



A CLINICAL STUDY OF FUNCTIONAL OUTCOME OF ALL ARTHROSCOPIC ROTATOR CUFF REPAIR

Orthopaedics

Dr. Susmita Peddi M.s Ortho

Dr. Sivakumar Mamillapalli M. S Ortho., FAJR(USA)

ABSTRACT

Introduction: Rotator cuff tears are among the most common shoulder injuries and are usually accompanied by shoulder pain, disability and dysfunction over the past decade rotator cuff repairs are shifted from mini-open rotator cuff repair to all arthroscopic rotator cuff repair, as the arthroscopic technique is less invasive approach which has advantage of early post operative rehabilitation and good outcome. The purpose of the study was to evaluate the functional outcome of arthroscopic rotator cuff repair in rotator cuff tear patients. **Materials And Methods:** This prospective study included 15 cases of Rotator cuff tear patients of either sex fitting the inclusion criteria from October 2023 to September 2024. patients included were between 18 to 75 years of age with MRI proven Rotator cuff tear who underwent all Arthroscopic rotator cuff repair and willing to participate in study. patients will undergo detailed history, clinical and radiological evaluation, all arthroscopic rotator cuff repair by single row or double row technique using suture anchors by single trained surgeon. post operative rehabilitation done as per standard protocol and post operative evaluation done at 3rd month, 6th month and 1 year. Range of motion, UCLA and ASES Scoring done at pre operative and post operative follow-ups. **Results:** A prospective study with 15 patients is undertaken to study the functional outcome of Arthroscopic rotator cuff repair, the mean age in our study is 59.8 Years, majority are in the age group of 40 to 70 years. out of 15 patients, 7 were male, 8 were female. Major part of our study contained partial thickness tears (60%) rather than full thickness tears (40%). 73.3% (11) patients in our study had traumatic tears and 26.7% (4) patients had degenerative tears. there is significant improvement of flexion from 121.9 degrees preoperatively to 145 degrees postoperatively at 1 year, abduction from 125 degrees to 150 degrees, external rotation from 60 to 80 degrees, internal rotation from 40 degrees to 65 degrees. in our study according to UCLA score, out of 15 patients, 3 patients had poor outcome, 3 patients had average outcome, 6 patients had good outcome and 3 patients had excellent outcome. Mean UCLA score increased from 15.91 preoperatively to 42.40 postoperatively at the end of 1st year. Mean ASES score improved from 37.16 preoperatively to 92.17 postoperatively. **Conclusion:** Arthroscopic rotator cuff repair is as good as mini open rotator cuff repair in outcome. Advantages of arthroscopic rotator cuff repair include less post operative pain, small scar and ability to diagnose other shoulder pathologies. patients need preoperative and post operative physiotherapy to achieve good range of motion for better final outcome.

KEYWORDS

Rotator cuff, Functional outcome, Arthroscopic

INTRODUCTION

Rotator cuff tears are among the most common shoulder injuries & are usually accompanied by shoulder pain, disability & dysfunction. Over the past decade, rotator cuff repairs have shifted from open to mini-open to all arthroscopic rotator cuff repairs. The rotator cuff undergoes progressive degenerative changes with increasing age and may lead to partial tear of cuff and finally to complete rupture of the rotator cuff. The spectrum of these disorder ranges from inflammation to massive tearing of the rotator cuff musculotendinous unit. Rotator cuff repair is the one of the most frequent procedures performed in the shoulder joint. Surgical treatment of chronic rotator cuff tears is indicated when non operative treatment fails. The techniques of rotator cuff repair have evolved from traditional open repair, to arthroscopically assisted mini-open rotator cuff repair (MRCR), to complete arthroscopic rotator cuff repair (ARCR). Though mini open rotator cuff is commonly performed in many centres, arthroscopic rotator cuff repair is now becoming standard surgery for rotator cuff tear. Arthroscopic techniques are now used to repair even large tears and also to mobilize retracted tears. Arthroscopic repair match open and mini open repair in results and also helps in thorough evaluation of joint thereby increasing diagnostic value of procedure. Arthroscopic technique is a less invasive approach which may have advantageous for postoperative rehabilitation and outcome. The study is meant to evaluate the functional outcome of arthroscopic rotator cuff repair in rotator cuff tear patients. All arthroscopic rotator cuff repair associated with less morbidity than the open technique & yields comparable clinical results.

