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Functional Outcome After Arthroscopic Rotator Cuff Repair – An Early Experience

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ABSTRACT

According to recently reported outcome studies, functional outcomes after arthroscopic rotator cuff repair are reasonable and comparable to open or mini-open techniques. We report the functional outcomes after arthroscopic rotator cuff repair of 10 consecutive patients. The average age was 53.9(range 46-59) years. There was a significant improvement of the function of the shoulder when the preoperative scores were compared with those at the time of at least six months follow-up (range of 6 months to 18 months). With the UCLA rating scale, the average total score increased from preoperative 9.8 (range, 6-15) to postoperative 32.6 (range, 23-35). With the use of ASES shoulder index, the average total score improved from 14.6(range, 1.6-35) to 92.3 (range, 66.6 to 100). We concluded that arthroscopic rotator cuff repair is a treatment method in selective patients with symptomatic rotator cuff pathology to alleviate shoulder pain and improve function.

INTRODUCTION

Several treatment methods have been described in treating patient with shoulder pain as a result of rotator cuff pathology. Surgical interventions for rotator cuff tears include open, mini-open and arthroscopic repair [1,2,3,4,5]. According to recently reported outcome studies, functional outcomes after arthroscopic rotator cuff repair are reasonable and comparable to those achieved after open or mini-open techniques [2,6,7,8]. Arthroscopic technique is a less invasive approach which may have advantageous for postoperative rehabilitation and outcome [2,6,9,10]. The purpose of this study was to study early experience using arthroscopy in treating patients with symptomatic rotator cuff tears.

MATERIALS AND METHODS

Patient Selection

We evaluated consecutive patients with symptomatic rotator cuff tears who were treated with arthroscopic surgery between January 2008 and December 2008. All of the procedures were performed in a single hospital.

Outcome Assessment

All patients were evaluated using the rating scale of the University of California Los Angeles (UCLA)[11] and the shoulder index of the American Shoulder and Elbow Surgeons (ASES) [12] preoperatively and at a minimum of 6 months (range, 6 to 18 months) postoperatively.

Surgical Technique

All surgical procedures were performed under general anesthesia. The patient was placed in the lateral decubitus position with the patient posteriorly angled 45 degrees. Examination under anesthesia was performed for passive range of motion. Manipulation was done in cases with limited passive range of motion. The arm was placed in a foam traction sleeve after cleaned and draped and then connected to a shoulder traction device. The upper limb was positioned in 30 degree abduction and 15 degrees of forward flexion. Traction was then applied with the arm in neutral position. Three kg each were placed for arm distraction and abduction traction. The posterior portal was created 2 cm inferior and 1cm medial to the posterolateral acromial angle. The anterior portal was placed in the rotator cuff interval using outside-in technique. Glenohumeral joint arthroscopy was performed. Intraarticular lesions were addressed accordingly. The arthroscope was then inserted into the subacromial space through the posterior portal. Using the scope trocar and cannula, an anterior subacromial portal was created using the same anterior skin incision. A lateral subacromial portal was made on a coronal line drawn from the posterior corner of the acromioclavicular joint 3cm lateral to the lateral border of the acromion. Acromioplasty was routinely performed in all patients.

After the completion of the acromioplasty, arthroscopic bursectomy was performed. The rotator cuff tear was then identified. A rear viewing portal was created as described by Kim *et al.* [13]. The mobility of the rotator cuff was evaluated. If there was significant tension, the coracohumeral ligament was released. The edge of the tear was debrided. Footprint of the rotator cuff at greater tuberosity was prepared with shaver and decorticated lightly with the round burr. The size of the tear was then measured with the probe.

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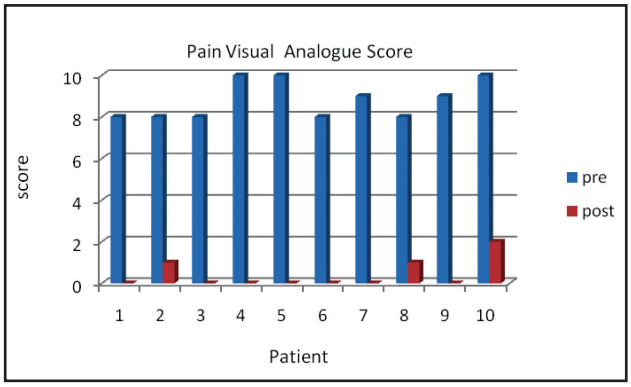

Fig. 1: Graph showing the preoperative(pre) and postoperative(post) VAS pain score for each patient.

