



## Original Research Article

## Comparison of outcome between mini-open and arthroscopic rotator cuff repair

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## ARTICLE INFO

## Article history:

Received 16-12-2020

Accepted 28-12-2020

Available online 06-04-2021

## Keywords:

Rotator cuff repair

Rotator cuff tears

Arthroscopic repair

## ABSTRACT

**Introduction:** The aim of this study is to compare the outcomes of all-arthroscopic repair and mini-open repair for rotator cuff tendon tear on post-operative pain, shoulder joint range of motion and physical function.

**Materials and Methods:** The study is a prospective comparative study of rotator cuff repair. The patients include in the study are enroll into all-arthroscopic surgery or mini-open surgery groups. The patients are assess by UCLA and ASES scores pre and postoperatively for upto 1-year follow-up.

**Results:** A total of 44 patients are include in the study. We find no statistical significance comparing the UCLA and ASES scores of both groups. The patients in the all-arthroscopic surgery group experience significantly less pain initially.

**Conclusion:** According to the results of this study, the outcomes of mini-open surgery and arthroscopic repair are equivocal, with no difference in post-operative pain, shoulder joint range of motion and patient satisfaction.

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## 1. Introduction

Rotator cuff tears are common in old age and sports persons. Achieving a functional improvement and painless movements usually require a surgical intervention. Various modalities have been described for rotator cuff repair which include open surgery, mini-open surgery and arthroscopic repair.<sup>1</sup> While these 3 are different approaches, they can be considered as an evolution of technique towards a minimally invasive surgery. Advances in instruments and techniques have made arthroscopic repair widely acceptable treatment modality for rotator cuff repair.<sup>2</sup> There still is a considerable controversy regarding which modality to choose, with surgeon preference and comfort being one of the deterrents. There is still uncertainty regarding the long term outcomes using the two techniques.

## 2. Materials and Methods

Through this study, we wanted to compare the outcomes of all arthroscopic approach to mini-open approach at short to mid- term follow-up.

## 2.1. Source of data

We conducted a prospective cohort study for 19 months from a period of from December 2017 to June 2019, on 44 patients admitted and operated for rotator cuff tears, at Civil hospital Ahmadabad. We include patient having tear in any of rotator cuff tendon on clinical examination confirmed on MRI who gave Informed consent to participate in study and follow up for postoperative rehabilitation. Patients with associated shoulder pathology like SLAP, frozen shoulder, fracture etc, Previously operated rotator cuff repair patients with failure, Irreparable tears, AC joint arthritis, biceps pathology, cuff tear arthropathy, glenohumeral joint arthritis, Acute tear repaired within 3 months

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after injury, Patients not willing for strict adherence to postoperative rehabilitation protocol are exclude from the study.

## 2.2. Methodology

Our protocol included taking a detailed history, clinical examination and preoperative UCLA and ASES score,<sup>3</sup> and a follow-up at 3,6 weeks, 6 months and 1 year. After randomization, 22 patients were operated by mini-open surgery while 22 patients were operated arthroscopically.

All patients underwent surgery in a lateral position with arm in abduction. Initially always a diagnostic arthroscopy was performed that allowed us to document the extent of the lesion. For all cuff repairs we used braided polyester sutures.

In both mini-open & arthroscopic following steps remain the same.

1. Adequate subacromial decompression
2. Maintaining the integrity of the deltoid origin
3. Mobilizing torn tendons and performing an interval slide when indicated
4. Repairing tendons to bone

For mini-open repair, 22 cases had a classic mini-open cuff repair with acromioplasty and trans-osseous tendon repair.

While in 22 patients of arthroscopic repair, after performing a subacromial decompression, debridement of the cuff, and preparation of the tuberosity with a shaver,<sup>4,5</sup> we passed mattress sutures through the edge of the cuff with the help of the curved and straight "lasso". Upto 6 suture anchors were used according to the cuff tear.

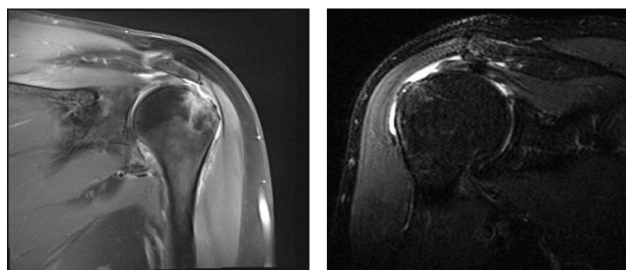
Postoperatively a shoulder immobilizer with 15 degree abduction support was given. On day 1, pendulum exercises were started followed by early passive elevation exercises and finally active assisted shoulder exercises.<sup>6</sup>

## 3. Results

1. Of the 44 patients in the study, only 4 (2 of the mini-open group and 2 of the arthroscopic repair group) were below 40 years of age.
2. The maximum incidence of rotator cuff tears occurred in 41-50 year age group patients (43%), while age group 61-70 year comprises 20% of total patients.
3. The patients had an almost equal sex demographic.
4. Mean tear size was 2.73 cm (+/- 0.89 cm).
5. The predominant symptom in these patients was inability of overhead abduction followed by pain in shoulder.
6. At presentation the mean UCLA score in mini-open group was 11.31, which improved to 31.18 at the end of 1 year, while for arthroscopy group, the presenting UCLA score was 11.95 which improved to 30.36 at the end of one year.

However, this difference in improvement is not statistically significant (p value = 0.97).

