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Research paper

Functional outcome of arthroscopic repair of full-thickness degenerative rotator cuff tears

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ABSTRACT

Background: In the past decade, in spite of the advancement in the clinical knowledge, imaging modalities for precise diagnosis and minimally invasive surgeries, the ideal management for degenerative rotator cuff tears is still a matter of debate.
Methods: This prospective study was conducted from January 2013 to August 2016, involved 16 patients (09 males, 07 females) with the mean age of 62.81 ± 7.24 years (range 54–80 years), who had the full-thickness degenerative tear of the rotator cuff. Arthroscopic repair using single row technique was performed in all the patients. The outcome was assessed using ASES questionnaire; pain score by visual analogue scale (VAS) and range of motion of the shoulder joint at presentation, 24 weeks and at final follow-up.
Results: At the mean follow-up of 24.68 ± 3.17 months (range 20–29 months), the mean ASES score and pain score (VAS) improved significantly from 31.16 ± 5.57 to 71.79 ± 3.92 (p-value <0.001) and 5.63 ± 0.72 to 1.9 ± 0.92 (p-value <0.001) respectively. There was significant improvement in all the movements of the shoulder joint. 14 patients were satisfied with the final functional outcome.
Conclusion: Arthroscopic repair of a full thickness degenerative tear of the rotator cuff using single row repair technique leads to satisfactory functional outcome in terms of activities of daily living, pain scores and range of motion.

1. Introduction

Rotator cuff tears (RCT) are the common cause of shoulder complaints in the elderly population. Management options for the RCT include conservative and surgical (open/arthroscopic) repair of the tear. But debate about the best treatment option has not been resolved and controversy still persists about the optimal management of the degenerative RCT, as the acceptable results have been achieved with both conservative as well as surgical intervention in the past.[1,2]

The proponents of surgical intervention of the degenerative tears of rotator cuff feel that RCT has limited ability to heal without repair. Furthermore, conservative management leads to the progression of the tear which can be disabling later in life in the terms of pain and functional outcome.[3–5] While the proponents of conservative management feel that results of the functional outcome even after the surgical intervention are similar to the conservative management and re-tear rates after the surgical repair are also very high. Furthermore, surgical intervention has inherent risks of surgery.[6–8]

In our search on the pubmed database, we could find only one original article from the Indian subcontinent about the management of degenerative RCT using the arthroscopic technique.[9] The present study was conducted to assess the functional outcomes after arthroscopic management of degenerative RCT in terms of the pain score and activities of daily living in patients aged >50 years.

2. Materials and methods

2.1. Study design

This was a prospective study of 16 patients with full thickness degenerative rotator cuff tear, who met the inclusion criteria. All the patients were operated between January 2013 and December

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2014 at our centre by arthroscopic repair of RCT using single row repair technique. The patients were advised surgery based on chronic shoulder pain with inability or difficulty in elevating arm and patients who have not improved with the conservative trial of at least six months duration.

Inclusion criteria

1. Age >50 years.
2. Full thickness degenerative RCT confirmed on preoperative MRI.
3. No, or minimal improvement after conservative management of at least 6 months.

Exclusion criteria

4. Partial thickness rotator cuff tears.
5. Traumatic rotator cuff tears.
6. Preoperative MRI showing significant pathology requiring surgical intervention other than rotator cuff tears.
7. Re-tears of the repaired rotator cuff tears.

2.2. Preoperative evaluation

Preoperative evaluation included comprehensive history, physical examination, MRI of the shoulder joint. Preoperative range of motion of shoulder joint was assessed. The American Shoulder and Elbow Surgeons (ASES) questionnaire was filled.[10]

ASES is a 100 point scoring system in which 50 points were derived from the patient's report of pain on Visual analogue scale (VAS).[11] The cumulative score of 10 activities of daily leaving on 4-point ordinal scale accounts for the remaining 50 points.

