

## Original Research Article

# Arthroscopic repair of rotator cuff tears: analysis and functional outcome

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### ABSTRACT

**Background:** Rotator cuff injuries are common injuries occurring around the shoulder with an incidence ranging from 5 to 39%. Rotator cuff tears can be either partial thickness or full thickness. If remains untreated, may lead to persistent shoulder pain, functional limitation and decreased quality of life. In the present study, we assess the functional outcome following arthroscopic repair of rotator cuff tears. We also assess the various parameters affecting the functional outcome following repair.

**Methods:** 15 patients with rotator cuff tears were subjected to this study. Preoperative evaluation of the American Shoulder and Elbow Surgeons (ASES) shoulder score and University of California and Los Angeles (UCLA) shoulder score was done. Arthroscopic rotator cuff repair using single row repair with suture anchors was done. The patients were followed up at 6 weeks, 3 months and 6 months where ASES score and UCLA score were assessed.

**Results:** Of the 15 patients, 14 had supraspinatus tear, 2 patients had infraspinatus tear and 2 patients had subscapularis tear. According to UCLA scoring system 22% patients had excellent, 43% patients had good results, 23% patients had fair results and 12% patients had poor results. ASES score also showed progressive improvement at subsequent follow ups at 3 and 6 months.

**Conclusions:** From our present study we conclude that arthroscopic rotator cuff repair is a good modality showing excellent functional outcome with less morbidity, minimal postoperative pain, better cosmesis and early resumption of daily routine activities.

**Keywords:** Arthroscopic repair, Single row technique, UCLA score, ASES score

### INTRODUCTION

Rotator cuff injuries are common injuries occurring around the shoulder with an incidence ranging from 5 to 39%.<sup>1</sup> The cause of these injuries is multifactorial but are mostly degenerative with increasing incidence with age.<sup>2</sup> Acute tears can also occur secondary to trauma. If remains untreated, may lead to persistent shoulder pain, functional limitation and decreased quality of life.<sup>3,4</sup>

Rotator cuff tears can be either partial thickness or full thickness. The diagnosis of these tears are both clinical

and radiological. With the advent of magnetic resonance imaging (MRI), diagnosis of these tears is easier. MRI shows a sensitivity of 89.6% and specificity of 100% in diagnosis of rotator cuff tears.<sup>5</sup>

Treatment modality varies with the thickness of these tears. Patients with partial thickness tears less than 50% can be started on conservative management with analgesics and physiotherapy.<sup>6</sup> Patients who do not respond to conservative management can be treated with debridement with or without acromioplasty. In patients with tear more than 50%, repair remains the modality of

choice.<sup>7</sup> Repair of rotator cuff tears can be either by open, mini-open and arthroscopic techniques. The first successful open repair of rotator cuff was reported by Codman in 1911.<sup>8</sup> Neer, in 1972 proposed certain fundamental principles for open repair of these tears.<sup>9</sup> The first arthroscopic repair of rotator cuff tears was performed by Johnson in 1992.<sup>10</sup> With the improvement in technology and availability of better instrumentation arthroscopic repair techniques have become a mainstay in treatment of these injuries.

In the present study, we assess the functional outcome following arthroscopic repair of rotator cuff tears. We also assess the various parameters affecting the functional outcome following repair.

**METHODS**

This prospective study was conducted in the Department of Orthopedics, Hindu Rao Hospital for a period of 2 years from June 2017 to June 2019. In this study, 15 patients with rotator cuff tears who fulfilled the inclusion criteria underwent arthroscopic repair procedure.

**Inclusion criteria**

Degenerative full thickness rotator cuff tears and partial thickness rotator cuff tears with thickness more than 50% in patients more than 45 years after 6 weeks trial of conservative management confirmed on MRI, acute traumatic symptomatic full thickness or partial thickness rotator cuff tears more than 50% in patients less than 45 years of age, patient giving informed consent for participation in the study were included.

**Exclusion criteria**

Patients with rotator cuff arthropathy; patients with other pathologies involving the shoulder like infective, inflammatory or fractures around the shoulder; history of any previous rotator cuff repair, patients not giving consent for the study were excluded.

Patient’s detailed history and clinical examination was performed to assess the condition. Special tests were conducted for rotator cuff integrity and signs of impingement. All the required routine investigations and radiological examination in the form of X-rays and MRI was performed. The diagnosis was confirmed on MRI and preoperative evaluation of the American Shoulder and Elbow Surgeons (ASES) shoulder score and University of California and Los Angeles (UCLA) shoulder score was done.

The surgery was performed under general anesthesia in lateral decubitus position with arm abducted and 3kg of vertical traction. Standard arthroscopic portals were made, 2 viewing portals (posterior and lateral) and 2 working portals (anteromedial and anterolateral). Initial diagnostic arthroscopy was performed and adhesions if

any were released. Greater and lesser tuberosities were abraded with a burr to prepare the footprints. The technique of repair in our study was single row repair technique with suture anchors.

