Chapter-05 Arthroscopic Bankart Repair

Chapter · January 2013

DOI: 10.5005/jp/books/11787_5

1 author:

Xinning Li
Boston University
104 PUBLICATIONS **867** CITATIONS

SEE PROFILE

Arthroscopic Bankart Repair Book Chapter

Video Atlas of Shoulder Surgery
Jaypee Brothers Medical Publishers LTD of New Delhi, India

Xinning Li, M.D., Joshua Dines, M.D., and David Altcheck, M.D.
Hospital for Special Surgery
Sports Medicine and Shoulder Service
Department of Orthopaedics
New York, NY

Introduction:

The anterior capsulolabral complex is composed of the labrum, capsule, and the anterior inferior glenohumeral ligament. Function of the complex is to increase the depth of the glenoid cavity to stabilize the glenohumeral joint. Furthermore, this soft tissue complex will resist anterior translation of the humeral head when the shoulder is placed in 90° of abduction.[9] Anterior shoulder dislocation is the most common pattern of instability and 85% is associated with a Bankart lesion.[10] Open Bankart repair has been the standard of treatment and is associated with good functional outcome with low recurrence rate.[7] In 1987, Morgan et al reported on the result of arthroscopic Bankart repair in 25 patients with transglenoid suture fixation. There was no recurrent instability and all patients were rated excellent with pain free full range of motion.[8] With the advancement of arthroscopic instrumentation and techniques, subsequent studies comparing arthroscopic versus open Bankart repairs have demonstrated equal functional outcomes and no differences in the recurrent dislocation rates.[2, 3, 5, 6] The advantages of arthroscopic anterior shoulder stabilization is the ability to provide clear images of the anatomy and pathology of the shoulder joint in a minimum invasive setting without violating the subscapularis muscle. This technique will also allow the surgeon to manage concomitant lesions such as posterior or superior labral tears, rotator cuff tears, and any other pathology. Other advantages of arthroscopic technique when compared to the open procedure are less postoperative pain, greater range of motion, faster recovery and better cosmesis.

Indications:

Arthroscopic anterior stabilization of the shoulder is commonly indicated in following two subsets of patients. This technique allows diagnostic examination of the shoulder, preparation of the glenoid bone, secure and anatomic fixation of the capsulolabral complex with suture anchors, and avoiding injuries to the normal structures. Prerequisite for arthroscopic repair is sufficient quality of the capsulolabral tissue to allow suture fixation and a motivated patient that will follow the postoperative rehab protocols.

1) Patients with episodes of recurrent instability and refractory to conservative management including a period of bracing, physical therapy, and rest.[12]

2) Patients with first time dislocation and engage in contact or high demand sports or work that increases their risk of recurrent instability.[1, 4]

Contraindications:

Contraindications to arthroscopic Bankart repair include the following.[11]

1) Deficiency of the soft tissue / capsulolabral complex that does not allow suture repair or fixation. This can be a result of multiple surgeries, underlying collagen disorder, or iatrogenic injuries during surgery.

2) Bone defect on either the glenoid surface or humeral head. Glenoid deficiency of >25 to 30% (inverted pear) will need bone grafting either with a Laterjat procedure, iliac crest graft, or allograft. Humeral head deficiency of >30% (Engaging Hill-Sachs Lesion) will alter the normal humeral head excursion and require bone grafting to prevent recurrent instability.

3) Associated humeral avulsion of glenohumeral ligament (HAGL) lesion. Technically challenging with arthroscopic repair and an open procedure is preferred.

4) Patients who can voluntary dislocate their shoulder, have multidirectional instability, hyperlaxity, and non-compliant or non-motivated to the postoperative rehabilitation.

5) Patients with brachial or scapula-thoracic dysfunction are not candidates for arthroscopic repair.