MATERIALS & METHODS

Source Of Data : this prospective study included 15 cases of rotator cuff tear repair patients of either sex fitting the inclusion criteria, from October 2023 To September 2024.

Inclusion Criteria

- Age group 18 to 75 years.
- Patients with MRI proven rotator cuff tear.
- Patients willing to participate in study.
- Patients willing to undergo All Arthroscopic rotator cuff repair.

Exclusion Criteria

- Associated shoulder lesions.

- Revision rotator cuff repairs.
- Irreparable tears.
- Rotator cuff tear arthropathy

Methodology

- Patients admitted with MRI Proven rotator cuff tear after meeting the inclusion and exclusion criteria are selected for the study.
- They will undergo detailed history, clinical & radiological evaluation. clinical examination includes ROM, Empty can test, belly press test, neer's impingement test.
- With prior informed consent, a pre anaesthetic evaluation is done.
- Arthroscopic rotator cuff repair by single row or double row technique using suture anchors
- post operative rehabilitation as per standard protocol, post operative evaluation done at 3rd month, 6th month & 1 year. UCLA & ASES Scoring done at pre operative & post operative follow up

Data Analysis

To examine continuous variables Arithmetic mean, standard deviation, Chi square test, Pearson's correlation and t-tests were used. Paired t-test were used to compared Pre-operative and postoperative UCLA scores, ASES scores

Surgical Technique

- All surgical procedures were performed under G.A. The patient was placed in lateral decubitus position with the patient posteriorly angled 45 degrees.
- Examination under anaesthesia is performed for passive ROM.
- The arm was placed in a foam traction sleeve after cleaned and draped connected to a shoulder traction device.
- The upper limb was positioned in 30 degree of abduction and 5 degree of forward flexion. traction was then applied with the arm in neutral position. 3 kg each were placed for arm distraction & abduction traction.
- The posterior portal was created 2 cm inferior and 1cm medial to posterolateral acromial angle.
- The anterior portal was placed in the rotator cuff interval using outside-in technique. Gleno humeral joint arthroscopy was performed.
- Intra articular lesion were addressed accordingly, the arthroscope was then inserted into the subacromial space through the posterior

portal, using the scope trocar & cannula, an anterior subacromial portal created using same anterior incision.

- A lateral sub acromial portal was made on a coronal Line drawn from the posterior corner of the acromioclavicular joint 3cm lateral to lateral border of acromion, acromioplasty was routinely performed in all patients.

After completion of the acromioplasty, arthroscopic bursectomy was performed. The rotator cuff tear was then identified, mobility of the rotator cuff was evaluated. If there was significant tension, the coraco humeral ligament was released. The edge of the tear was debrided. Foot print of the Rotator cuff at greater tuberosity was prepared with shaver & decorticated lightly with the round burr. The size of the tear was measured with the probe, a spinal needle was inserted percutaneously near the lateral edge of the acromion to locate the place of the suture anchor insertion on the greater tuberosity, a stab incision was made immediately next to the needle and a biosuture anchor/titanium double loaded anchors were inserted according to the product usage guidelines, the number of biosuture anchors/ titanium double loaded anchors needed depends on the size of the tear and sutures are passed through cuff tissue and knots are applied.

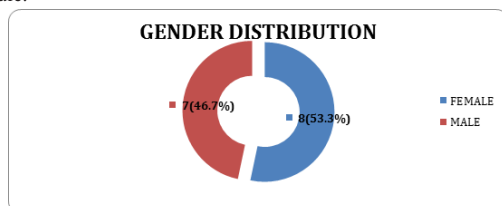
Post Operative Management

All patients arms were immobilised with a shoulder brace with abduction/pillow for 3weeks. Cryotherapy was used routinely postoperatively.

- Gentle pendulum exercises were started from 2nd post operative day, patients were discharged from hospital on the 2nd or 3rd post operative day.
- The first patient follow-up occurred 2 wks after surgery & subsequent follow ups were at 1,2,3,6,12 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