7. The ASES score for mini-open group at presentation was 29.95 which improved to 82.54 at 1-year follow-up, while the ASES score for the arthroscopic group was 30.61 which improved to 83.46 at 1 year follow-up. This difference in improvement is not statistically significant (p = 0.48)..
8. This shows that there is no statistical significance in post-operative UCLA and ASES scores of both mini-open and arthroscopic cuff repair. Thus there is no statistically significant difference in the outcomes of mini-open and arthroscopic rotator cuff repair.
9. Of the 22 patients operated by mini-open approach, 1 patient had failure of surgery, with recurrence of initial symptoms at 6 month follow-up, while 1 patients had superficial surgical site infection, which resolved with oral antibiotics..
10. While 3 out of 22 patients operated by arthroscopic repair had recurrence at 6 month follow-up and none showed any signs of infection.



**Fig. 1:** MRI of shoulder showing a rotator cuff tear



**Fig. 2:** Arthroscopic rotator cuff repair

## 4. Discussion

In current orthopedics practice, arthroscopic repair of rotator cuff tear offers excellent results in terms of

**Table 1:**

	At presentation	UCLA Score (Mean Value)			
		6 weeks	12 weeks	6 months	1 year
Mini open	11.31	18.45	23.409	26.59	31.18
Arthroscopy	11.95	20.41	23	26.09	30.36

**Table 2:**

	At Presentation	ASES Score (Mean Value)	
		6 months	1 year
Mini open	29.95	74.1	82.542
Arthroscopy	30.61	70.43	83.466

**Fig. 3:** Stitch line for mini-open rotator cuff repair**Fig. 4:** Stich line for Arthroscopic rotator cuff repair

functional outcome with minimal morbidity. Added advantages of this approach are decreased postoperative pain, deltoid preservation, full joint visualization, cosmetic appeal, minimal hospital stay and early rehabilitation. This has evolved arthroscopy from mere diagnostic tool to surgical tool.<sup>6</sup>

Our study shows highest incidence of rotator cuff disease in age group 41-50 years. This shares similarity with other such studies in Indian subcontinent. We found no statistical significance between age of patient and postoperative results. Similarly Bennett, Stollsteimer and Savoier reported no significant association between age and postoperative results.

The description for outcome with Sex as a variable is limited in literature. Our study shows incidence of rotator cuff tear 48 % in male and 52 % in female. We found no significant difference in postoperative result. The almost equal sex distribution is also shared by other studies carried out by Kim, Boileau, and Galatz.<sup>7</sup> They also reported no statistical significance between sex and postoperative functional outcome. This view is also in accordance with wide studies by Harryman et al. and Watson et al.<sup>8</sup>

In our study, among 29 patients gave history of precedent trauma. Rest patients had no such history. Improvement in functional outcome after arthroscopic repair is significantly better in patients with traumatic etiology than degenerative cuffs. We didn't find any reference for comparison.

Mean preop UCLA scores (11.636) and ASES (30.08) scores (were improved up to UCLA(30.77) and ASES(83.00) at end of 12 months follow-up. We have compared our results with Cochrane review article conducted by Paul Saridakis, BS and Grant Jones<sup>9</sup> at Ohio state university which reviewed ten articles systemically.

Zhang et al. Noted patient treated with arthroscopic group have higher recurrence than mini-open which also seen in our study (3:22).

Mini-open cuff repair is often disgraced by surgeons as being a more painful procedure, especially for 1 week postoperatively.<sup>10</sup> We did observe a great initial pain relief when arthroscopic repair was performed. However, interestingly, the time needed to be completely pain free was



**Fig. 5:** Mini-open repair

the same for both the groups which was at roughly 6 weeks.

Arthroscopic rotator cuff repair has garnered a great attention and is usually preferred by patients, but it still remains a surgically demanding procedure with a very long learning curve. With practice the time of surgery becomes similar to mini-open repair, which averages to about 1.5 hours in our hospital.

There are several weaknesses to the current study. The data is limited to one surgeon and may not necessarily be applied to all surgeons who perform rotator cuff repairs with varying skill levels. The numbers in the current study are relatively small.

## 5. Conclusion

In current orthopedics practice, arthroscopic repair of rotator cuff tear offers excellent results in functional outcome with minimal morbidity with advantages of this approach are decreased postoperative pain, deltoid preservation, full joint visualization, cosmetic appeal, minimal hospital stay and early rehabilitation. This has evolved arthroscopy from mere diagnostic tool to surgical

tool.<sup>11</sup>

Diagnosis of rotator cuff tears is made chiefly by History and clinical examination. Importance of thorough clinical examination should not be subdued by Magnetic Resonance Imaging and Ultrasonography. MRI should be thoroughly studied to define 'personality' of tear which includes, number of tears, pattern, fatty degeneration, bursal/ articular side, location from insertion, etc.

However, improvement in function and range of motion can be achieved only by meticulous repair techniques, adequate subacromial decompression and strong adherence to rehabilitation program.<sup>12</sup> This should be addressed by Surgeon through actively reinforcing Physiotherapy and regular follow-ups after surgery.

In the current study evaluated there is no statistical difference in outcome between the two groups, indicating that either procedure is efficacious in the treatment of small and medium size rotator cuff tears.

## 6. Source of Funding

None.



**Fig. 6:** Arthroscopic repair

## 7. Conflict of Interest

None.

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**Cite this article:** Thakor KN, Amin PC, Patel ZM, Dalal AN, Patel SN. Comparison of outcome between mini-open and arthroscopic rotator cuff repair. *Indian J Orthop Surg* 2021;7(1):67-72.