

STUDY OF SINGLE ROW RECONSTRUCTION OF ROTATOR CUFF TEARS ARTHROSCOPICALLY WITH METALLIC SUTURE ANCHORS

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Abstract

Background: Rotator cuff disease encompasses a wide range of pathology from minimal bursal or articular side irritation and tendonitis to severe degenerative rotator cuff arthropathy. Our study is prospective type where we try to see the functional outcome of arthroscopic rotator cuff repair with single row metallic suture anchors in 15 patients by UCLA and ASES shoulder scoring system. **Materials and Methods:** It's a prospective study. Patients regardless of age operated by arthroscopy at followed up for minimum of 18 months and pain, function and muscle power are assessed by U C L A scoring system and range of mobility Functional outcome of arthroscopic rotator cuff repair with single row metallic suture anchors in 15 patients is assessed by UCLA and ASES shoulder scoring system. **Result:** In our study we have results showing preoperative and postoperative UCLA and ASES scores of 15 patients treated arthroscopically in our institute for partial as well as full thickness tears. We noted that there was no difference in functional outcome in both partial and full thickness tears proven statistically. There are less chances of postoperative stiffness and early mobilization possible with strict postoperative physiotherapy protocol. **Conclusion:** Arthroscopic rotator cuff repair provides early pain relief and improves mobility, strength as well as patient satisfaction post operatively.

INTRODUCTION

Tears of the rotator cuff tendons remain a common source of pain and disability among the adult population. Age appears to be the most common etiology. Epidemiological studies strongly support a relationship between age and cuff tears prevalence. In a recent study the frequency of such tears increased from 13% in youngest group (aged 50-59yrs) to 20% (aged 60-69yrs) 31% (aged 70-79yrs) and 51% in oldest group (aged 80-89yrs).^[1,2] Advances in procedure now allow arthroscopic repair of even largest tears and arthroscopic techniques are required to mobilize many of retracted tears arthroscopic results now match open surgical techniques and allow for more thorough evaluation of shoulder at time of surgery increasing diagnostic value of procedure as several other conditions may cause shoulder pain. Arthroscopic surgery allows for a shorter recovery time and predictably less pain in first few days following procedure than does any open surgery.^[2] During the past 3 decades, arthroscopy has dramatically changed the orthopaedic surgeon's approach to the diagnosis and treatment of a variety of joint ailments. A high degree of clinical accuracy,

combined with low morbidity, has encouraged the use of.

MATERIALS AND METHODS

The study was conducted on patients who have undergone Arthroscopic Rotator cuff tear during June 2018-2021 in Department of Orthopaedics, Osmania general Hospital, Hyderabad and followed up for 1 year.

Sample Size – 15

The study was conducted in Osmania Medical College/ Hospital, hyderabad after obtaining approval from Institutional Ethics Committee and written informed consent obtained from each patient. Patients who were diagnosed to have cuff tears on M R I and suspected to have cuff tears on clinical evaluation are included in the study. Patients were treated by arthroscopic repair of Rotator cuff Tear by single row technique and 5 mm suture anchors. Patients who had less than 1 year follow up and those who had associated fractures with rotator cuff tears were excluded.

Inclusion Criteria

Presence of tear in any of the rotator cuff tendons, Cuff repair performed solely with the use of arthroscopic techniques.

Exclusion Criteria

Patients having associated shoulder lesions like SLAP etc, Irreparable tears and associated symptomatic acromioclavicular arthritis.

All the patients fulfilling the above inclusion criteria were taken into study irrespective of age, sex and gender. The protocol included evaluation of patients according to his symptoms and his functional ability to do his activities of daily living. A proforma was designed which is to be filled by the patient himself/herself pre operatively and on his subsequent visits post operatively at 3 weeks, 6 weeks, 12 weeks, 6 months and 1 year. The patient would fill the subjective data by themselves while the muscle strength and range of motion are assessed by the surgeon and documented. The functional outcome was assessed by two scoring systems.

The results were finally evaluated using 2 shoulder scoring systems.