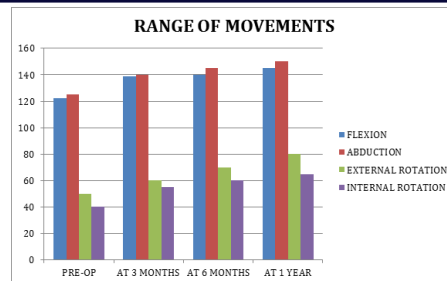
A Prospective study with 15 patients is undertaken to study the functional outcome of Arthroscopic rotator cuff repair. The mean age in our study is 59.8years. Majority are in the age group 40 to 70 yrs. Out of 15 patients, 7 were male, 8 were female. Major part of our study contained partial thickness tears (60%) rather than full thickness tears (40%). 73.3%(11) patients in our study had traumatic tears and 26.7%(4) patients had degenerative tears. There is significant improvement of flexion from 121.9° preoperatively to 145.0° postoperatively at 1 year, abduction from 125° to 150°, external rotation from 60° to 80°, internal rotation from 40° to 65°. In our study according to the UCLA Score, out of 15 patients, 3 patients had poor outcome, 3 patients had average outcome, 6 patients had good outcome and 3 patients had excellent outcome. Mean UCLA score increased from 15.91 preoperatively to 42.40 postoperatively at the end of 1st year. Mean ASES score improved from 37.16 preoperatively to 92.17 postoperatively. In our study Out of 15 patients, 7 were male, 8 were female.



In our study, there is significant improvement of flexion from 121.9° preoperatively to 145.0° postoperatively at 1 year, abduction from 125° to 150°, external rotation from 60° to 80°, internal rotation from 40° to 65°

Table 1: Range of movements

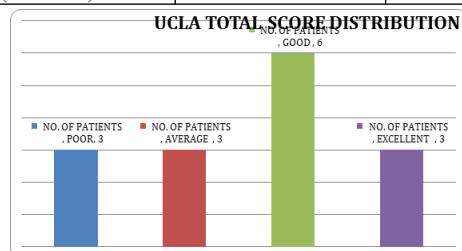
	Pre op	At 3 months	At 6 months	At 1 year	Pre op - 1 year	P Value
Flexion	121.9±6.56	138.6±9.36	140±8.89	145±10.90	24°	<0.001**
Abduction	125±8.64	140±11.36	145±10.03	150±14.58	25°	<0.001**
External rotation	50±3.61	60±4.28	70±6.74	80±2.61	30°	<0.001**
Internal rotation	40±4.23	55±4.83	60±2.94	65±3.65	25°	<0.001**



In our study according to the UCLA Score, out of 15 patients, 3 patients had poor outcome, 3 patients had average outcome, 6 patients had good outcome and 3 patients had excellent outcome.

Table 2: UCLA total score distribution of patients studied

Total Score	No. of patients	Percentage
0-20 (Poor)	3	20%
21-27 (Average)	3	20%
28-31 (Good)	6	40%
32-35 (Excellent)	3	20%



In our study Mean UCLA score increased from 15.91 preoperatively to 42.40 postoperatively at the end of 1st year.

Table 3: Difference of UCLA and pair wise significance

Difference	UCLA at presentation - 3 months	UCLA at presentation - 6 months	UCLA at presentation - 1 year
Mean±SD	15.91±3.71 TO 25.3±3.90	15.91±3.71 TO 37.45±5.45	15.91±3.71 TO 42.40±6.95
P value	<0.001	<0.001	<0.001

In our study Mean ASES score improved from 37.16 preoperatively to 92.17 postoperatively

Table 4: Difference of ASES and pair wise significance

Difference	ASES at presentation - 3 months	ASES at presentation - 6 months	ASES at presentation - 1 year
Mean±SD	37.16±9.42 TO 62±7.35	37.16±9.42 TO 75.10±9.58	37.16±9.42 TO 92.17±10.34
P value	<0.001	<0.001	<0.001

DISCUSSION

In this study, majority were in the age group between 40 to 70yrs with the mean age of 59.8yrs. Similarly studies conducted by Sugaya et al.,² Park et al.,³ Brian. Cole et al.,⁴ Burks et al.⁵ also had mean age of 57.7yrs, 57yrs, 57yrs, 56yrs respectively. In our study, age of the patient was not found to be a significant factor which affects the clinical outcome of the rotator cuff repairs. Similar observations were made by Bennet WF et al.,⁶ Stollsteimer and Savoie et al.⁷ One reason why age has not found to have any major affect in our series could be because of mean age less than 60 years. This group is known to have good outcome after cuff repair.

