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Video Article

Arthroscopic Bankart repair with inferior glenohumeral ligament tightening using the antegrade suture passer

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A B S T R A C T

Arthroscopic repair is the gold standard for treating Bankart lesions, with commonly used portals including the posterior, anterosuperior, and anteroinferior portals. The two anterior portals are established through a safe triangle created by the superior margin of the subscapularis, the inferior margin of the biceps tendon, and the anterior superior edge of the glenoid cavity. However, the disadvantage of this conventional method is that it can lead to crowding of the instruments at the rotator interval, making it difficult to handle. The inferior glenohumeral ligament (IGHL) and its bands play a major role in the pathophysiology of glenohumeral instability. Restoration of the capsular tension by tightening the anterior band of the IGHL is an integral part of a successful Bankart repair, achieved by suturing the labrum at the 6 o'clock position to an anchor placed at the 5 o'clock position of the glenoid, creating a south-to-north capsulolabral shift. Traditionally, this is done using a curved suture passer (Lasso). However, taking a bite using the Lasso through the anteroinferior portal is difficult.

Our technique involves the use of an antegrade suture passer (Arthrex Scorpion, Naples, Florida, United States) to create a mattress suture at the 6 o'clock position through the modified anterosuperior portal. Although the external landmarks of the anterosuperior portal remain the same, we have made modifications by entering the joint superior to the biceps tendon. This modification prevents overcrowding and makes it easier to handle the instruments. Because the anterosuperior portal serves as a viewing portal, we opted to use an arthroscopic trocar sleeve instead of a cannula, which prevents additional crowding within the joint.

Arthroscopic Bankart repair with inferior gleno humeral ligament tightening using the antegrade suture passer

- Under general anesthesia, the patient is positioned in a lateral decubitus position with the arm placed in 60-degree abduction and 20-degree flexion. Fifteen pounds of traction is applied.
- We use three portals: the standard posterior viewing portal, the anteroinferior working portal, and the anterosuperior viewing portal. Diagnostic arthroscopy is done through the posterior portal.
- To prevent overcrowding in the rotator interval, the anterosuperior portal is modified by entering the joint superior to the biceps tendon, and the arthroscopic trocar sleeve is used instead of a cannula.
- The labral tissue and the capsule are elevated from the glenoid up to the 6 o'clock position using an arthroscopic periosteum elevator.

The excursion of the capsulolabral tissue is noted. The edge of the glenoid is freshened using an Arthroscopic rasp instead of a burr.

- A double-loaded anchor is inserted at the 5 o'clock position. The first suture is retrieved through the capsulolabral tissue at the 6 o'clock position for a mattress suture using a Scorpion Suture passer (Arthrex, Naples, Florida, US) and tightened to obtain a south-to-north capsulolabral shift, tightening the anterior band of IGHL. The second limb of the anchor forms a simple suture at the 5:30 position, which will form the bumper effect.
- The second anchor is inserted at the 4 o'clock position, and the suture is retrieved through the capsulolabral tissue using a Lasso suture passer and tied with a simple suture. The third anchor is placed at the 3 o'clock position and tied with a simple suture.
- The Remplissage procedure begins with preparing the Hill-Sachs bed and placing the anchor, followed by the subsequent completion of the procedure after the Bankart repair has been carried out.

Technique structure

Outline of the clinical problem

The first arthroscopic Bankart repair was described by Wolf et al. [1] He used four portals, the anterosuperior, the anteroinferior, the posteroinferior and the posteroinferior portals. Nowadays many surgeons

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prefer three portal technique. The anteroinferior and anterosuperior portals lie in the “intra-articular triangle” described by Matthews et al. [2] bounded by the glenoid rim, the humeral head, and the long head of biceps tendon. This can cause crowding of instruments at the rotator interval and will cause handling of instruments difficult. According to Turkel et al. [2] anterior band of the IGHL acted as the main anterior stabilizer when the shoulder kept in 90° abduction and external rotation. Hence tightening anterior band of IGHL which is achieved by south to north capsulolabral shift is the key to a successful Bankart repair. Capsulolabral plication at 6 o'clock position is difficult using the conventional lasso suture passer in the anteroinferior portal, or else an accessory posterior portal may be required [3].

