularis muscle, which should be visible. The glenoid neck was abraded to stimulate healing. Using a rasp, the soft tissueand the intended area of placation was freshened to incite some inflammation without damaging the tissue [Figure 2].

2.4. Suture anchor placement

The anterior neck was abraded, and freed up the capsule and labral complex so it can be advanced superiorly. The position of the suture anchors trying to get two or three anchors placed below the 3-o'clock position. Sutures

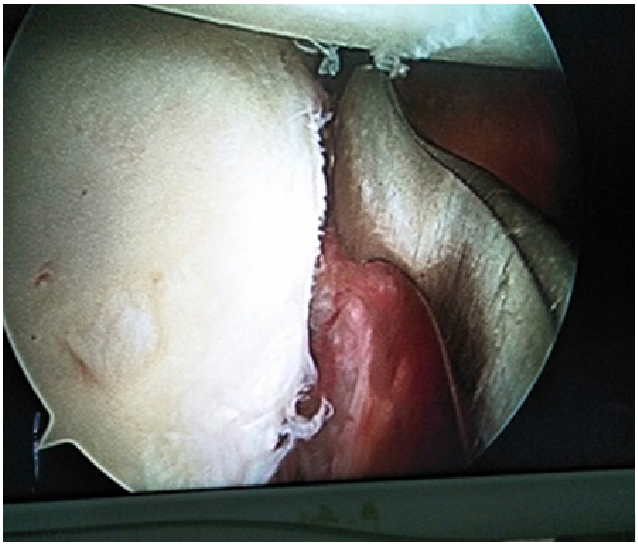

Fig. 2: Arthroscopic visualization of the debridement and creating raw area over glenoid and preparation of the glenoid neck with an oscillating burr to create a denuded surface for healing

were shuttled using a simple hoop suture configuration for tensioning and bumper re-creation at the inferior glenoid. Sutures were then shuttled using a simple hoop suture configuration as this allows tensioning and bumperre-creation at the inferior glenoid. Sutures were secured with a sliding knot followed by alternating half-hitches with attention to place the knot away from the articular surface.[14]

2.5. First suture anchor placement

The spear point guide was placed at the 5:30 position on the neck (face of glenoid), 1to 2 mm on the articular surface for reaming and placementof the suture anchor. Angledreamer and anchor inserter was used. The second and third anchors may be either single-loadedor double-loaded and usually are biocomposite double-loaded anchors. With this technique, most inferior suture was taken out the posteroinferior cannula using a suture grasper. A good bite of the capsule and labrum was obtained just distal to the intended site of the anchor. Firmly the first suture that was passed through the labrum to the capsule and labrum up to the edge of the glenoid is secured, creating an anterior bumper. The second and third suture anchor either single-loaded or double-loaded is done using the same technique [Figure 3]. Upon completion, the portals are closed with 2-0 monofilament suture and sterile dressing and chest strapping bandage was applied.[14]

Post-operative care : Arm chest bandage was applied. Stitch was off at 14 days.

Parameters to be studied according to Modified Rowe and ASES (American Shoulder and Elbow Society) score.[15,16]

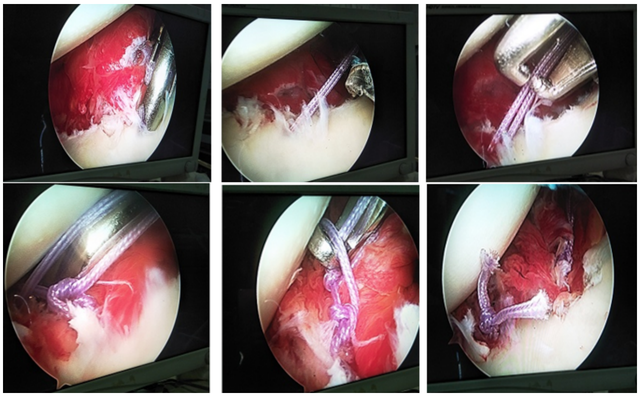

Fig. 3: Right shoulder: the angulated suture-shuttling device is placed in the anteroinferior cannula and penetrates the capsule lateral to the glenoid rim and inferior to the anchor and then reduction of the capsulolabral defect to the glenoid rim with a grasper while penetrating the capsule with the shuttling device

Recurrence rates or stability according to rehabilitation program schedule at 15 days, 4 weeks, 6 weeks, 9 weeks,12 weeks, 16 weeks and 6 months.

