Clinical Results of Arthroscopic Bankart Repair With Knot-Tying and Knotless Suture Anchors

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Purpose: To compare the results of arthroscopic Bankart repair completed with knot-tying with results of the procedure performed with knotless suture anchors. **Methods:** We evaluated 82 patients who underwent arthroscopic Bankart repair. A total of 61 patients were treated with knot-tying suture anchors, and 21 patients were treated with knotless suture anchors during the same period. In all, 75 male and 7 female patients were studied. Mean patient age at the time of operation was 24 years (range, 16 to 42 years), and the mean follow-up period had a duration of 29 months (range, 24 to 41 months' duration). **Results:** Shoulder scores improved in both groups ($P < .05$). Postoperative pain, patient satisfaction score, and redislocation rate were significantly different between the 2 groups, with the knot-tying suture anchor group showing better results ($P = .007$, $P = .007$, and $P = .012$, respectively). In the knot-tying suture anchor group, 4.9% (3 patients) experienced redislocation and 1 patient underwent revision surgery. The redislocation rate in the knotless suture anchor group was 23.8% (5 patients), and 4 patients underwent revision surgery. **Conclusions:** The knot-tying and knotless suture anchor groups showed improvement in postoperative shoulder scores after arthroscopic Bankart repair. However, results after the knotless technique was performed were unsatisfactory when compared with results in the standard suture anchor group, particularly in terms of redislocation rate. **Level of Evidence:** Level III, retrospective comparative therapeutic study. **Key Words:** Bankart—Arthroscopic repair—Knot-tying suture anchor—Knotless suture anchor.

Arthroscopic Bankart repair completed with the use of suture anchors has gained wide acceptance as a method of restoring the attachments of the labral/capsular ligaments to the anterior and inferior glenoid rim.[1-3] Successful outcomes with suture anchors in arthroscopic Bankart repair depend on knot security. A significant learning curve is associated with arthroscopic knot tying, and improper technique is a potential cause of treatment failure and recurrent pain or dislocation. This procedure can be challenging to master and time consuming to perform because arthroscopic tied knots are bulky, even for the experienced surgeon.[4,5]

Many experts have attempted to overcome this problem since Thal first reported the use of knotless suture anchors.[4,6,7] This new technique may provide a secure, low-profile repair without introducing complexities to the procedure of arthroscopic knot tying.

Recently, however, the late disengagement of a knotless anchor has been reported,[8] and an in vitro comparison study of knot-tying and knotless metal suture anchors has shown that knotless suture anchors may cause significantly greater gap formation between bone and soft tissue in comparison with knot-tying anchors.[9] Moreover, to date, no report has compared the clinical results of knot-tying anchors with those of knotless suture anchors. This study was undertaken to compare the clinical results of knot-tying and the use of knotless suture anchors in arthroscopic Bankart repair.

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We hypothesized that knot-tying suture anchors and knotless suture anchors would yield the same results, and that the use of knotless suture anchors may result in limited range of postoperative motion because some of the tissues that are placed in the hole when knotless anchors are inserted may produce loading and cause excessive tension on the capsule.

METHODS

Patient Demographics

We retrospectively evaluated patients who underwent arthroscopic Bankart repair with the use of knot-tying suture anchors or knotless suture anchors between August 2001 and September 2002. Medical records and intraoperative arthroscopic photographs of 123 shoulders in 117 patients were reviewed. Patients who had a classic Bankart lesion with good remaining labrum were included. Those with a bony Bankart lesion, an anterior labroligamentous periosteal sleeve avulsion (ALPSA)-like lesion, humeral avulsion of the glenohumeral ligament (HAGL), an associated SLAP lesion, rotator cuff tear or rotator cuff fibrillation, poor labrum, or associated hyperlaxity (2+ or greater laxity on the sulcus sign) were excluded. The number of final subjects was 82 (knot-tying suture anchors were used in 61 patients and knotless suture anchors in 21 patients). The knot-tying suture anchor group consisted of 23 athletes, and 5 athletes were included in the knotless suture anchor group. Among them, 15 contact athletes (25%) were included in the knot-tying group and 3 (14%) in the knotless group. All procedures were performed by the senior author. During the procedure, we randomly decided in each case whether to use knot-tying suture anchors or knotless suture anchors. All patients were followed for at least 24 months. Postoperative evaluations included the visual analogue scale (VAS), Rowe score, Constant score, and patient satisfaction ratings. The VAS is used to measure pain, with 0 indicating no pain and 10 representing extremely severe pain. Among the various categories of the UCLA (University of California at Los Angeles) score, only the patient satisfaction score (5 of a total of 35 points) was used for our study.[10]

Operative Techniques

We used mini-Revo suture anchors (Linvatec, Largo, FL) for 61 patients and knotless suture anchors for 21 patients. Knotless suture anchors consist of a metal body with 2 prongs and an attached, closed "anchor" loop of braided metal (Knotless Anchor, Mitek, Norwood, MA).[6] A longer, open "utility" suture loop (No. 2 Ethibond, Ethicon, Somerville, NJ) was linked to the anchor loop and was used to pull the anchor loop through the torn labrum to be repaired.

The patient was positioned in a beach chair position. Standard arthroscopic portals, including a posterior portal as a viewing portal and anteroinferior and anterosuperior portals as working portals, were used in both procedures. The exposed labral edge of a Bankart lesion was debrided with a motorized shaver to promote healing after repair. Special care was taken to ensure that the anteroinferior glenohumeral ligament was adequately released from the glenoid and the underlying subscapularis tendon and mobilized. A motorized burr was used to decorticate the anterior glenoid neck from the edge of the articular cartilage 1 to 2 mm medially.

When knot-tying suture anchors were used, a bone punch was inserted through the anteroinferior portal at an angle of 60° to 80° on the glenoid, vertical to the glenoid articular surface to the greatest extent possible, and 1 to 2 mm toward the articular cartilage of the rim; a punch hole was created at the 5 to 5:30 o'clock position for the right shoulder. After the anchor had been properly positioned, the outer strand that faced away from the glenoid articular surface was retrieved through the anterosuperior portal. Next, a suture hook loaded with a monofilament suture such as No. 1 nylon or No. 5 polydioxanone suture (PDS) was used to penetrate the inferior glenohumeral ligament and labrum at the most inferior position about 1 cm lateral to the glenoid rim through the anteroinferior portal (Fig 1). The pulling suture was passed, retrieved through the anterosuperior portal, and tied to the outer strand of a single anchor suture outside the anterosuperior portal. The pulling suture loaded with the outer strand of the anchor suture was pulled back through the capsulolabral structure from the anteroinferior portal to create a simple stitch. A nonsliding Revo knot with alternating half-hitches was used to secure the capsulolabral structure to the glenoid articular margin. Additional anchors were placed in a similar manner at both 4 and 3 o'clock positions.

When knotless suture anchors were used, punch holes were created in the anterior glenoid rim in accordance with the size of the capsulolabral lesion. The same technique was used with knotless suture anchors as was used with knot-tying suture anchors. A suture hook loaded with a pulling suture was passed through the inferior glenohumeral ligament and labrum through the anteroinferior portal and was then