



## Outcomes of arthroscopic Bankart repair (ABR) for anterior shoulder instability using two knotless suture anchors fixation.

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### Article received on:

24/03/2021

### Accepted for publication:

10/06/2021

## INTRODUCTION

Shoulder joint is a multiaxial ball and socket joint. The congruity of Glenohumeral joint ensured by both static as well as dynamic stabilizers. Nature has sacrificed the stability over mobility in shoulder. Abduction, extension and external rotation can dislocate the glenohumeral joint. In variety of sports and non-sports related injuries the Labrum and associated glenohumeral capsule/ligaments- the static stabilizers can be torn allowing the humeral head to dislocate from glenoid. If the labrum and associated glenohumeral capsule/ligaments does not heal or left untreated the shoulder continues to dislocate with minimal exertion and is said to be unstable. This dislocation has a negative effect on the functionality of the shoulder.

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**ABSTRACT... Objectives:** The purpose of this study is to evaluate the short term outcomes of isolated Arthroscopic Bankart Repair (ABR) using knotless suture anchor technique, in young and middle aged patients with post traumatic Anterior Shoulder Instability (ASI). **Study Design:** Prospective Observational Study. **Setting:** Sports Units of Hayatabad Medical Complex, Peshawar. **Period:** January 2018 to December 2020. **Material & Methods:** 32 patients were included in this study, all of them were male, and who had traumatic anterior shoulder dislocation and underwent Arthroscopic Bankart Repair (ABR), with at least 2 years follow-up and minimum of 4 months of physiotherapy postoperatively. Sample size was calculated through non-probability consecutive sampling technique. Recurrent instability, postoperative glenohumeral osteoarthritis, post-surgical complications and subjective scores (Simple Shoulder Test [SST], American Shoulder and Elbow Surgeon [ASES] and Rowe scores) were evaluated. **Results:** Among the 32 participants, five patients (15.6%) experienced at least one episode of redislocation, eight patients (25%) had moderate to severe glenohumeral-osteoarthritis. The overall satisfaction rate was 76% with ASES, SST and Rowe scores of 82%, 9% and 79% respectively. One patient (3.12%) had wound infection. **Conclusion:** Isolated Arthroscopic Bankart Repair (ABR) using knotless suture anchor fixation for anterior shoulder instability followed by physiotherapy has excellent short term outcome in term of low post-surgical complication rate, high patient satisfaction, ability to joint work back and improved subjective scores, although high rate of postoperative glenohumeral osteoarthritis is disappointing necessitating further studies on the matter.

**Key words:** Arthroscopic Bankart Repair, Anterior Shoulder Instability, Lebral Repair.

**Article Citation:** Ullah S, Haleem W, Waqar M, Khan Z, Ahmad I, Khan MA. Outcomes of arthroscopic Bankart repair (ABR) for anterior shoulder instability using two knotless suture anchors fixation. Professional Med J 2021; 28(11):1595-1599. <https://doi.org/10.29309/TPMJ/2021.28.11.6485>

Bankart lesion is of two types i.e. soft bankart in which anteroinferior labrum avulse from glenoid rim and bony bankart which delineate anteroinferior glenoid rim fracture beside soft tissue injury. Patients with Bankart lesion experience shoulder pain that is diffuse in nature and gets worse with internal movement of shoulder. Dislocation of the shoulder joint occurs in 1 to 2% of the population.<sup>1</sup> Its incidence is 1.7% among adults and it is three times more common among men.<sup>2</sup> Ninety percent of shoulder dislocations are anterior<sup>3</sup>, and traumatic injuries account for 95% of them.<sup>4</sup> In athletic patients under the age of 20 years, the recurrence rates are greater than 90%.<sup>4</sup> Among patients aged 20 to 25 years, the rates are between 50 and 75%.<sup>4</sup>

In term of diagnosis, CT scan cannot visualize detached labrum although to demonstrate labrum avulsion CT arthrography has been used. CT scan can also show fracture around the glenoid. MRI is superior in detecting anterior glenoid labrum detachment plus bony fracture around the glenoid.

Traumatic labrum tear was first addressed by Bankart in 1923 and held it a reason behind Anterior shoulder instability (ASI). Over time different treatment strategies have been proposed for anterior shoulder instability including open and arthroscopic repairs, but in recent years the shift is more towards Arthroscopic repair. The open repair for Bankart lesion of anterior shoulder instability is still considered the gold standard by many surgeons.<sup>5</sup> But open repair does not always show us a significantly improvement of functionality of the shoulder. The initial results of arthroscopy were disappointing, with a recurrent rate of up to 49% using the Caspari's transglenoid suture, with the anchor technique, the results were better, but still higher than the open technique.<sup>6</sup> Due to technical advances combined with an increased understanding of the factors leading to recurrent instability, the results of Bankart arthroscopic repair have improved significantly and now can be compared with the results of the open technique.<sup>6</sup> Arthroscopic repair has the advantage of providing minimally invasive, anatomical reconstruction with low rates of operative complications and improved shoulder motion.<sup>7,9</sup> In absence of bone loss, arthroscopic bankart repair (ABR) is presently the leading treatment modality.<sup>8</sup> The purpose of this study is to evaluate the results of Arthroscopic Bankart Repair (ABR) using suture anchor.