Preoperative Evaluation:
Preoperative evaluation start with a complete and detailed history of the dislocation or subluxation event. Traumatic versus atraumatic, previous instability episodes, and ability to self dislocate can provide important information for the pathology and appropriate procedure to perform. Physical examination will help confirm the diagnosis and should be focused on provocative maneuvers including apprehension sign, relocation sign, anterior and posterior load and shift, sulcus sign, hyperabduction, and active compression test. It is essential to differentiate anterior instability (Bankart lesions) from posterior instability, hyperlaxity, multi-directional instability, and other pathology resulting in the instability (HAGL, SLAP, etc).

Imaging should consist of true AP and internal + external AP to evaluate for glenoid bone loss. Axillary view to confirm that the humeral head is relocated and to rule out a posterior dislocation. This view can also demonstrate any glenoid fracture or bony Bankart lesion. Other views include Bernageau view (glenoid profile) and Stryker-notch view (Hill Sachs Lesion). Magnetic resonance imaging with and without arthrogram can also be obtained to help characterize the labral complex and associated pathology.

Surgical Technique:

Patient Positioning:
For arthroscopic Bankart repair, the patient is placed in a modified beach chair position with the arm in a McConnell arm holder. All patients will have an interscalene block and mild sedation throughout the surgery. Examination under anesthesia is performed to evaluate glenohumeral translation in the anterior, posterior, and inferior directions. At this time, the patient is prepped sterilely to the medial boarder of the scapula, which allows the surgeon more room to work arthroscopically. An axillary bolster comprised of three sterile cotton rolls wrapped in a triangular shape with ACE bandage (Figure?) is placed under the axilla. The arm is distracted

laterally with the McConnel arm holder over the bolster to provide lateralization of the humeral head that further distracts the glenohumeral joint to allow room for arthroscopic Bankart repair.

Alternatively, a lateral decubitus position can also be utilized. The patient is placed on a beanbag with the involved side up and in an arm holder attached to an overhead distraction device. Weights (5 – 10 lbs) can be set up to allow traction in both the horizontal and vertical direction. All bone prominences are well padding with either pillows or towels. The arm is typically held in approximately 65-70° of abduction, 15° of flexion and slight internal rotation.

Pearl: The essential step in positioning for arthroscopic Bankart repair is distraction of the joint space to allow instrumentation. This can either be accomplished with an axillary bolster in the beach chair position or an overhead distraction device with weights in the lateral decubitus position.

Portal Placement:

The standard posterior viewing portal is placed 2-3 cm inferior and 1-2 cm medial from the posterior-lateral corner of the acromion in the soft spot. This spot can be manually palpated and the joint line can be localized with anterior and posterior translation of the humeral head. Diagnostic arthroscopy is performed to evaluate the damage to the anterior labral complex and associated pathology in the shoulder. The second portal established in the anterolateral and superior position within the rotator interval with the assistance of an 18-gauge spine needle. This portal is just inferior to the biceps tendon and in the superior and lateral aspect of the rotator interval. The advantages of this particular position is the ability to place suture anchors below the 5 or 7 o'clock position without the need to establish a second portal in the rotator interval. A threaded 8.25mm cannula is placed in this portal to allow anchor placement, suture passage, and knot tying.

Pearl: Standard posterior viewing portal and anterolateral portal in the superior aspect with in the rotator interval with threaded cannula utilized as the working portal for anchor placement, suture passage, and knot tying. (Picture of portal placement?)

Mobilization of the Bankart Lesion:

The critical step in the successful arthroscopic Bankart repair is mobilization of the capsulolabral complex off the anterior glenoid neck. Especially in cases of chronic instability, this complex maybe healed in at a medialized position that would prevent anatomic repair if mobilization is not performed. Viewing from the posterior portal, the complex is mobilized from the glenoid neck with an arthroscopic periosteal elevator to the 6 o'clock position (sometimes beyond to allow superior shift). A rasp is used to debride the tissue off the glenoid neck and labral footprint. The 4.5mm shaver is used to decorticate the glenoid to the bleeding bone surface to facilitate healing after repair. Care is taken not to take down too much anterior-inferior glenoid bone, which would further destabilize the repair. The Bankart lesion must be elevated thoroughly to allow visualization of the subscapularis tendon through the lesion.[11]

Pearl: Bankart Lesions must be mobilized from the inferior glenoid neck to allow lateralization and anatomic suture fixation onto the glenoid surface.

