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Original Article

Evaluation of the clinical-functional results from repairing extensive rotator cuff injury with inclusion of the tendon of the long head of the biceps

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ABSTRACT

Objectives: To assess the outcomes of the arthroscopic margin convergence of the posterior cuff to the biceps tendon. *Methods*: From October 2003 to December 2007, 20 patients with massive rotator cuff tear which include the rotator interval were treated with arthroscopic margin convergence of the posterior cuff to biceps tendon. Sixteen patients were female and four were male. The mean age was 58.95 years old. The dominant side was affected in 16 cases (80%). The outcomes were analysed according to the UCLA Score with a minimum follow-up period of two years. *Results*: The UCLA score improved, on average, 14 points ($p < 0.001$). Six patients had excellent results; nine good; three fair and two poor results. The mean improvement of forward flexion was 33º ($p < 0.001$), 3º of external rotation ($p < 0.396$) and two vertebral levels for internal rotation ($p < 0.025$). *Conclusion*: The arthroscopic margin convergence of the posterior cuff to the biceps tendon leads to satisfactory results.

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Introduction

The term "extensive rotator cuff injury" has been widely used to identify lesions that are particularly difficult to repair and are thus correlated with an uncertain prognosis.[1,2] Cofield[3] defined these injuries as complete tendon ruptures greater than or equal to 5 cm of its diameter, while Zumstein et al.[4] defined extensive lesions as those that were complete and compromised two or more tendons that made up the rotator cuff.

Repairing chronic extensive rotator cuff tears is a challenge even for the most experienced shoulder surgeons. These tears are generally associated with atrophy of the musculature of the rotator cuff, with retraction and loss of mobility of the tendon, which greatly increases the difficulty in repairing it.[2,5]

Better knowledge of the injury patterns and advances in the quality and design of materials, along with improvements in surgical techniques, have made it possible to repair extensive tears by means of arthroscopy.[6-10] In the case of extensive tears of U-shaped pattern, with retraction of the supraspinatus tendon, without mobility and with deficiency of the rotator interval, a procedure to converge the margins of the posterior portion of the rotator cuff using the tendon of the long head of the biceps brachii muscle may be a good repair option.[8]

This study, conducted by the Shoulder and Elbow Group of the ABC Medical School (Faculdade de Medicina do ABC), had the aim of presenting the results obtained through this surgical technique, in treating extensive rotator cuff injuries.

Materials and methods

Between October 2003 and December 2007, 53 patients with extensive rotator cuff tears underwent arthroscopic surgical treatment performed by our group.

For inclusion in this study, patients in whom the supraspinatus tendon had retracted and lacked mobility, and in whom the rotator interval was deficient, were selected. The repair was performed using the margin convergence technique, with suturing of the posterior portion of the rotator cuff using the tendon of the long head of the biceps brachii muscle. Patients were excluded if they failed to respond to the request to come for a reassessment or if they had not yet completed 24 months of postoperative follow-up. Thus, 20 patients were evaluated: 16 women (80%) and four men (20%), of mean age 58.95 years (range: 42 to 75 years); 18 patients were right-handed and two were left-handed, and the lesion had occurred in the dominant limb in 16 patients (80%).

The preoperative joint mobility was assessed by means of the parameters described by Hawkins and Bokos.[11] The maximum elevation ranged from 60° to 160°, with a mean of 117.62°; the lateral rotation was from 20 to 80°, with a mean of 47.38°; and the medial rotation, which was evaluated according to the vertebral level that the patient was able to reach with the thumb, ranged from the ipsilateral greater trochanter to T7, with a mean of L2.

All the patients were evaluated using the UCLA score[12] before the surgery, and the mean score was found to be 15.05 (range: 10-24). Magnetic resonance imaging was also performed preoperatively, and this showed fatty muscle degeneration of the supra and infraspinatus muscles, as assessed using Goutalier's classification,[5] with means of 2.9 and 2.4, respectively.

After the operation, the patients were reassessed clinically using the UCLA score[12] and their joint mobility was reassessed by means of the parameters described by Hawkins and Bokos.[11]

The statistical analysis was performed using the SPSS software (Statistical Package for the Social Sciences), version 17.0. The Wilcoxon signed rank test was used to investigate possible differences between the pre and postoperative UCLA scores and in relation to joint mobility. Spearman's correlation analysis was used to ascertain the degree of correlation between the variables of interest (postoperative UCLA score, fatty degeneration of the supra and infraspinatus muscles before the operation, and re-rupture). We used the significance level of 5% (0.05) for applying the statistical tests.

Surgical technique

The patients underwent the surgical procedure in the "deckchair" position, under general anesthesia associated with brachial plexus block. The arthroscopic procedure began with an inspection of the joint using an optical device introduced through the posterior portal. The stability of the tendon of the long head of the biceps brachii muscle was tested by evaluating the competence of the medial pulley. In cases in which the upper portion of the subscapular tendon was torn, the lesser tubercle was repaired using an anchor and suture stitches, done by means of articular viewing. Going into the subacromial space, the rotator cuff was repaired by advancing the posterior portion of the lesion to the tendon of the long head of the biceps brachii. The repair was done using tendon-to-tendon stitches. Subsequently, this combination was reattached to the greater tubercle using anchors. In this manner, tenodesis of the long head of the biceps was performed without tenotomy at its origin. At the end of the procedure, the repair was also verified by means of articular viewing (Figs. 1-4).

After the operation, the patients were kept immobilized using a sling for six weeks, and only doing passive exercises of the shoulder and active exercises of the elbow and wrist, which were started on the day after the surgery. After this period, the immobilization was removed and active movement of the shoulder was started in order to gain strength.

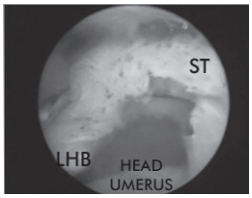

Fig. 1 - Lateral view of the left shoulder: extensive lesion of the supraspinatus with deficient rotator interval.
LHB: long head of the biceps; ST: supraspinatus tendon.