Early Functional Result of Arthroscopic Bankart Repair:

The Rajavithi Hospital's Experience

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Objective: *To study functional result and redislocation rate of the shoulder after arthroscopic Bankart repair using suture anchors.*
Methods: *Sixteen patients who underwent arthroscopic Bankart repair at Rajavithi Hospital between Jan 2007 and Dec 2008 were enrolled in this study. Demographic data and functional score were collected using the methods of UCLA (University of California, Los Angeles) and ASES (American Shoulder and Elbow Surgeons). Preoperative and postoperative scores were compared using statistical analysis.*
Results: *Postoperative functional scores were statistically better than preoperative scores in all patients. No redislocation was observed. There was no correlation between preoperative number of dislocations and functional result one year after surgery.*
Conclusion: *The functional result after arthroscopic Bankart repair using suture anchors is excellent with proper selection and technique. There was no correlation between preoperative number of dislocations and functional result.*

Keywords: *Anterior shoulder dislocation, Bankart, Suture anchor, functional score, UCLA, ASES*

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The shoulder has the greatest range of motion of all joints in human body. Its stability is a result of both the static effect of ligaments-tendons and the dynamic effect of the muscles around the shoulder girdle. Five mechanisms have been shown to provide joint stability: bony joint conformity, negative intra-articular pressure and joint cohesion, glenoid labrum, ligament-capsular restraints, and the shoulder girdle muscles. The greatest contributors to shoulder stability are the labrum and ligament-capsular restraints. Labrum disruption from the glenoid rim is an important factor in instability.

Shoulder instability has been recognized since the time of Hippocrates. Shoulder dislocations have been managed with a variety of reduction maneuvers, and in refractory cases, the shoulder capsule was stabilized by hot iron for cauterizing[1]. Nowadays the complexity of pathophysiology in shoulder instability is better understood[2].

Shoulder instability can be categorized into two main types: multiple directional instability, which is responsive to rehabilitation, and unidirectional dislocation, which leads to recurrent instability. This study focuses on repair using the Bankart lesion or traumatic avulsion of the capsule labral complex from the anterior glenoid rim.

Bankart lesion is a common pathologic condition in anterior shoulder instability. Recurrent dislocation of the shoulder with this lesion will disturb activities of daily living[3].

The management of Bankart lesion began with surgery to repair the lesion[4,2] in order to prevent repeated anterior shoulder joint dislocation, but reduced shoulder function and movement was a common complication[5,6]. Arthroscopic Bankart lesion repair was developed to reduce stiffness of the shoulder[10-16]. There are many techniques and instruments for arthroscopic surgery with satisfactory postoperative outcomes.

The purposes of this study were to evaluate functional results after arthroscopic Bankart repair using suture anchoring, and the rate of redislocation, as well as the relationship between pre-operative frequency rates of anterior shoulder dislocation and functional scores after surgery.

Material and Method

Descriptive study of the results after arthroscopic suture anchoring repair in isolated Bankart lesions with recurrent anterior shoulder dislocation was performed at Rajavithi Hospital in the year 2007-2008. Sixteen patients (13 males and 3 females), average age 28.38 years, were included. All patients were selected using the inclusion criteria in Table 1 and the exclusion criteria in

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Table 2. The operations were performed by the first author.

Table 1. Inclusion criteria

1. Recurrent anterior shoulder dislocation with sign of anterior shoulder instability, diagnosed by history of illness and physical examination.
2. Injury was the cause of initial anterior shoulder dislocation.
3. The Bankart lesion was confirmed by arthroscopic examination.
4. The Bankart lesion was fixed with suture anchors.
5. The patient was able to co-operate and follow-up postoperatively.

Table 2. Exclusion criteria

1. Bony lesions of glenoid and humerus were certified by arthroscopic examination. Glenoid bone lesion was evaluated by the method of Lo.[17] (Glenoid bone loss is more than 25% of glenoid surface at the central diameter level.)
2. The humeral bone lesion was Hill-Sachs lesion.[18]
3. Capsular laxity.
4. Capsular detachment from the humerus in the pattern of Humeral Avulsion of Glenohumeral ligaments (HAGL).