Range of motion

Pain

At each visit the patients was assessed according to the post-operative monitoring protocol given in case record form. Data obtained from study was analysed by using unpaired students t-test to evaluate the recurrence rates or stability, range of motion and the pain according to the Modified Rowe and ASES (American Shoulder and Elbow Society) score.

This exercises as per post-operative rehabilitation protocol as follows postoperative period (0-3 weeks) abduction pillow, passive/active ROM: abduction (90 degree), flexion (90 degree) and external rotation (45 degree); no extension isometric abduction, horizontal abduction, and external rotation, elbow ROM, ball squeeze and ice. In Phase I (3-6 weeks) discontinue brace/pillow, progressive passive and active ROM, protecting anterior capsule, active internal rotation (full) and external rotation (neutral) using tubing and free weights, prone extension (not posterior to trunk), shoulder shrugs and active abduction, supraspinatus strengthening and ice was done. In phase II (6 weeks-3 months) continued ROM, gradually increasing external rotation (goal is full ROM by 2 months) and continued strengthening exercises, with emphasis on rotator cuff and parascapular muscles. In phase III (3-6 months) continue capsular stretching and strengthening and ergometer and may include isokinetic strengthening and endurance exercises for internal rotation. Patients were warned off heavy works, participation in contact sports, till 6 months of operation. After 6 months, patients were allowed to participate in their occupation.

3. Results

In arthroscopic technique, the mean age (mean± S.D.) of patients was 29.933 ±5.885 years with range 21-40 years and the median age was 30 years. In open technique, the mean age (mean± S.D.) of patients was 26.60 ±3.66 years with range 21-40 years and the median age was 30 years. Difference of mean age in two groups was not statistically significant (p=0.073) [Table 1].

Chi-square value: 5.0000; p-value: 0.02534, Statistically significant.

Association between complain in two groups was statistically significant (p=0.02534) [Table 2].

Chi-square value: 1.2000; p-value: 0.5488, Statistically not significant.

Association between side in two groups was statistically significant (p=0.5488) [Table 3].

Chi-square value: 1.7101; p-value: 0.4253, Statistically not significant.

Association between dominance in two groups was statistically significant (p=0.4253) [Table 4].

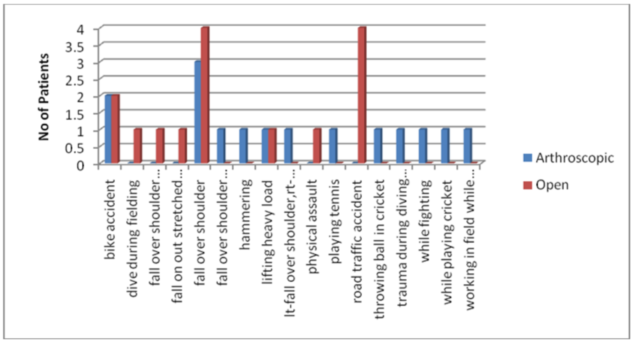

Fig. 4: Distribution of history of trauma in two groups

Difference of mean no. of dislocation in two groups was statistically significant (p<0.00001) [Table 5].

Chi-square value: 26.2500; p-value: <0.00001, statistically significant.

About 14 (93.3%) patients were negative in bony apprehension test in arthroscopic technique whereas 15 (93.8%) patients were positive in bony apprehension test in open technique [Table 7].

Mean Rowe pain was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period [Table 8] Mean Rowe stability was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period. Mean Rowe motion was higher according in arthroscopic technique compare to open technique at 4W, 6W, 9W, 12W, 16W and 6M follow-up period [Table 9]. Mean ASES pain was higher according in arthroscopic technique compare to open technique at 15D, 4W, 6W, 9W and 12W follow-up period [Table 10]. Mean ASES stability was significantly

Table 1: Distribution of mean age in two groups

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Age	Arthroscopic	15	29.933	5.885	21.000	40.000	30.000	0.073
	Open	15	26.600	3.660	22.000	34.000	26.000	

Table 2: Distribution of complain in two groups

Group Complain	Arthroscopic	Open	Total
Instability, Pain	6	12	18
Row %	33.3	66.7	100
Col %	40	80	60
Instability, Occasional Pain	9	3	12
Row %	75	25	100
Col %	60	20	40
Total	15	15	30
Row %	50	50	100
Col %	100	100	100

Table 3: Distribution of side in two groups

Group Side	Arthroscopic	Open	Total
Both	1	0	1
Row %	100	0	100
Col %	6.7	0	3.3
Left	2	3	5
Row %	40	60	100
Col %	13.3	20	16.7
Right	12	12	24
Row %	50	50	100
Col %	80	80	80
Total	15	15	30
Row %	50	50	100
Col %	100	100	100