1. U C L A (University of California Los Angeles)
2. ASES (American Shoulder and Elbow surgeons) Shoulder Scoring Index and statistically analysed and compared with other studies.

Statistical Methods

Descriptive and prospective study has been carried out in the present study.

RESULTS

Study Design: A Descriptive and Prospective study of functional outcome with 15 patients is undertaken to study the functional outcome and evaluation of UCLA and ASES score.

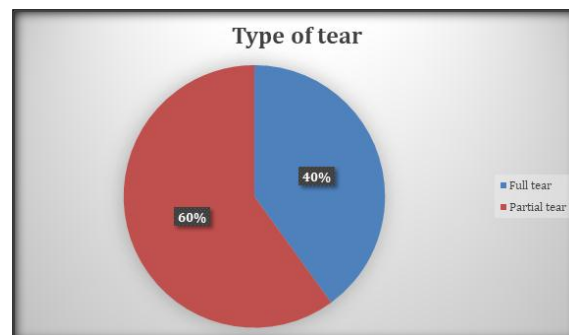


Figure 1: Distribution of type of tear of patients studied

Major part of our study contained partial thickness tears rather than full thickness tears.

Table 1: Age distribution of patients studied

Age in years	Number of patients	%
<30	1	6.7
31-40	1	6.7
41-50	6	40
51-60	5	33.4
61-70	1	6.7
>70	1	6.7
Total	15	100.0
Gender		
Male	11	73.4
Female	4	26.6
Etiology		
Degenerative	9	60
Trauma	6	40
Symptom		
Inability to lift shoulder	11	73.3
Pain in shoulder	4	26.7

50±11.67 is the mean age in our study is 50 years. In our study maximum number of patients was male. Most common cause noted in our study for rotator cuff tears is trauma to affected limb. Majority of patients complain of inability to lift affected shoulder.

Table 2: Distribution of habits of patients studied

Habits	Number of patients (n=15)	%
Smoking		
No	12	80
Yes	3	20
Alcohol		
No	10	66.7
Yes	5	33.3

The incidence of smoking and alcohol is as shown and is of not much significance.

Table 3: Distribution of jobs empty can test of patients studied

Jobs empty can test	Number of patients	%
Negative	0	0.0

Positive	15	100.0
Restriction of external rotation		
Negative	4	26.7
Positive	11	73.3
Arm lift off		
Negative	12	80
Positive	3	20
Be Belly press test		
Negative	11	73.3
Positive	4	26.7

Jobs empty can test is positive in all the cases. Restriction of external rotation seen in 11 patients. Arm lift off was positive in 80% patients. Belly press was positive in 4 patients.

Table 4: Evaluation of UCLA score

	UCLA					
	At presentation	At 3 wks.	At 6 wks.	At 12 wks.	At 6 months	at 1 year
Min-Max	6.00-19.00	8.00-17.00	8.00-18.00	14.00-29.00	17.00-32.00	30.00-35.00
Mean \pm SD	10.9 \pm 3.76	13.1 \pm 2.59	16.15 \pm 2.53	20.4 \pm 3.85	27.65 \pm 3.23	33.1 \pm 1.33
95 % CI	9.24-12.55	11.96-14.23	15.04-17.2	18.73-22.08	26.23-29.06	33.51-33.68

Table 5: Evaluation of ASES score

	ASES		
	at presentation	at 6 months	at 1 year
Min-Max	7.00-38.00	66.5-88.00	76.00-98.00
Mean \pm SD	24.14 \pm 10.5	76.1 \pm 7.18	92.9 \pm 6.77
95 % CI	19.53-28.74	72.95-79.24	89.93-95.86



Figure 2: Photos in present study. A- PREOP, B- Follow up at 1 year, C- Postop X-Ray, D- Pre op, E- Follow up at 1 year, F- Post op x ray, G-MRI, H- follow up at 1 year, I- Post op X-Ray.

Table 6: Compared to study conducted by Kyung Cheon Kim et al.

