Arthroscopic Bankart Repair Using Knot-Tying Versus Knotless Suture Anchors: Is There a Difference?

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Purpose: To compare the clinical outcome between the use of knotless sutures versus knot-tying sutures in arthroscopic Bankart repairs. **Methods:** Between January 2007 and January 2011, 87 patients who underwent arthroscopic Bankart repair with the use of knot-tying suture anchors or knotless suture anchors were evaluated, with 45 patients in the knot-tying suture group and 42 patients in the knotless group. Patients were assigned to either group, with odd-numbered patients going to the knot-tying suture arm and even-numbered patients assigned to the knotless arm. Outcomes included the Constant score, the visual analog scale (VAS) score, patient satisfaction score, and range of motion in forward flexion and external rotation with the arm in adduction. Redislocations or subluxations with the 2 techniques was also studied. **Results:** Both groups showed a statistically significant improvement between the preoperative and postoperative VAS scores and Constant scores. In the knot-tying suture group, the VAS score improved from 2.5 ± 2.3 to 0.7 ± 0.5 ($P < .05$) and the Constant score improved from 64 ± 7 to 92 ± 10 ($P < .05$). In the knotless group, the VAS score improved from 2.8 ± 2.5 to 0.9 ± 0.6 ($P < .05$), and the Constant score improved from 62 ± 6 to 89 ± 9 ($P < .05$). The patient satisfaction scores were 6.9 and 7.1 for the knot tying and knotless groups, respectively. No statistically significant differences were found when comparing the outcomes between the 2 groups. The change in the range of forward flexion and external rotation was also similar in the 2 groups. There was also no difference in recurrence or redislocation rates. **Conclusions:** Both the knot-tying and knotless suture anchors groups showed statistically significant and similar improvement in VAS and Constant scores. Both anchors provided reasonable outcomes. The knotless suture anchor is a good alternative to knot-tying suture anchors so that arthroscopic Bankart repairs can be performed without knot tying. **Level of Evidence:** Level II, prospective comparative study.

Surgery is often performed for shoulder instability that affects the young and active individual. Open repair of the Bankart lesion has traditionally given good to excellent results.[1] With the evolution of minimally invasive surgery, arthroscopic Bankart repair using suture anchors is now widely accepted as a method of restoring the labrum to the glenoid rim, with reported results similar to those of open stabilization.[2,3] Benefits of arthroscopic surgery include the avoidance of subscapularis tenotomy, a faster return to normal activity, smaller surgical scars, an improved range of motion, and a shorter hospital stay.[4]

Many arthroscopic repair studies describe the use of suture anchors with arthroscopic knot tying.[5-8] Successful outcome with suture anchors is thus highly dependent on knot security.[9] A good-quality arthroscopic knot-tying suture anchor repair is difficult to achieve technically, and significant practice is required.[4,9,10] This process can take time to master. In view of this, concerns exist regarding the quality and consistency of arthroscopic knot tying.[9] Hence, an inadequate technique is a potential cause of treatment failure and recurrent pain or dislocation.

Knotless anchors arose as a solution to the difficulty of tying secure knots with reliable tension arthroscopically.[9] They offer the advantage of a secure low-profile repair without the technical challenges of tying knots arthroscopically.[9] However, a late disengagement of a knotless anchor has been reported,[11] and an in vitro comparison study of knot-tying versus knotless metal suture anchors has shown that knotless suture anchors may cause significantly greater gap formation

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The authors report that they have no conflicts of interest in the authorship and publication of this article.

Received June 3, 2013; accepted January 14, 2014.

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0749-8063/13365/$36.00

http://dx.doi.org/10.1016/j.arthro.2014.01.005

between bone and soft tissue in comparison with knot-tying anchors.[12] These concerns need to be addressed, and evidence in the form of outcome studies to support or reject the knotless suture as an option is required.

To date, there are only a few studies in the literature that have compared the clinical outcomes with the use of knotless sutures versus knot-tying sutures in arthroscopic Bankart repairs.[13,14] The aim of this study was to compare the clinical outcomes between the 2 techniques. We hypothesized that there would be a significant improvement in outcomes with both techniques and that there would be no difference in outcomes between them.