The arm was kept in a shoulder immobilizer in 30° abduction. Passive flexion-extension exercises and pendulum exercises was started immediately post operatively. Active exercises were started at 6 weeks. The patients were followed up at 6 weeks, 3 months and 6 months where ASES score and UCLA score were assessed. The statistical data were compiled and analysed by SPSS (statistical package for social sciences) Statistical software version 17.0.

**Ethical approval**

The study was approved by the ethics committee of Hindu Rao Hospital on 12 June 2017.

**RESULTS**

The proforma was compiled and following results were observed

**Age distribution**

The age of the patients ranged from 32 years to 72 years with a mean age of 52.33 years and standard deviation of 5.44 years.

**Table 1: Age distribution.**

Age (in years)	Frequency	Percentage (%)
31-40	2	13.33
41-50	5	33.33
51-60	6	40
61-70	1	6.66
71-80	1	6.66
<b>Total</b>	15	100

**Gender distribution**

Of the 15 patients, 10 were males and 5 were females.

**Associated comorbidities**

Of the 15 patients, 3 patients had associated diabetes for which they were taking treatment and 2 patients were hypertensive.

**Test for rotator cuff impingement**

Hawkin’s Kennedy test was positive in 10 patients and Neer’s impingement sign was positive in 8 patients. Jobe’s supraspinatus test was positive in 12 of the 15 patients which was confirmed on MRI which showed 14 patients with supraspinatus tear. Internal Rotation resistance stress test was positive in 8 patients.

**Test for rotator cuff tear**

Among the tests for supraspinatus tear, drop arm test was positive in 10 patients of which all were positive on MRI.

Test for infraspinatus, external rotation resistance test was positive in 1 patient of the 2 who had infraspinatus tear on MRI.

**Table 2: Rotator cuff tears.**

Rotator cuff tear	Patients with positive clinical test	Patients with positive MRI findings
Supraspinatus tear	10	14
Infraspinatus tear	1	2
Subscapularis tear	2	2
Teres minor tear	-	-

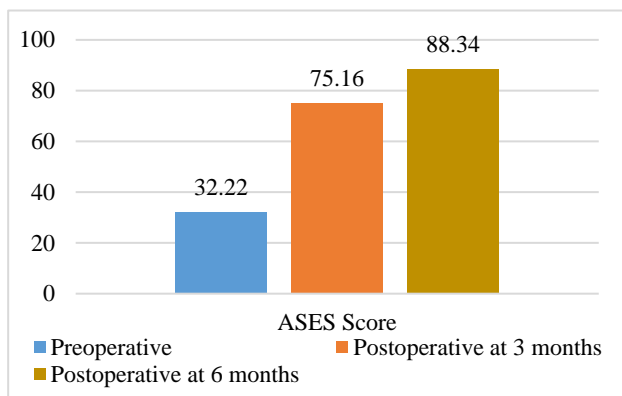
Belly press test for subscapularis was positive in 1 patient and lift off test was positive in 1 patient. 2 patients had confirmed subscapularis tear on MRI.

**MRI findings**

Of the 15 patients, 14 patients had supraspinatus tear, 2 patients had infraspinatus tear and 2 patients had subscapularis tear.

**Table 3: MRI findings.**

Rotator cuff tear	Patients with positive MRI findings
Isolated supraspinatus tear	11
Supraspinatus and infraspinatus tear	2
Supraspinatus and subscapularis tear	1
Isolated subscapularis tear	1
<b>Total</b>	<b>15</b>



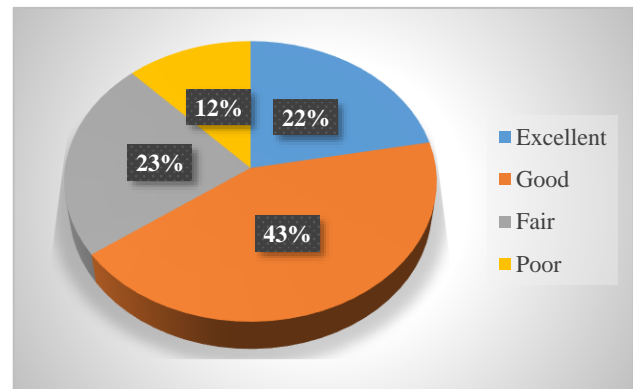
**Figure 1: Analysis of functional outcome using ASES score.**

**Functional outcome using ASES shoulder score**

In the present study, pre-operative ASES score was 32.22 which improved to 75.16 at 3 months postoperatively and 88.34 at 6 months postoperatively.

**Functional outcome using UCLA shoulder score**

Preoperative UCLA score was 10.55 which improved to 23.7 at 3 months postoperatively and 32.43 at 6 months postoperatively. 22% patients showed excellent results, 43% patients showed good results, 23% showed fair results and 12% patients poor results.



**Figure 2: Functional outcome using UCLA score.**

**Postoperative function**

Most patients regained adequate power with 7 patients showing forward flexion upto 100° to 120° and 5 patients with forward flexion of 75° to 100°. 3 patients had flexion <75°.