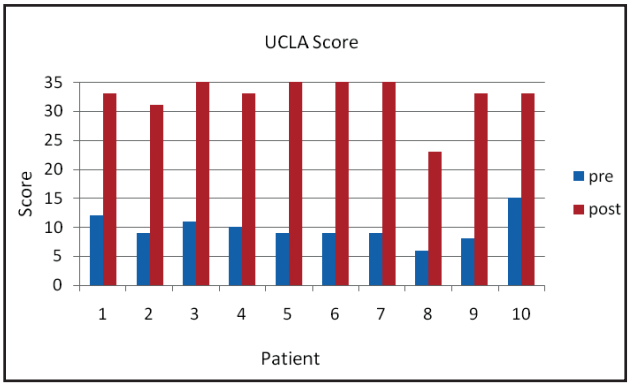

Fig. 2: Graph showing the peroperative(pre) and postoperative(post) UCLA scores of each patient.

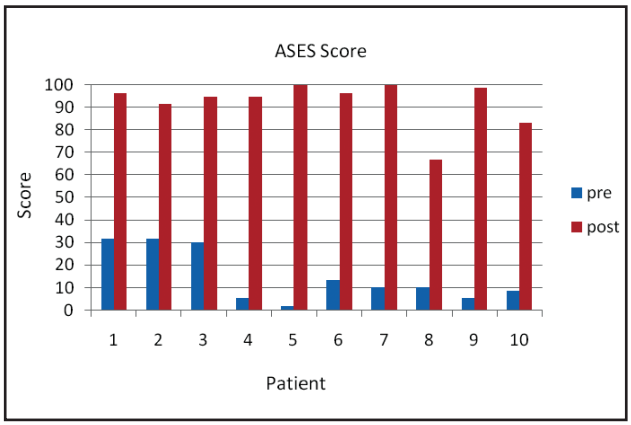

Fig. 3: Graph showing the preoperative(pre) and postoperative(post) ASES scores of each patient.

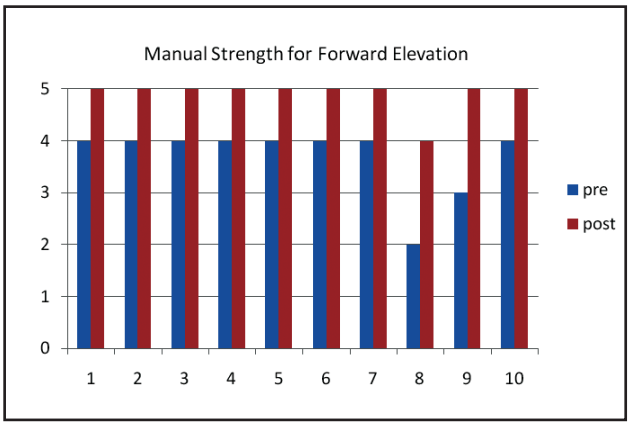

Fig. 4: Graph showing the preoperative(pre) and postoperative(post) manual strength for forward elevation of each patient.

A branula needle was then inserted percutaneously near the lateral edge of acromion to locate the place of suture anchor insertion on the greater tuberosity. A stab incision was made immediately next to the needle and a bio-suture anchor was inserted according to the product usage guideline. The number of bio-suture anchors needed depend on the size of rotator cuff tear. Using a penetrating suture retriever or a suture hook, the sutures were passed through the cuff. A SMC sliding knot [14] or a stacked half-hitch non-sliding knot tying technique was used to repair the cuff tear.

Postoperative management

All patients' arms were immobilized with a shoulder brace with abduction pillow for 3 weeks. Cryotherapy was used routinely postoperatively. The gentle pendulum exercise was started from the second postoperative day. Patients were discharged from the hospital on the second or third postoperative day. The first outpatient follow-up occurred 2 weeks after surgery. The active assisted range of motion exercises were started using a rope & pulley and stick. Subsequent follow-up visits were at 1, 2, 3, 6, 12 months after surgery. Active range of motion exercises were started 3 months after surgery. Strengthening exercises were initiated when the shoulder pain was minimal or pain was absent. Heavy manual work or overhead activities were allowed after gaining good shoulder strength.