Table 4: Distributionof dominance in two groups

Group Dominance	Arthroscopic	Open	Total
Both	1	0	1
Row %	100	0	100
Col %	6.7	0	3.3
No	2	4	6
Row %	33.3	66.7	100
Col %	13.3	26.7	20
Yes	12	11	23
Row %	52.2	47.8	100
Col %	80	73.3	76.7
Total	15	15	30
Row %	50	50	100
Col %	100	100	100

Table 5: Distribution of meanno of dislocation in two groups

		Number	Mean	SD	Minimum	Maximum	Median	p-value
No of Dislocation	Arthroscopic	15	6.067	1.033	5	8	6	<0.00001
	Open	15	19.867	1.959	17	25	20	

Table 6: Distribution of parameters in two groups

		Arthroscopic	Open	Total
Past Illness	No	15	15	30
Drug History	Nil	15	15	30
Anterior drawer test	Positive	15	15	30
Anterior Apprehension test	Positive	15	15	30
Throwing test	Positive	15	15	30
Jobe Relocation test	Positive	15	15	30
Leffert Test	Positive	15	15	30
Rowe test	Positive	15	15	30
X-Ray	No bony injury	15	15	30
MRI	Normal	15	15	30

Table 7: Distributionof bony apprehension test in two groups

Group Bony apprehension test	Arthroscopic	Open	Total
Negative	14	0	14
Row %	100	0	100
Col %	93.3	0	46.7
Positive	1	15	16
Row %	6.3	93.8	100
Col %	6.7	100	53.3
Total	15	15	30
Row %	50	50	100
Col %	100	100	100

Table 8: Distribution of mean rowe PAIN according to follow-up in two groups

	Rowe pain	Number	Mean	SD	Minimum	Maximum	Median	p-value
15D	Arthroscopic	15	3.0000	2.5355	0.0000	5.0000	5.0000	0.7165
	Open	15	3.3333	2.4398	0.0000	5.0000	5.0000	
4W	Arthroscopic	15	5.0000	0.0000	5.0000	5.0000	5.0000	
	Open	15	5.0000	0.0000	5.0000	5.0000	5.0000	
6W	Arthroscopic	15	10.0000	0.0000	10.0000	10.0000	10.0000	<0.0001
	Open	15	5.0000	0.0000	5.0000	5.0000	5.0000	
9W	Arthroscopic	15	10.0000	0.0000	10.0000	10.0000	10.0000	<0.0001
	Open	15	5.0000	0.0000	5.0000	5.0000	5.0000	
12W	Arthroscopic	15	10.0000	0.0000	10.0000	10.0000	10.0000	
	Open	15	10.0000	0.0000	10.0000	10.0000	10.0000	
16W	Arthroscopic	15	10.0000	0.0000	10.0000	10.0000	10.0000	
	Open	15	10.0000	0.0000	10.0000	10.0000	10.0000	
6M	Arthroscopic	15	10.0000	0.0000	10.0000	10.0000	10.0000	
	Open	15	10.0000	0.0000	10.0000	10.0000	10.0000	

higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period [Table 11].

4. Discussion

In arthroscopic technique, the mean age (mean± S.D.) of patients was 29.933 ±5.885 years with range 21-40 years and the median age was 30 years. In open technique, the mean age (mean± S.D.) of patients was 26.60±3.66 years with range 21-40 years and the median age was 30.00 years. Difference of mean age in two groups was not statistically significant. Thus age was matched in two groups. There was no statistically significant difference in age distribution between the groups. [Numerical variables between groups compared by t-test; (p=0.0730)].

Kralinger et al.,[17] noted that age between twenty one and thirty years was at risk factor for recurrence in a retrospective series of 180 patients, and Hovelius et al.,[18] confirmed these results in a prospective study of 255 patients (257 shoulders) with a twenty-five-year follow-up. In that study, 43% had no additional dislocations, 7% had one recurrence or subluxation, 27% had an operative procedure because of recurrent dislocation, and 22% had a recurrent dislocation or subluxation but no operative