The operative procedure

The patient is placed in the beach chair position or lateral decubitus. The portals for arthroscopic instruments are anterosuperior, anteroinferior, and posterior portals. Procedures for the glenoid preparation are labrum and capsular mobilization from the neck of the glenoid, allowing access to the inferior aspect of the capsule. The anterior capsule labral tissue is mobilized laterally along the anterior glenoid rim.

A suitable bed for fixation and tissue healing is created by debridement of the glenoid neck area with an arthroscopic burr and placing the first anchoring suture in the 5-o'clock position 2 millimeters in the articular rim at a 45° angle relative to the glenoid surface. The new suture anchors are placed in sequential order approximately 5 to 7 millimeters apart for a secure repair in the 4- and 3-o'clock positions, respectively.

Postoperative rehabilitation

Postoperatively the shoulder is placed in a sling without a swathe for 3 to 4 weeks. The position of the arm is in internal rotation slightly anterior to the frontal plane. Physical therapy is started during arm sling management: active assistive range of motion of hand, wrist, and elbow with the adducted shoulder performing a passive range of motion with 10° of external rotation and 90° of forward flexion. The main focus of early protective postoperative care during the first three weeks is to maintain proximal and distal strength mobility, provide pain relief, and prevent selective hypomobility of the capsule section resulting from iatrogenic change due to the surgery. Strengthening exercises are introduced after the sixth week. At the fourth month, the patient can play non-contact sports. Full activity can be resumed no sooner than the end of the sixth month.

The data of this study was analyzed by paired t-test for functional outcome before and after operation. The Pearson correlation coefficient was used to determine the relationship between anterior shoulder dislocation before and after the operation.

The patients had improved UCLA and ASES score at six months and 12 months after operation with significant P value ($p<0.001$). End results were better than six-month results. No recurrence of shoulder dislocation is evident. There was no significant correlation between number of anterior shoulder dislocation and functional score after operation (Table 5).

Table 3. Comparison of UCLA (University of California Los Angeles) functional scores preoperatively, 6 months postoperative, and 12 months postoperative

UCLA	Pre-operative score	Postoperative score 6 months		Postoperative score 12 months	
		Mean ± 2SD	P value	Mean ± 2SD	P value
Pain	9.13 ± 2.05	9.75 ± 1.37	<0.05	9.88 ± 1.00	<0.005
Function	5.50 ± 4.00	8.50 ± 1.79	<0.001	9.75 ± 1.37	<0.001
Anterior forward flexion	2.56 ± 1.02	4.25 ± 0.89	<0.001	4.81 ± 0.81	<0.001
Power	4.44 ± 1.02	4.75 ± 0.89	0.055	5.00 ± 0.00	<0.001
Patient satisfaction	0.00 ± 0.00	5.00 ± 0.00	<0.001	5.00 ± 0.00	<0.001
Total	21.63 ± 3.86	32.25 ± 3.22	<0.001	34.44 ± 2.19	<0.001

Table 4. Comparison of ASES (American Shoulder Elbow Surgeons) scores preoperatively, 6 months postoperative, and 12 months postoperative

ASES score	Pre-operative score	Postoperative score 6 months		Postoperative score 12 months	
		Mean ± 2SD	P value	Mean ± 2SD	P value
Pain	47.19 ± 7.27	49.38 ± 3.42	<0.05	50.00 ± 0.00	<0.05
Put on a coat	1.46 ± 1.24	4.27 ± 1.02	<0.001	5.00 ± 0.00	<0.001
Sleep on affected side	2.40 ± 1.02	5.00 ± 0.00	<0.001	5.00 ± 0.00	<0.001
Wash back/fasten bra in back	3.22 ± 0.89	4.27 ± 1.02	<0.05	5.00 ± 0.00	<0.001
Manage toileting	4.69 ± 0.81	5.00 ± 0.00	0.08	5.00 ± 0.00	0.08
Comb hair	5.00 ± 0.00	5.00 ± 0.00	- †	5.00 ± 0.00	- †
Reach a high shelf	1.35 ± 0.81	4.69 ± 0.81	<0.001	4.69 ± 0.81	<0.001
Lift 10 lbs above shoulder	1.88 ± 0.68	4.27 ± 1.02	<0.001	4.79 ± 0.68	<0.001
Throw a ball overhand	0.00 ± 0.00	4.06 ± 1.02	<0.001	4.06 ± 1.02	<0.001
Do usual work	3.33 ± 0.00	5.00 ± 0.00	<0.001	5.00 ± 0.00	<0.001
Do usual sport	1.29 ± 0.88	2.96 ± 0.88	<0.001	2.96 ± 0.88	<0.001
Total score	72.37 ± 7.98	94.59 ± 6.49	<0.001	97.31 ± 2.93	<0.001