RESULTS

There were a total of 10 patients including 8 males and 2 females. The average age was 53.9 years (range, 46-59). All were right hand dominant. The shoulder pathologies studied included 3 left shoulders and 7 right shoulders. There were 3 shoulder pathologies with obvious preceding traumatic events. All patients had Bigliani type II acromion arch. Five patients had full thickness rotator cuff tears (2 medium-sizes, 2 large-sizes, one subscapularis full thickness tear with biceps tendon subluxation). One of the patients with a large-size tear had a previous open rotator cuff repair done. Four patients had bursal surface partial thickness rotator cuff tears (Ellman grade III). One patient had PASTA lesion with Ellman grade III. One patient associated with a severe biceps lesion near the entrance of the bicipital groove, one patient associated with acromioclavicular joint arthritis and another one associated with calcific tendinitis. Three patients had shoulder pain for fewer than 6 months, 3 patients had symptoms for 6 months to one year and 4 patients had

symptoms for more than one year before the surgery. All patients had a history of night pain which was disturbing their sleep quality before they decided to seek a surgical option.

The average preoperative VAS score was 8.8 (range, 8-10) and VAS score at a minimal of 6 months follow-up (range, 6 to 18 months) was 0.4(range, 0-2) (Fig.1). All patients claimed that their night pain diminished. Both rating systems reflected a significant improvement in the function of the shoulder when the preoperative scores were compared with those at the time of at the 6 -18 month follow-up. With UCLA rating scale (Fig. 2), the average total score increased from preoperative 9.8 (range, 6-15) to 32.6 (range, 23-35) postoperative. According to the ASES shoulder index (Fig.3), the average total score improved from 14.6 (range, 1.6-35) to 92.3 (range, 66.6 to 100). The average manual strength for forward elevation (Fig.4) was 3.7 (range, 2 to 4) preoperatively and 4.9 (range, 4 to 5) postoperatively. All patients regarded this procedure as helpful and were willing to undergo the same procedure again should the need arise.

Complications

There were no intraoperative or perioperative complications.

DISCUSSION

The goal of rotator cuff surgery is to alleviate shoulder pain and improve shoulder function [1,2,3,6,9,11]. Rotator cuff repair with open technique has a reported success rate of 88% to 90% [11,15-18]. The preservation of the deltoid muscle attachment prevents significant deficits in motion and shoulder strength [1,19-21]. Thus, open repair techniques have evolved to mini-open techniques which diminish the detachment of the deltoid from the acromion. The results of mini-open repairs of full thickness rotator cuff tears are comparable to those accomplished by the open repair method [3,5,16,22]. Arthroscopic rotator cuff repairs have been recently reported to show promising outcomes [2,6,10]. Tauro [6] reported that patients who underwent arthroscopic repairs had less scarring, shorter hospital stays, less postoperative pain and earlier rehabilitation than those compared with the open repair technique. Kim *et al* [23] reported that arthroscopic repairs of medium and large full thickness tears of rotator cuffs had equal outcomes to technically unsuccessful arthroscopic repairs that were converted to mini-open repair techniques.

The most technically difficult part of arthroscopic rotator cuff repair was the passage of the suture through the rotator cuff, especially the anterior margin of the tear. This study was done during the early stage of our learning curve. Preoperative tear size is one of the major determinants of the outcome of rotator cuff repair. Fifty percent of the patients had partial thickness rotator cuff tears (either with grade Ellman III rotator cuff tear or associated with biceps lesions). Another half of the patients had full thickness medium to large tears of the rotator cuff. In our study, most of the patients had excellent outcomes except for the one patient who had previous open surgery and his preoperative MRI revealed more than 50% fatty infiltration of the rotator cuff. Studies have shown that more than 50% fatty infiltration of the rotator cuff is associated with a poorer clinical outcome [24].

Shoulder pain at night is the single most important factor which leads the patient to seek help from health providers as the night pain disturbs the quality of sleep and thus the overall performance of the individual patient. Eliminating the night pain brings overall satisfaction to the patients. The drawback of this study was the small number of subjects studied when compared to other studies. However, the function of the shoulders and the VAS pain scores demonstrated after the arthroscopic rotator cuff repairs were significantly improved.

CONCLUSION

There was significant improvement in shoulder function following arthroscopic rotator cuff repairs as compared to preoperative scores with those at the time of at least six months follow-up (6 months to 18 months). Arthroscopic rotator cuff repair is a satisfactory treatment method in select patients with symptomatic rotator cuff pathology to alleviate shoulder pain and improve function.

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