Surgical indications

- Recurrent shoulder instability with glenoid bone loss <25%
- Anteroinferior labral defect

Surgical contraindications

- Glenoid bone loss >25%
- Multidirectional instability
- Voluntary dislocation

Treatment options

The management of shoulder instability consists a wide range of interventions from rehabilitative and supportive measures to surgical repair or reconstruction of the disrupted mechanisms [4]. In 1923, Dr. Arthur Bankart first developed an open surgical technique for the treatment of recurrent shoulder instability [5]. With the evolution of minimally invasive surgery, most surgeons currently prefer arthroscopic Bankart repair using three portals. In recent years, a single portal technique has also been developed [6]. The anteroinferior portal is the working portal used for instrumentation, anchor placement, and passing suture loops, while the anterosuperior portal is the viewing portal. The posterior portal is used for suture shuttling.

We made the following modifications to the conventional method.

- Even though the outside landmarks of the anterosuperior portal are the same, we modified it by entering the joint superior to the biceps tendon to prevent overcrowding and make handling the instruments easier.
- Since the anterosuperior portal is a viewing portal, we used an arthroscopic trocar sleeve instead of a cannula to prevent further crowding.
- We used an antegrade suture passer instead of a curved lasso suture passer to get a bite at the 6 o'clock position.
- We used a double-loaded suture anchor at the 5 o'clock position. The mattress suture at the 6 o'clock position will produce a south-to-north capsulolabral shift, which will tighten the anterior band of the IGHL. Another simple suture at the 5:30 o'clock position will produce the classical bumper effect.

Outcomes of the technique

The long-term outcome of arthroscopic Bankart repair has been widely studied, and research indicates that it can be highly successful in restoring shoulder stability and function. According to S Zink et al. 10-year follow-up study, the degree of osteoarthritis appears to be the primary factor that determines a favourable functional outcome [9]. Capsular lesions were frequently observed in shoulders undergoing arthroscopic Bankart repair and were found to be associated with a higher risk of postoperative recurrence of instability. Although these lesions were more common among older patients, young competitive athletes were more likely to experience recurrence of instability after

surgery [10].

Our patient had no history of dislocation after the surgery. He returned to normal activities after 3 months and recreational sports after 6 months.

Complications

Nowadays, arthroscopic Bankart repair is increasingly popular procedure used to treat recurrent shoulder instability. While it has been successful in treating acute cases, there are challenges and shortcomings associated with this procedure which must be acknowledged. One challenge is the high level of technical skill required to perform the surgery, which can lead to higher complication rates if not done by an experienced surgeon. Additionally, there is a risk of recurrence or failure of the repair, especially in patients with significant bone loss or structural abnormalities. Compared to the open bone augmentation procedures which have a lower recurrence rate ranging from 2% to 6%, the arthroscopic labral repair shows a higher recurrence rate of 16% [7]. Lukas et al. demonstrated, in a systematic review and meta-analysis of 4584 shoulders, that several factors were associated with an increased risk of recurrence following an arthroscopic Bankart repair. These factors included age of ≤20 years and ≤30 years, participation in competitive sports, the presence of a Hill-Sachs lesion, an off-track Hill-Sachs lesion, glenoid bone loss, an ALPSA lesion, more than one preoperative dislocation, a surgical delay of more than 6 months from the first-time dislocation to surgery, and an ISIS score of > 3 [8]. Moreover, post-operative rehabilitation following arthroscopic Bankart repair can be time-consuming and may require significant patient commitment. Other potential complications include infection, nerve injury, and stiffness of the joint.

Conclusion and future perspectives

Arthroscopic portals should fulfil two basic criteria. Firstly, they should provide a good visualization of intra-articular structures and allow for easy access to pathologies to facilitate debridement or repair. Secondly, they should be safe to prevent damage to adjacent neurovascular structures. The current technique uses three portals, with the anterior portals entering the joint through the rotator interval via the safe triangle. However, this can cause crowding of instruments. The anterior band of the IGHL acts as a hammock, preventing inferior subluxation of the humeral head. Therefore, tightening of the anterior band of IGHL, along with labral repair, is an integral part of successful Bankart surgery. Future long-term, high-volume studies will provide more insight into the outcomes of our modifications to the conventional method. These studies will help guide patients and identify factors that promote optimal results.

Ethical approval

No ethical committee approval required as our presented technique is a modification of an established current technique.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jisako.2023.03.433>.

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