† retain full function

Table 5. Correlation between number of dislocation before operation and functional score

Correlated scores of dislocation	Correlation coefficient	95% confident interval	P value
ASES score pre-operation	0.3219	-0.2068 to 0.7051	0.2241
ASES score post-operation 6 months	0.0007	-0.4952 to 0.4962	0.9979
ASES score post-operation 12 months	0.2757	-0.2549 to 0.6786	0.3014
UCLA score pre-operation	0.1536	-0.3703 to 0.6034	0.5702
UCLA score post-operation 6 months	0.2549	-0.2756 to 0.6664	0.3406
UCLA score post-operation 12 months	-0.3940	-0.7444 to 0.1264	0.1310

Discussion

Arthroscopic surgery is becoming more popular. Early arthroscopic Bankart lesion fixation devices were staples and tracks, but with the advent of suture anchoring, accurate anatomic repair can be performed[7-16].

The results of open classical Bankart repair are very promising, with only 8% redislocation rate after one year postoperative. However, suture anchoring and the capsular shift technique have improved this outcome[7-9].

This study showed no redislocation of the shoulder one year after arthroscopic suture anchoring. The promising results of arthroscopic Bankart repair using suture anchors will be considered in recurrent anterior dislocation of shoulder patients without evidence of bony defect, capsular laxity. or HAGL; in this case, Bankart lesion corresponds to Arciero's study[7].

Koss (1997) reported successful arthroscopic suture anchoring of Bankart lesions in patients who had fewer than five recurrent anterior shoulder dislocations. When the number exceeded five, his results were still not promising, but all of his patients were not single Bankart lesion patients[13].

This study's promising results of arthroscopic Bankart repair using suture anchoring will be considered in the recurrent anterior dislocation of shoulder patients without evidence of bony defect, capsular laxity, or HAGL, because there is no correlation between number of dislocations and functional results, as well as no correlation in delayed management. The report of Ochoa[19] showed that delaying the operation for recurrent shoulder dislocation, even if it has only Bankart lesion, led to further glenoid bone loss and more redislocations before surgery. However, more cases must be collected in further studies to confirm this increased redislocation rate.

The treatment of Bankart lesion with arthroscopic suture anchoring technique will be successful if it includes proper selection pathology.

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ความสามารถการใช้งานของผู้ป่วยที่ได้รับการผ่าตัดไหล่ด้วยวิธี arthroscopic Bankart repair

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วัตถุประสงค์: เพื่อศึกษาความสามารถการใช้งานในผู้ป่วยข้อไหล่เคลื่อนซ้ำทางด้านหน้า ซึ่งได้รับการผ่าตัด arthroscopic Bankart repair และความสัมพันธ์ของจำนวนครั้งที่ไหล่เคยเคลื่อนกับความสามารถการใช้งาน

วัสดุและวิธีการ: ผู้ป่วย 16 รายซึ่งได้รับการผ่าตัด arthroscopic Bankart repair ในช่วงปีพุทธศักราช 2550 ถึง 2552 ได้รับการประเมินด้วย ASES และ UCLA score ก่อนผ่าตัด เทียบกับหลังผ่าตัด 6 เดือน และ 12 เดือน

ผลการศึกษา: ผู้ป่วยทั้ง 16 ราย มีค่าเฉลี่ยของ ASES และ UCLA score ดีขึ้นหลังผ่าตัด โดยดีขึ้นมากที่สุดเมื่อ 12 เดือนหลังผ่าตัด

สรุป: การรักษาภาวะข้อไหล่เคลื่อนซ้ำทางด้านหน้าด้วยการทำ arthroscopic Bankart repair ให้ผลดีในด้านการใช้งาน จำนวนครั้งของไหล่เคลื่อนก่อนผ่าตัดไม่มีความสัมพันธ์โดยตรงต่อผลการรักษาในด้านการใช้งาน