Methods

Between January 2007 and January 2011, 95 consecutive patients who underwent arthroscopic Bankart repair with the use of knot-tying suture anchors or knotless suture anchors were evaluated. Preoperatively, patients were assigned to either group, with odd-numbered patients going to the knot-tying suture arm and even-numbered patients assigned to the knotless arm. Clinical records, intraoperative records, and intraoperative arthroscopic photographs were reviewed. The study received approval from the appropriate ethics committee and was performed in accordance with the ethical standards in the 1964 Declaration of Helsinki. It also received approval from the National Healthcare Group Disease-Specific Review Board.

All patients included in the study had a classic Bankart lesion caused by a traumatic anterior shoulder dislocation. All had at least 2 episodes of dislocation with persistent instability and conservative treatment had failed. Surgery was performed within 6 weeks of the last documented dislocation. No surgery was performed for patients who had a first episode of dislocation. Patients with (1) a bony Bankart lesion, (2) humeral avulsion of the glenohumeral ligament, (3) an associated SLAP tear, (4) a rotator cuff tear, or (5) an engaging Hill-Sachs lesion were excluded. A sample size of 40 participants in each group (80 in total) was sufficient to detect a standard difference of 0.65 (65% of the standard deviation) for the VAS score with a 2-sample *t* test at 80% power. Moreover, for within-group comparison, 40 participants was sufficient to detect a standard difference of 0.45 (45% of the standard deviation) for the VAS score with a paired *t* test at 80% power.

All procedures were performed by the senior author (V.P.K.). No additional procedure such as interval closure, posterior labral repair, or thermal capsulorrhaphy was performed. None of the cases involved an engaging Hill-Sachs lesion.

The mean follow-up period was 2.7 years (range, 2 to 3.7 years). Patients were evaluated both preoperatively and postoperatively with the visual analogue scale (VAS), Constant score, and patient satisfaction score (scale of 1 to 10). Preoperative and postoperative range of motion, particularly forward flexion and external rotation with the arm in adduction, were evaluated. Postoperatively, patients were also assessed for recurrence of dislocations or a positive apprehension test result. Clinical parameters such as the VAS score, Constant score, and patient satisfaction score were assessed by a nurse clinician not involved in the direct care of the patient. Patient satisfaction was evaluated on a scale of 1 to 10, with 1 being the worst satisfaction and 10 being the best. This assessment was done only in the postoperative review. Failure was defined as a non-traumatic redislocation or subluxation or a positive apprehension test result.

Surgical Technique

All surgery was performed with the patient in the beach chair position. Standard arthroscopic portals, were used, with a posterior portal as a viewing portal and anteroinferior and anterosuperior portals as working portals. The posterior portal was located approximately 3 cm inferior to the posterolateral corner of the acromion at the posterior soft spot. The arthroscope entered the joint in the interval between the infraspinatus and teres minor tendons. The anteroinferior portal was placed as close as possible to the superior edge of the subscapularis tendon to allow access to the anterior and inferior aspects of the glenoid rim. The anterosuperior portal was placed in the rotator interval just superior and anterior to the biceps tendon.[9] After diagnostic arthroscopy, the anterior labrum was mobilized adequately, and a motorized shaver was used to debride the exposed labral edge to promote healing. An arthroscopic rasp and burr were used to decorticate the anterior glenoid neck.

Knot-Tying Suture Group

Anchor holes were created on the glenoid surface using a drill that was inserted through the anteroinferior portal at an angle of 50° to 70° to the plane of the glenoid and 1 to 2 mm from the glenoid rim. The first anchor was placed at the 5:30 o'clock position for the right shoulder and the 6:30 o'clock position for the left side. One end of the FiberWire (Arthrex, Naples, FL) was then retrieved through the anterosuperior portal. A 45° curved suture lasso (Lasso; Arthrex) was used to penetrate the labrum at the most inferior position about 1 cm lateral to the glenoid rim through the anteroinferior portal. The pulling suture loop was passed, retrieved through the anterosuperior portal, and tied to the end of the single anchor suture that lay outside the anterosuperior portal. The loaded pulling suture was then pulled back through the capsulolabral structure and out through the anteroinferior portal. A sliding hangman's knot with alternating half-stitches was used to secure the capsulolabral structure to the glenoid articular margin. Additional anchors were