However, if age exceeds more than 70 years, the results could have been poorer or age would have shown it affect over the outcome. Age has been proved to be the most important predictor of clinical and radiological outcomes after the rotator cuff repair, as age is a predictor of tissue viability, and therefore, probably predicts success of cuff repair. Many studies have shown that the success of cuff repair decreases with advancing age especially after 65 years, and retear rates may be higher after 65 years. Millar et al.⁸ reported that mean ASES score and range of motion is better in arthroscopic repair than open repair. Tauro⁹ reported lesser hospital stay, small scar, less

postoperative pain in arthroscopic group compared to open repair. In the present study, majority of tears are traumatic tears. Patients with degenerative tears have decreased outcome and range of motion compared to traumatic tears. Very little work has been done in this regard. Braune et al¹² in 2003 had stated traumatic tears to have a better outcome than the degenerative tears.

On the basis of histological investigations,¹³ partial tears extend over time and will be converted to full thickness tears, arthroscopic repair is best for partial tears. In our study, we had 6 full thickness tears and 9 partial thickness tears. We found no significant change in final outcome between partial or full thickness tear. Comparing our study to one more similar study where both partial and full thickness tears were treated arthroscopically by single row technique. The study was conducted by Karin S Peters¹⁴ at St. George Hospital where they have assessed the patients by ASES shoulder scoring system pre operatively and at 6 months. They hypothesized that partial thickness tear has higher incidence of retears and shoulder stiffness compared to full thickness group. At 6 months follow up they found there was no statistical significance. Park et al.¹⁵ and Deutsch et al.¹⁶ reported significant increase in shoulder scores in arthroscopic repair.

There is significant improvement of flexion from 121.9° preoperatively to 145° postoperatively at 1yr, abduction from 125° to 150°, external rotation 50° to 80°, internal rotation 40° to 65°. In the study conducted by Cole et al⁴ and Alberto N M¹⁷ et al also showed significant increase in flexion, abduction and rotations at the end of follow up. We observed patients with degenerative tears have less improvement in range of motion compared to traumatic tears. Adequate postoperative rehabilitation programs are determinant to obtain good recovery in terms of range of motion, muscle strength, and function. We followed initiation of passive range of motion from postoperative day one in our patients and achieved better range of motion. In our study out of 15 patients, 3 patients had poor outcome, 3 patients had average outcome, 6 patients had good outcome and 3 had excellent outcome.

We were not able to compare between the techniques in our study as the most of the cases were single row and comparison cannot be done due to inadequate cases in group operated by double row technique. One other study where post op function assessed by Ganesh Kamath et al¹⁸ at Barnes – Jewish Hospital and pre operative and post operative ASES results were analysed. The mean age in both studies is around 51-60 years and pre op and post operative ASES results were analyzed and found to be statistically significant. Similarly Burks et al.,³ S W Khoo et al,¹⁹ Cole et al,⁴ Sugaya et al¹² had similar results as our study.

In one other study conducted by Christopher K Jones and Felix H. Savoie²⁰ at the southern center for Orthopedics and sports medicine, Georgia a retrospective study was conducted on patients who were operated for massive and large tears by arthroscopy and assessed by UCLA shoulder scoring system. They found at end of study that 88% of patients had good to excellent results with 6 patients having failed but in our study 60% had good to excellent results according to UCLA scoring system. As three dimensional evaluation of a tear is possible with arthroscopy, specific repair for specific tear can be done. Pain, function and range of motion have shown significantly good improvement in our study which had lead to significant patient satisfaction. Patient was able to do all daily routine activities like combing hair, dressing, after getting satisfactory range of motion. There were no infections and neurovascular injuries reported. 3 patients had postoperative shoulder stiffness who continued physiotherapy and NSAIDS for long time. No re surgery has been done for any patient. The limitations of the study include less sample, less follow up period and lack of randomization.

CONCLUSION

- Advantages of arthroscopic rotator cuff include less post operative pain, small scar & ability to diagnose other shoulder pathologies.
- There is no difference in functional outcome between partial thickness and full thickness tear treated arthroscopically.
- Patients need pre operative physiotherapy to achieve good range of motion before surgery for better final outcome.
- Adherence to strict post operative physiotherapy is key for achieving full range of movement and pain free activities of daily living. Age, Sex, type of tear do not affect the post operative result, but a larger clinical trial would be needed to prove the same.
- Patients with Degenerative tears and especially elderly women

will have less satisfactory outcome compared to patient with traumatic tears and young age.