## MATERIAL & METHODS

Data was gathered retrospectively from a prospectively kept database which has been in situ since January 2018 within the primary institute. Each patient's data was analyzed for mechanism of injury and duration of symptoms, after the demographic data was collected. The diagnosis was confirmed by MRI. Excel sheets were used for examining patients data and drawing result. We recruited 32 patients (32 shoulders) who

underwent arthroscopic Bankart repair between Jan 2017 and Dec 2020 with minimum follow up for 2 years. All the surgeries were performed by a trained orthopedic and sports surgeon and the patients were followed by one orthopedic resident. All the included patients had age between 19 to 40 years. These patients had history of sport or non-sport related trauma to shoulder with resulting anterior shoulder dislocation. All these patients had Anterior Shoulder Instability confirmed on history and physical examination. Furthermore, all patients had Bankart lesion confirmed on magnetic resonance imaging at the time of surgery, Patients who had posttraumatic anterior shoulder dislocation, evident on x-rays and physical examination after the injury, resulting in unidirectional Anterior Shoulder Instability and isolated Bankart lesion confirmed on Magnetic Resonance Imaging (MRI), who underwent Arthroscopic bankart repair using suture anchor technique, under the age of 40 years and have an active life style, with no vascular or neurological deficit, who were ready to participate in research study and willing to be contacted on mobile phone, had no co-morbidities and must be fit for General anesthesia and surgery and who must have gone through complete sessions (4 months at least) physiotherapy and rehabilitation postoperatively were included while patients with atraumatic shoulder dislocation or multidirectional shoulder instability, with Glenoid bone loss more than 25% evident on preoperative Computerized Tomography Scan (CT scan), having associated Rotator cuff tear, engaging Hill-Sachs lesion, whom chief complaint was pain with shoulder movement under load rather than instability, who opt for open bankart repair and who had posttraumatic Anterior shoulder Instability in Bilateral shoulders were excluded from the study.

All the surgeries were performed by a single surgeon using same arthroscopic operative techniques in all the patients. Preoperatively, in waiting room, interscalene nerve block was given to all the patients for post-operative pain control. After General Anesthesia while the patient in supine position the effected shoulder was examined for anterior, posterior, inferior or multidirectional instability and range of motion

was evaluated. The patients were then placed in lateral decubitus position, with the trunk angled 60° forward. All the bony prominences were padded. Preoperative antibiotic was given before giving entering the ports. Standard three arthroscopic portals were namely anterior, anterosuperolateral and posterior were used. Diagnostic arthroscopy was performed. A 30° Arthroscopic prob was used to detach the labrum from the anterior glenoid. A bleeding bed was created along the glenoid neck using burr and RASP. Through the inferior cannula drill guide for 3.5mm knotless suture anchor was introduced and pilot hole was drilled in 5 o'clock and 3 o'clock position on the rim of glenoid for suture anchor. Two knotless suture anchors were used. The anchor was secured to glenoid. One of the suture limbs was run through the capsule and labrum. Polypropylene suture was used for skin closure, shoulder sling and abduction pillow was placed. Interscalene catheter was removed on 3<sup>rd</sup> postoperative day.

### Postoperative Rehabilitation

All the participants received rehabilitation similar to the protocol mentioned by Billy Kan-Yip Law et.al<sup>9</sup> in their study.

Day 1	Pendulum exercise
Day 3 onward	Allow Internal rotation and forward flexion as pain tolerated
1 <sup>st</sup> week onward	External Rotation as pain tolerated
4 <sup>th</sup> week onward	External Rotation with 90° abduction
6 <sup>th</sup> week onward	To regain full range of motion and start strengthening exercise
2 months	Weight training, allow non-contact sports
4 <sup>th</sup> month	Return to contact sports and throwing

### Outcome Measures

In the follow up period after surgery the patients were assessed for recurrent instability, glenohumeral arthritis in operated shoulder

radiographs, Subjective assessment (including, Simple Shoulder Test (SST), American Shoulder and Elbow Surgeon score (ASES) and Rowe score.) and complications.