Suture Anchor Placement and Fixation Technique:

Our preferred method of fixation is using a knotless horizontal mattress suture on the capsulolabral complex with a push lock anchor technique. (Arthrex PEEK Pushlock 3.5mm anchor, Naples, FL). Depending on the size of the lesion, two or three anchors are typically utilized in our repair. A curve Suture Lasso (right curve for right shoulder and vice versa) is inserted into the joint via the working threaded cannula. It is pass through the capsulolabral tissue inferior to the intended position of the anchor. Next, a prolene suture (nitinol wire loop can also be used) is advanced into the joint and the Suture Lasso is withdrawn from the cannula. An arthroscopic grasper is used to retrieve the prolene suture from the same cannula and followed by the passage of the #2 FiberWire through the labral complex using the prolene as a shuttling device. This same step is repeated to facilitate the passage of the second limb of the FiberWire into the capsulolabral complex about 1 cm above the first limb in a horizontal mattress fashion. Both limbs are retrieved through the anterolateral working cannula. Next step is to pass the spear for the pushlock anchor through the cannula onto the glenoid rim in a slightly medialized position onto the face at the 5 to 5:30 position. A bone socket for the anchor is created with a step drill. Thread the #2 FiberWire suture limbs through the eyelet of the PushLock anchor and advance into the glenoid rim while maintaining tension on the sutures. The anchor is further advanced into the bone socket and tension is released on the suture limbs. The capsulolabral tissue is reduced onto the glenoid rim with tapping of the anchor into the socket. Remove the driver by rotating in the counterclockwise direction. Same steps are repeated for additional knotless anchor fixation usually in the 3 and 4 o'clock position. This knotless technique will minimize irritation of the glenohumeral joint from the suture material in previous techniques involving tying knots.

Alternative techniques involve placement of a second portal in the anterioinferior position lateral to the coracoid for working and anchor placement. In our experience, we found one portal placed in the anterolateral position with a threaded cannula was sufficient for the procedure. Also a simple suture technique that creates a bumper effect can also be used for repair. A sliding knot with alternating half hitches is preferred for simple suture fixation. After the repair, an arthroscopic drive through sign should no longer be present. Capsular laxity should then be assessed again with both closure of the rotator interval and capsular plication performed if indicated in the patient.

<u>Pearl:</u> *It's essential to place the first anchor in the 5 o'clock or lower on a slightly medialized position on the glenoid face to mobilize the capsulolabral tissue in a superior direction. Both knotless and knotted techniques can be used for the repair. Depending on the size of the lesions, at least 2 and preferably 3 anchors should be utilized.*

Postoperative Rehabilitation:

Procedure is performed on an outpatient basis and the patients go home the same day. Wound is closed with interrupted 3-0 nylons and the patient is placed in a shoulder ultra sling with an abduction pad (20 degrees). The sling is worn for the first 3 post-operative weeks with motion encouraged in the elbow, wrist, and hand. Pendulum and passive range of motion exercises are allowed after 3 weeks in the sling. The sling is then discontinued at the 6-week time point and active assisted range of motion is started. Strengthening exercises is then started after the 3 months follow-up. Return to full activity (athletics, contact sport, and work) is permitted at 6

months. This postoperative regiment can be tailored to the individual patient. Earlier pendulum and passive range of motion exercises can be started at the 1 week post op time point if stiffness is an concern or the patient is compliant.

Pearl: Sling is worn for 6 weeks with pendulum and passive ROM exercises start during the 1-3 postoperative weeks. Strengthening at the 3 month time period and return to full activities at 6 months.