**DISCUSSION**

Rotator cuff disease encompasses a spectrum of disease ranging from impingement to tear to arthropathy. Our study delineates the functional outcome following arthroscopic repair of rotator cuff tears and is compared to other studies.

In our study the average age of patients was 52.33 years with maximum patients in the age group of 40-60 years. This was comparable to other studies by Abechain et al, Boileau et al and Cho et al.<sup>11-13</sup>

There was male preponderance in our study. The results of the same are variable in various studies with some showing equal male and female preponderance and others showing male preponderance.

Preoperative functional outcome using UCLA shoulder score showed a score of 10.55 which improved to 32.43 at 6 months with 22% patients showing excellent results and 43% patients showed good results. The results were

comparable to studies conducted by Mihata et al, Cho et al and Kim et al.<sup>13-15</sup>

Preoperative ASES score was 32.22 which improved to 88.34 at 6 months postoperatively which were comparable to results conducted by Sugaya et al, Cho et al and Koh et al.<sup>13,16,17</sup>

## CONCLUSION

From our present study we conclude that arthroscopic rotator cuff repair is a good modality showing excellent functional outcome with less morbidity, minimal postoperative pain, better cosmesis and early resumption of daily routine activities.

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## REFERENCES

1. Rockwood CAJ, Matsen III FA. Rotator cuff. In: Matsen III FA, Fehring EV, Lippitt SB, Wirth MA, Rockwood CAJ. The shoulder. Philadelphia: W.B. Saunders Company, 2008: 800-801.
2. Coghlan JA, Buchbinder R, Green S, Johnston RV, Bell SN. Surgery for rotator cuff disease. Cochrane Database Syst Rev. 2008;1:CD005619.
3. Neer CS 2nd. Impingement lesions. Clin Orthop Relat Res 1983;173:70-7.
4. Yamamoto A, Takagishi K, Osawa T, Yanagawa T, Nakajima D, Shitara H, et al. Prevalence and risk factors of a rotator cuff tear in the general population. J Shoulder Elbow Surg. 2010;19:116-20.
5. Bartolozzi A, Andreychik D, Ahmad S. Determinants of outcome in the treatment of rotator cuff disease. Clin Orthop Relat Res. 1994;308:90-7.
6. Davidson J, Burkhart SS. The geometric classification of rotator cuff tears: A system linking tear pattern to prognosis. Arthroscopy. 2010;26(3):417-24.
7. Ainsworth R, Lewis JS. Exercise therapy for conservative management of full thickness tears of rotator cuff: a systematic review. Br J Sports Med. 2007;41(4):200-10.
8. Codman EA, Akerson IB. The Pathology Associated With Rupture Of The Supraspinatus Tendon. Ann Surg. 1931;93(1):348-59.
9. Neer CS 2nd. Anterior Acromioplasty for the chronic impingement syndrome in the shoulder: A preliminary report. J Bone Joint Surg Am. 1972;54:41-50.
10. Johnson. Arthroscopic Rotator Cuff repair using a Staple. Maui Sports Medicine Meeting. Kanapali, Maui, 1992.
11. Abechain JJK, Godinho GG, Matsunaga FT, Netto NA, Daou JP, Tamaoki MJS. Functional outcomes of traumatic and nontraumatic rotator cuff tears after arthroscopic repair. World J Orthop. 2017;8(8):631-7.
12. Boileau P, Brassart N, Watkinson DJ, Carles M, Hatzidakis AM, Krishnan SG. Arthroscopic repair of full-thickness tears of the supraspinatus: does the tendon really heal? J Bone Joint Surg Am. 2005;87:1229-40.
13. Cho NS, Rhee YG. The factors affecting the clinical outcome and integrity of arthroscopically repaired rotator cuff tears of the shoulder. Clin Orthop Surg. 2009;1(2):96-104.
14. Mihata T, Watanabe C, Fukunishi K, Oheu M, Tsujimura T, Fujiwara K, et al. Functional and Structural outcome of single row versus double row versus combined double row and suture bridge repair of rotator cuff tears. Am J Sports Med. 2011;39(10):2091-8.
15. Kim KC, Shin HD, Cha SM, Park JY. Repair integrity and functional outcome after Arthroscopic conversion to a full thickness rotator cuff tear: Articular vs Bursal side partial tears. Am J Sports Med. 2014;42(2):451-6.
16. Sugaya H, Maeda K, Matsuki K, Morishii J. Functional and structural outcome after arthroscopic full thickness rotator cuff tear repair: single row vs dual row fixation. Arthroscopy. 2005;21(11):1307-16.
17. Koh KH, Kang KC, Lim TK, Shon MS, Yoo JC. Prospective randomized clinical trial of single row vs double row repair in 2- to 4cm rotator cuff tears: Clinical and magnetic resonance imaging results. Arthroscopy. 2011;27(4):453-62.

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