	Number of patients	Follow up	Pre op UCLA	At end of follow up	Pre op ASES	At end of follow Up	P value
Kyun Cheon Kim et al. ^[3]	79	30.6 Months	21.6	30.9	50.4	86.2	<0.001
Our study	20	12 Months	10.9	33.1	24.14	92.94	<0.001

In comparison to above study we have follow up for 12 months of 15 patients where as in above study 79 patients were followed up for 30.6 months on average and both studies have statistically significant outcome ($p < 0.001$). One other study where post op function assessed by Ganesh Kamath et al at Barnes – Jewish Hospital and pre-operative and post-operative ASES results were analysed

Table 7: post op function assessed with other studies

	Number of patients	Mean age	Follow up	Pre operative ASES	ASES a t end of follow up	P value
Ganesh Kamath et al. ^[5]	42	53	24 months	47.01±17.9	82.7±21.0	<0.0001
Karin S.Peters et al. ^[6]						
Full thickness	105	59	2 years	47±1	67±2	<0.05
Partial thickness	64	62		46±1	60±2	
Our study	20	51.45	12 months	24.14±10.5	92.94±6.77	<0.001

DISCUSSION

Rotator cuff disease encompasses a wide range of pathology from minimal bursal or articular side irritation and tendonitis to severe degenerative rotator cuff arthropathy. Rotator cuff pathology affects adults of all ages and other shoulder afflictions must be ruled out by careful history and physical examination.^[1] Epidemiological studies strongly support a relationship between age and cuff tears prevalence. In a recent study the frequency of such tears increased from 13% in youngest group (aged 50-59yrs) to 20% (aged 60-69yrs) 31% (aged 70-79yrs) and 51% in oldest group (aged 80-89yrs).^[2]

In recent past small tears were treated arthroscopically while larger tears would require an open procedure. Advances in procedure now allow arthroscopic repair of even largest tears and arthroscopic techniques are required to mobilize many of retracted tears arthroscopic results now match open surgical techniques and allow for more thorough evaluation of shoulder at time of surgery increasing diagnostic value of procedure as several other conditions may cause shoulder pain. Arthroscopic surgery allows for a shorter recovery time and predictably less pain in first few days following procedure than does any open surgery.^[2] The study was taken up to evaluate the functional outcome of patients treated arthroscopically for rotator cuff tears with single row metallic suture anchors. The functional outcome was assessed by using U C L A and A S E S shoulder scoring system. The pre operative and post operative values were obtained and were compared to those of previous similar studies.

Majority of patients were between ages 51-60 years who had difficulty in carrying out their activities of daily living. Majority of them were men forming 65% whereas the rest of them were women forming 35%. Majority of patients the etiology was due to history of fall on affected shoulder 85%. Majority of patients complained of inability to lift the shoulder following

trauma. The incidence of partial thickness tears was 11 out of 20 evaluated and full thickness tears noted in rest 9. Acromioplasty and sub acromial decompression provided better pain relief in patients who had positive impingement sign pre operatively. The technique and number of suture anchors used did not alter the clinical outcome results. When our study was compared to study conducted by Kyung Cheon Kim et al, Chungnam National University, south korea.^[3]

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.

In one other study conducted by Christopher K Jones and Felix H. Savoie at 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 98% had good to excellent results according to UCLA scoring system.^[4]

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 Peters 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 (< 0.05) in our study where we compared outcome we found we had statistically significant improvement in ASES values pre op and post operatively at 6 months. In the present study 98% of the patients were satisfied at the time of the follow-up. The patient's satisfaction published by Tauro,^[7] Gartsman,^[8] and Weber,^[9] were 92%, 90%, 91%, and 92% respectively. The

outcome of rotator cuff repairs may be influenced by a variety of factors.

The average age of the patients in our study was 50 years. Although in this study there was no limitation concerning the age, we found no statistical significant relation between the age of the patient and the postoperative net results. Similarly, Bennet,^[10] reported no difference in the outcome based upon the age as a variable. Stollsteimer and Savoie,^[11] showed also no difference in the outcome noted among patients of different ages, suggesting that the arthroscopic repair is equally effective in all age groups.