Avoiding Pitfalls and Complications:

This arthroscopic technique is challenging and the surgeon should be very familiar with arthroscopic suture management, anchor placement, and knot tying techniques. Other potential pitfalls and tips include:

1) Portal placement needs to be precise especially if only one anterolateral portal is used. If two portals are used, they need to be separated by at lease 3 cm for suture management with the anteroinferior portal placed at a position to allow access to the 5 to 5:30 position on the glenoid rim.
2) Suture anchors need to be fixed in a secure position on the glenoid and should always be visualize with an arthroscope to avoid unloading the suture from the anchor.
3) If knotless anchor technique is used, then it is essential to place the anchor in the same trajectory as the bone socket to avoid breaking the anchor.
4) Suture management is essential to avoid tangling and twisting of the limbs. If a single cannula is used for suture passage and tying, then using a snap with each limb of the suture will place traction and decrease risk of tangling the sutures within the cannula.
5) Distraction of the joint in either the beach chair or lateral decubitus position is important to minimize injury to the cartilage surface.

References:

1. Arciero RA, Wheeler JH, Ryan JB, McBride JT. Arthroscopic Bankart repair versus nonoperative treatment for acute, initial anterior shoulder dislocations. The American journal of sports medicine. 1994 Sep-Oct;22(5):589-94.
2. Bottoni CR, Smith EL, Berkowitz MJ, Towle RB, Moore JH. Arthroscopic versus open shoulder stabilization for recurrent anterior instability: a prospective randomized clinical trial. The American journal of sports medicine. 2006 Nov;34(11):1730-7.
3. Cole BJ, L'Insalata J, Irrgang J, Warner JJ. Comparison of arthroscopic and open anterior shoulder stabilization. A two to six-year follow-up study. The Journal of bone and joint surgery American volume. 2000 Aug;82-A(8):1108-14.
4. DeBerardino TM, Arciero RA, Taylor DC, Uhorchak JM. Prospective evaluation of arthroscopic stabilization of acute, initial anterior shoulder dislocations in young athletes. Two- to five-year follow-up. The American journal of sports medicine. 2001 Sep-Oct;29(5):586-92.
5. Fabbriciani C, Milano G, Demontis A, Fadda S, Ziranu F, Mulas PD. Arthroscopic versus open treatment of Bankart lesion of the shoulder: a prospective randomized study. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. 2004 May;20(5):456-62.

6. Karlsson J, Magnusson L, Ejerhed L, Hultenheim I, Lundin O, Kartus J. Comparison of open and arthroscopic stabilization for recurrent shoulder dislocation in patients with a Bankart lesion. The American journal of sports medicine. 2001 Sep-Oct;29(5):538-42.
7. Kim SH, Ha KI, Kim SH. Bankart repair in traumatic anterior shoulder instability: open versus arthroscopic technique. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. 2002 Sep;18(7):755-63.
8. Morgan CD, Bodenstab AB. Arthroscopic Bankart suture repair: technique and early results. Arthroscopy : the journal of arthroscopic & related surgery : official publication of the Arthroscopy Association of North America and the International Arthroscopy Association. 1987;3(2):111-22.
9. O'Connell PW, Nuber GW, Mileski RA, Lautenschlager E. The contribution of the glenohumeral ligaments to anterior stability of the shoulder joint. The American journal of sports medicine. 1990 Nov-Dec;18(6):579-84.
10. Rowe CR, Patel D, Southmayd WW. The Bankart procedure: a long-term end-result study. The Journal of bone and joint surgery American volume. 1978 Jan;60(1):1-16.
11. Su B, Levine WN. Arthroscopic Bankart repair. The Journal of the American Academy of Orthopaedic Surgeons. 2005 Nov;13(7):487-90.
12. Voos JE, Livermore RW, Feeley BT, Altchek DW, Williams RJ, Warren RF, et al. Prospective evaluation of arthroscopic bankart repairs for anterior instability. The American journal of sports medicine. 2010 Feb;38(2):302-7.