2.3. Surgical technique

All the patients were operated under combined inter-scalene block and general anaesthesia in lateral decubitus position with torso rolled 25–30° posterior and arm in 45° abduction and 15° forward flexion with 10 pounds traction weight. The posterior portal was made at soft spot 2 cm inferior and 1 cm medial to the posterolateral border of the acromion and diagnostic arthroscopy was performed to confirm degenerative complete tear and to exclude pathologies like biceps tendon tear, Bankart or Hill Sach's lesions. The articular surface of the cuff was inspected, and partial or full thickness tears were identified (Fig. 1a). After the complete gleno-humeral arthroscopy, the posterior border of the acromion was palpated. The trocar was then placed underneath the acromion and inserted in an anterior direction to enter the sub-acromial space. The bursal tissue was cleared and adhesiolysis was performed using radiofrequency soft tissue ablation device through lateral portal. The medial and lateral extents of acromion were identified, along with the coracoacromial ligament. Sub-acromial decompression in the form of bursal debridement and acromioplasty was performed. We aimed to create adequate space for rotator cuff tendon with the acromioplasty. As all of the patients in our study had the chronic degenerative tear, so impingement was also considered to be part of the disease and removal of osteophytes and adequate decompression of subacromial space was done in every case.

After the decompression, the tear margins were debrided. Cuff mobility was assessed for the approximation of cuff to its footprint. An anterior and superior-lateral portals were made for anchor placement and suture shuttling. The bone bed, just off articular margin on humerus was prepared, using a shaver and radio frequency ablator (Fig. 1b). For fixation of the rotator cuff to the bone, 5.5 mm bio-corkscrew suture anchors (Depuy Mitek, Raynham, MA, USA) were inserted (Fig. 1c) at roughly 1-cm intervals, 4–5 mm off the articular surface and at an angle of approximately 45° to bone surface to increase anchor's resistance to pull-out. The sutures were passed through tendon after the anchors were placed. The number of anchors used varied depending upon the size of the tear. After placing all the sutures in the cuff, traction was applied to reduce the tendon to bone. We used three half hitches sliding knot, followed by three consecutive half hitches on alternating posts for the repair of the cuff to the bone (Fig. 1d). The portal sites were closed and the sterile dressing was done after the repair.

2.4. Postoperative care

Immobilization with an abduction pillow for four weeks was advised. The range of motion exercises of hand, wrist and elbow were started from day 1. All the stretching exercises of the shoulder were avoided. From 4 to 12 weeks, the passive and active-assisted range of motion exercises were encouraged in all planes. However, external rotation with abduction of the arm in 90° was avoided for 12 weeks. Active followed by strengthening exercises were started after 12–16 weeks.

2.5. Postoperative assessment

All patients were followed up regularly at 4 weeks, 24 weeks, at the final follow-up. A comprehensive evaluation including a physical examination, assessment of the range of motion and completion of ASES questionnaire was done.

2.6. Statistical analysis

The pre and postoperative outcomes of the range of motion of shoulder joint and ASES questionnaire which include VAS scores and activities of daily living were compared by unpaired *t*-tests (*p* values of <0.05 were considered significant).

2.7. Ethical clearance and informed consent

Ethical clearance was obtained from the institutional ethics committee of the hospital before the start of the study. Written informed consent was obtained from each patient before the conduct of the study.

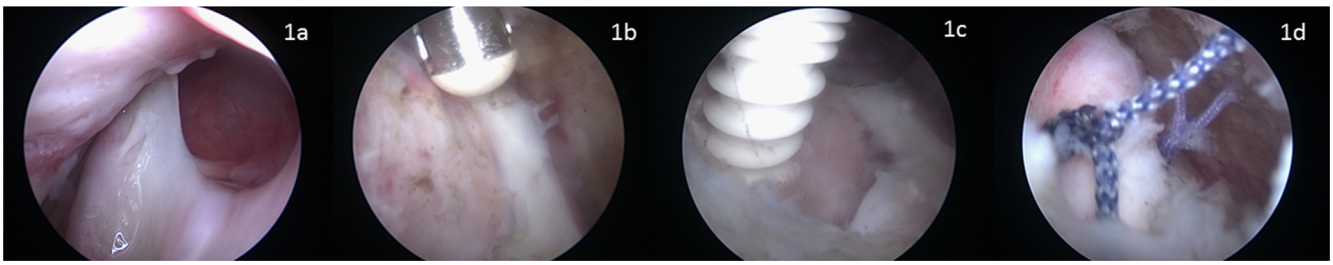

Fig. 1. Arthroscopic view of (a) crescent shaped full thickness rotator cuff tear as seen from glenohumeral joint, (b) preparation of bone footprint by electrocautery, (c) bio-absorbable anchor at the prepared site, (d) cuff secured at desired footprint of rotator cuff.