REFERENCES

1. Vivek P, Jaap Willems W. Rotator cuff tear: A detailed update, *Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology*, 2;(2015):1-14.
2. Sugaya H, Maeda K, Matsuki K, Moriishi J. Functional and structural outcome after arthroscopic full-thickness rotator cuff repair: single-row versus dual-row fixation. *Arthroscopy* 2005 Nov;21(11):1307-16.
3. Parks JY, Lhee SH, Choi JH, Park HK, Yu JW, Seo JB. Comparison of the clinical outcomes of single-and double-row repairs in rotator cuff tears. *Am J Sports Med*. 2008;36(7):1310-6.
4. Brian JC, Pearce M, Richard WK, Winslow A, Paul B. L., Jennifer KH et al. Arthroscopic rotator cuff repair: Prospective functional outcome and repair integrity at minimum 2-year follow-up. *Journal of Shoulder and Elbow Surgery* 2006;12:011.
5. Burks RT, Crim J, Brown N, Fink B, Greis PE: A Prospective Randomized Clinical Trial Comparing Arthroscopic Single-and Double-Row Rotator Cuff Repair. *Am J Sports Med*. 2009 Apr;37(4):674-82.
6. Bennett WF. Arthroscopic repair of full-thickness supraspinatus tears (small-to-medium): a prospective study with 2-to 4-year follow-up. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*. 2003;19(3):249-56.
7. Stollsteimer GT, Savoie 3rd FH. Arthroscopic rotator cuff repair: current indications, limitations, techniques, and results. *Instructional course lectures*. 1997;47:59-65.
8. Millar NL, Wu X, Tantau R, Silverstone E, Murrell GA. Open versus two forms of arthroscopic rotator cuff repair. *Clin Orthop Relat Res*. 2009;467(4):966-978.
9. Tauro JC. Arthroscopic rotator cuff repair: Analysis of technique and results at 2- and 3-year follow-up. *Arthroscopy* 1998;14:45-51.
10. Kim SH, Ha KI, Park JH, Kang JS, Oh SK: Arthroscopic versus mini-open salvage repair of the rotator cuff tear: outcome analysis at 2 to 6 year's follow-up. *Arthroscopy* 2003 Sep;19(7):746-754.
11. Galatz, L M, Ball, Craig M F, Teefey, Sharlene A M, William D, Yamaguchi, Ken. Completely Arthroscopically Repaired Large and Massive Rotator Cuff Tears. *JBJS*, 2004;86(2):219–224.
12. Braune C, von Eisenhart-Rothe R, Welsch F, Teufel M, Jaeger A. Mid-term results and quantitative comparison of postoperative shoulder function in traumatic and non-traumatic rotator cuff tears. *Arch Orthop Trauma Surg*. 2003;123(8):419-24.
13. Hamada K, Tomonaga A, Gotoh M, et al. Intrinsic healing capacity and tearing process of torn supraspinatus tendons: in situ hybridization study of alpha 1 (I) procollagen mRNA. *J Orthop Res*. 1997;15:24-32.
14. Peters, Karin S.; McCallum, Sebastian; Briggs, Lisa; Murrell, George A. C. A Comparison of Outcomes After Arthroscopic Repair of Partial Versus Small or Medium-Sized Full-Thickness Rotator Cuff Tears. *Journal of Bone & Joint Surgery, American Volume*. 2012;94(12):1078-1085.
15. Park JY, Chung KT, and Yoo MJ. A serial comparison of arthroscopic repairs for partial and full-thickness rotator cuff tears. *Arthroscopy*. 2004;20:705-11.
16. Deutsch A. Arthroscopic repair of partial-thickness tears of the rotator cuff. *J Shoulder Elbow Surg*. 2007;16:193-201.
17. Alberto N M; Marcelo F, Pedro D S, Luciana Andrade da Silva. Evaluation of the results from arthroscopic repair on rotator cuff injuries among patients under 50 years of age. *Rev Bras Ortop*. 2011;46(3):276-80.
18. Kamath, Ganesh, Galatz, Leesa M. Keener, Jay D, Teefey, Sharlene, Middleton, William, Yamaguchi, Ken. Tendon Integrity and Functional Outcome After Arthroscopic Repair of High-Grade Partial-Thickness Supraspinatus Tears. *JBJS*. 2009;91;5:1055–1062.
19. SW Khoo, MS (Ortho), SM Khoo, MS (Ortho), YK Yeong, MS (Ortho), B Towil, MS (Ortho) Functional Outcome After Arthroscopic Rotator Cuff Repair – An Early Experience. *Malaysian Orthopaedic Journal*; 2009:32.
20. Christopher K. Jones, Felix H. Savoie II. Arthroscopic Repair of Large and Massive Rotator Cuff Tears. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, Vol 19, No 6 (July-August), 2003:pp 564-571.