Table 9: Distribution of mean Rowe Motion according to follow-up in two groups

	Rowe m otion	Number	Mean	SD	Minimum	Maximum	Median	p-value
15D	Arthroscopic	15	0.0000	0.0000	0.0000	0.0000	0.0000	
	Open	15	0.0000	0.0000	0.0000	0.0000	0.0000	
4W	Arthroscopic	15	17.3333	7.0373	0.0000	20.0000	20.0000	<0.0001
	Open	15	.0000	.0000	0.0000	0.0000	0.0000	
6W	Arthroscopic	15	20.0000	.0000	20.0000	20.0000	20.0000	0.3259
	Open	15	18.6667	5.1640	0.0000	20.0000	20.0000	
9W	Arthroscopic	15	34.6667	6.3994	20.0000	40.0000	35.0000	<0.0001
	Open	15	20.0000	.0000	20.0000	20.0000	20.0000	
12W	Arthroscopic	15	39.3333	1.7593	35.0000	40.0000	40.0000	<0.0001
	Open	15	20.0000	.0000	20.0000	20.0000	20.0000	
16W	Arthroscopic	15	40.0000	.0000	40.0000	40.0000	40.0000	<0.0001
	Open	15	35.0000	.0000	35.0000	35.0000	35.0000	
6M	Arthroscopic	15	50.0000	.0000	50.0000	50.0000	50.0000	<0.0001
	Open	15	40.0000	.0000	40.0000	40.0000	40.0000	

Table 10: Distribution of mean ASES Pain according to follow-up in two groups

	ASES pain	Number	Mean	SD	Minimum	Maximum	Median	p-value
15D	Arthroscopic	15	1.5333	.5164	1.0000	2.0000	2.0000	0.0004
	Open	15	1.0000	.0000	1.0000	1.0000	1.0000	
4W	Arthroscopic	15	2.5333	.6399	2.0000	4.0000	2.0000	0.0003
	Open	15	1.6667	.4880	1.0000	2.0000	2.0000	
6W	Arthroscopic	15	4.7333	.7037	3.0000	5.0000	5.0000	<0.0001
	Open	15	2.0000	.0000	2.0000	2.0000	2.0000	
9W	Arthroscopic	15	4.7333	.4577	4.0000	5.0000	5.0000	<0.0001
	Open	15	2.6667	.4880	2.0000	3.0000	3.0000	
12W	Arthroscopic	15	5.0000	.0000	5.0000	5.0000	5.0000	<0.0001
	Open	15	4.3333	.4880	4.0000	5.0000	4.0000	
16W	Arthroscopic	15	5.0000	0.0000	5.0000	5.0000	5.0000	
	Open	15	5.0000	0.0000	5.0000	5.0000	5.0000	
6M	Arthroscopic	15	5.0000	0.0000	5.0000	5.0000	5.0000	
	Open	15	5.0000	0.0000	5.0000	5.0000	5.0000	

Table 11: Distribution of mean ASES function according to follow-up in two groups

	ASES function	Number	Mean	SD	Minimum	Maximum	Median	p-value
15D	Arthroscopic	15	0.0000	0.0000	0.0000	0.0000	0.0000	
	Open	15	0.0000	0.0000	0.0000	0.0000	0.0000	
4W	Arthroscopic	15	0.6667	0.0000	0.0000	1.0000	1.0000	
	Open	15	0.6667	0.0000	0.0000	1.0000	1.0000	
6W	Arthroscopic	15	2.5333	.7432	1.0000	3.0000	3.0000	0.0008
	Open	15	1.6667	.4880	1.0000	2.0000	2.0000	
9W	Arthroscopic	15	1.4000	.5071	1.0000	2.0000	1.0000	0.1534
	Open	15	1.6667	.4880	1.0000	2.0000	2.0000	
12W	Arthroscopic	15	2.7333	.4577	2.0000	3.0000	3.0000	0.7025
	Open	15	2.6667	.4880	2.0000	3.0000	3.0000	
16W	Arthroscopic	15	3.0000	0.0000	3.0000	3.0000	3.0000	
	Open	15	3.0000	0.0000	3.0000	3.0000	3.0000	
6M	Arthroscopic	15	4.0000	0.0000	4.0000	4.0000	4.0000	
	Open	15	4.0000	.0000	4.0000	4.0000	4.0000	

treatment.

In arthroscopic technique, 6 (40.0%) patients had instability, pain and 9 (60.0%) patients had instability, occasional pain whereas in open technique, 12 (80.0%) patients had instability, pain and 3 (20.0%) patients had instability, occasional pain. Association between complain in two groups was statistically significant (p=0.02534). No significant relation was found between according to side in two groups (p=0.5488). Distribution of history of trauma in two groups was not statistically significant (p=0.3764). In arthroscopic technique, the mean no of dislocation (mean± S.D.) of patients was 6.0667 ±1.0328 with range 5.00-8.00 and the median no of dislocation was 6.