## RESULTS

### Recurrent Instability

Postoperative recurrent instability was reported in 5 cases out of 32 patients (15.6%) of which 2 patients (6.25%) had experienced second episode of trauma to the operated shoulder with complete dislocation on 16<sup>th</sup> and 20<sup>th</sup> month of index surgery. The remaining 3 patient (9.3%) were persistently experiencing instability in operated shoulder with at least 2 episode of dislocation on 12<sup>th</sup>, 15<sup>th</sup> and 16<sup>th</sup> months from index surgery. These three patients had significant glenoid bone loss (25%) on preoperative CT scan.

### Glenohumeral Arthritis

On follow up radiographs of operated shoulder, after 2 years from index surgery, 8 patients (25%) out of 32 had developed glenohumeral arthritis, 5 patients (15.6%) had grade-I, 2 patients (6.25%) had grade-II and 1 patient (3.12%) had grade-III osteoarthritis. Glenohumeral arthritis showed association with age and length of time from initial injury until surgery. 4 patients (50%) out of 8 had an age above 32 years and 5 patients (62.5) out of 8 had time period more than 1 month between initial injury and surgery.

### Subjective Assessment

The overall patient satisfaction rate was 76%, the mean ASES score was 82% with 80% excellent and good scores. The mean Rowe score was 79% with 76% excellent and good scores. Mean SST was 9%.

### Complications

1 patient (3.12%) had developed superficial wound infection that resolved after a course of oral antibiotics.

Recurrent Instability	Glenohumeral Arthritis	Subjective Assessment	Complications
5/32 (15.6%)	8/32 (25%)	° Overall satisfaction rate = 76%.	1/32 (3.12%)
° 2/5 (6.25%) had 2 <sup>nd</sup> episode of trauma that caused instability. ° 3/5 (9.3%) had significant glenoid bone loss on preoperatively CT.	° 5/8 (15.6%) had grade-1 OA. ° 2/8 (6.25%) had grade-II OA. ° 1/8 (3.12%) had grade-III OA	° Mean ASES score = 82%. ° Mean Rowe score = 79%. ° Mean SST =9%.	Superficial wound infection.
<b>Total Patients: 32 Total Shoulders: 32</b> <b>Cases/total = Percentage (%). OA = Osteoarthritis</b>			

## DISCUSSION

Our study mainly focuses on outcome and complications linked with arthroscopic bankart repair surgery using knotless suture anchor. Our study found that among total 32 participants, only 5 (15.6%) patients had recurrent dislocation. Among these 5, 2 patients had recurrent trauma leading to complete dislocation while other 3 had episodes of dislocation on 12<sup>th</sup>, 15<sup>th</sup> and 20<sup>th</sup> month after surgery. 8 participants from our study reported shoulder joint osteoarthritis after 2 years of surgery and 1 patient had wound infection. The mean post-surgical score of ASES was 76%. The mean score of post-surgical instability measured with ROWE was 79%. Mean score of simple shoulder test for functional limitation was 9%.

As discussed by Charles Milchtem et al. in his study, he reported the recurrent rate of 6.4% which is almost half as revealed by our study. This conflict in the results may be due to different population and different suturing used. But on other hand this study also support, our results as our study reported the satisfaction rate of 76% and ROWE score of 84% which is almost same as reported by fore mentioned author.<sup>10</sup>

Another study which definitely supports our results is done by Michael et al.<sup>11</sup> He reported the recurrent dislocation rate to be 9.7% which is almost same as found by our study. This similarity in results could be due to same suturing technique. Author further reported the mean ASES and ROWE score to be 92.8 and 85.0 which is a bit higher than ours. This difference in results could be due to different population as this study was done on athletic population.<sup>12</sup>

Similarly Yohei Ono et al. reported rate of osteoarthritis to be 36%, which is a bit higher than our results. This could be due to the greater follow-up time. On other hand, author reported the simple shoulder test score to be 10.8 which is almost same as ours results.<sup>13</sup>

Small simple size and short follow up period were the limitations of our study, which necessitate a similar study with large simple size and long follow up periods to know the outcome in long run.

## CONCLUSION

Isolated Arthroscopic Bankart Repair (ABR) using knotless suture anchor fixation for anterior shoulder instability followed by physiotherapy has excellent short term outcome, although high rate of postoperative glenohumreal osteoarthritis is disappointing necessitating further studies on the matter.






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2	Waqas Haleem	Data synthesis, Reference collection, Manuscript writing & proof reading.	
3	Muhammad Waqar	Data synthesis & manuscript writing.	
4	Zeeshan Khan	Data collection & proof reading.	
5	Israr Ahmad	Reference collection & manuscript writing.	
6	Muhammad Arif Khan	Proof reading.	