In patients who were twenty to twenty-five years old at the time of primary dislocation, 50% either never had a recurrence or stabilized over time without surgery. Adolescent athletes tend to have the greatest risk for recurrence, with re-dislocation rates of 70% to 80% for non-operative treatment versus 13% to 14% for arthroscopic stabilization.[19] In addition to at the time of first dislocation, there is a sex-specific difference in recurrence rate following non-operative treatment with male patients demonstrating a greater than 50% recurrence rate well into their middle to late twenties as compared with females, who reach a 50% recurrence rate in their late teens.[20]

In open technique, the mean no of dislocation (mean± S.D.) of patients was 19.8667 ±1.9591 with range 17-25 and the median no of dislocation was 20. Difference of mean no of dislocation in two groups was statistically significant (p<0.00001). No patient had past illness and history of drug in two groups. All patients were positive in anterior drawer test, anterior apprehension test, throwing test, Jobe Relocation test, Leffert test and Rowe test in two groups. All patients were no bony injury in X-Ray report in two groups. All patients were normal in MRI report in two groups [Table 6].

Pennekamp et al.,[21] used MRI to show that the Bankart lesion was reduced when the shoulder was positioned in external rotation and displaced when the shoulder was positioned in internal rotation. These results have not been clearly substantiated clinically. One randomized controlled trial of 198 patients found that the recurrence rate with immobilization in external rotation was 26% as compared with a rate of 42% in the group braced in internal rotation.[22] A subsequent randomized controlled trial found no difference in recurrence of instability in those braced in external rotation and those treated with a conventional sling in internal rotation,[23] thus leaving position of immobilization a matter of debate.

About 14 (93.3%) patients were negative in bony apprehension test in arthroscopic technique. Approximately 15 (93.8%) patients were positive in bony apprehension test in Open technique. Association between bony apprehension test in two groups was not statistically significant (p<0.00001) [Tables 6 and 7]. No significant difference was found between according to CT scan report in two groups (p=0.30910). Mean Rowe pain was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period. Mean Rowe stability was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period. Mean Rowe motion was higher according in arthroscopic technique compare to open technique at 4W, 6W, 9W, 12W, 16W and 6M follow-up period. Mean ASES pain was higher according in arthroscopic technique compare to open technique at 15D, 4W, 6W, 9W and 12W follow-up period. Mean ASES stability was significantly higher according in arthroscopic technique compare to open technique at 6W and 9W follow-up period. Mean ASES stability was higher according in arthroscopic technique compare to open technique at 6W, 9W and 12W follow-up period [Tables 8, 9, 10 and 11].

Objective data suggest that the outcomes of open and modern arthroscopic stabilization techniques for recurrent traumatic anterior shoulder instability are similar in the setting of minimal bone loss. This information has resulted in a relative increase in the use of arthroscopic stabilization techniques and an overall decline in open stabilization techniques[24,25]. Furthermore, recent data from a study of 3854 active duty military patients who underwent Bankart repair revealed a 4.5% rate of recurrence after arthroscopic stabilization and a 7.7% rate of recurrence after open stabilization.[18] While arthroscopic single-row techniques are commonly employed for primary surgical management in patients with capsulolabral avulsions. Recent cadaveric studies have shown that double-row fixation may better restore normal anatomy.[26,27] This is true even in the setting of small (25% of loss of the glenoid surface area) osseous Bankart lesions as well. Arthroscopic approaches to shoulder stabilization may benefit from the application of these principles in the clinical setting.[28] No comparative clinical studies have been performed to date to demonstrate the superiority of the double-row technique over traditional techniques.

5. Conclusion

Both arthroscopic and open surgical methods are utilized for management of anterior glenohumeral instability. The use of arthroscopy has increased significantly in today's practice and has begun to replace the traditional open methods with the benefit of small incision, less restriction of motion, quicker return to sports and higher patient's satisfaction. Ideal patients for arthroscopic Bankart repair have discrete Bankart lesion a robust well developed inferior glenohumeral ligament, no significant capsular laxity or intra-ligamentous injury and absence of concomitant intra-articular pathology. Instability during evaluation under anaesthesia is good prognostic indicators for arthroscopic

Bankart repair. Criteria that render patients less appropriate for arthroscopic repair include-capsular injury, capsular laxity, Bony Bankart, glenohumeral arthritis and rotator cuff tear and either absent or patulous poorly developed glenohumeral ligament. In developing country like India due to lack of surgical expertise and high price of arthroscopic technique and less participation in contact sports, open repair is still practiced.

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7. Conflict of Interest

The authors declare that there is no conflict of interest.

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