On the other hand, Boileau et al. reported that the age was clearly a factor influencing tendon healing. They found that the patients who had a healed tendon were, on the average, ten years younger than those in whom the tendon did not heal. They concluded that the chance of tendon healing decreased to 43% when the patient was more than sixty five years old. However, they stated that the absence of tendon healing (or only partial healing) did not necessarily compromise pain relief and patient satisfaction. There is little commentary in the literature with respect to sex for outcomes of rotator cuff disease.

This study included 11 males and 4 females. The almost equal sex distribution was also shared between this study and other studies carried out by Kim,^[12] Boileau,^[13] and Galatz.^[14] They also shared that there was no significant relation between the sex of the patient and the postoperative net results. On the other hand, in the study performed by Watson et al,^[15] they identified a small, but statistically significant difference between male and female patients with regard to overall satisfaction, improvement in the functions of activity of daily livings (ADLs), and performance of usual work. However they stated that "what does exist does not support a sex difference". Harryman et al,^[16] evaluated patient satisfaction, functional outcome, and ultrasonographic cuff integrity after 105 rotator cuff repairs and found no significant correlation of patient sex with the outcomes.

In the present study we found no significant relation between the dominant shoulder and the postoperative outcome. Cofield et al reported similar result.^[17]

Smoking has always been associated with poor healing properties of tissue.

Carbone et al noted that the severity of cuff tear increases with more numbers of cigarettes smoked. In this study It was not able to compare outcomes due to inadequate cases in group smokers.

This study included 40% full thickness and 60% partial thickness cuff tears. There was no statistical significant difference between the size of the tear and the postoperative net results. Various authors have reported a relation between the size of the cuff tear and the results of repair, suggesting that the functional outcome is better for small and medium tears than for large and massive tears. Others have suggested otherwise. Harryman et al,^[16] concluded that the patients with smaller tears had a higher rate

of healing. Basset and Cofield,^[16,17] found that the strength on the abduction and external rotation after repair of small and medium sized tears was consistently better than that after repair of large tears. Harryman et al,^[16] found a much higher prevalence of recurrent defects in the cuff in the patients who had had a larger tear. Iannotti et al,^[19] in a prospective study of forty patients who had repair of the rotator cuff, found a significant association between the functional outcome and the size of the tear at the time of the operation. On the other hand, Burkhart et al,^[20] reported the long-term functional results of arthroscopic rotator cuff repair (average, 3.5 years) and analyzed the results by tear size and repair technique. They found that the large and massive tears did as well as the small and medium sized tears. They concluded that the results of arthroscopic repair of rotator cuff tears are independent of tear size.

Complications have been rarely reported after arthroscopic rotator cuff repair, and some believe that the rate of complications is lower than that after open repair. The complications reported in our study were superficial infection in one patient. No intraoperative complications were reported. We did not encounter the complication of anchor loosening that led to reoperation. None of the cases included in our study suffered from postoperative stiffness. Sperling et al. reported persistence of pain in nine shoulders included in their study.

CONCLUSION

Arthroscopic rotator cuff repair is technically demanding procedure that needs prerequisite skills as diagnostic shoulder arthroscopy, arthroscopic subacromial decompression, and arthroscopic knot tying. Advantages of arthroscopic rotator cuff repair include, a small cosmetic scar, reduced early postoperative pain, availability to diagnose any intraarticular pathology that can affect the end results, and deltoid muscle preservation that allows early and easier postoperative rehabilitation. Diagnosis of rotator cuff tears is made mainly by history, clinical examination, and confirmed by ultrasonography or magnetic resonance imaging. In comparison to other studies our study shows that there is no difference in functional outcome between partial and full thickness tear treated arthroscopically. several arthroscopic methods of tendon-bone repair have been studied extensively, and controversy remains over the preferred choice of fixation. Single-row constructs offer excellent clinical results. To date, sufficient evidence does not exist proving double-row rotator cuff repair will result in superior clinical outcomes to single-row repair, particularly to justify the increased cost and operative time. Multiple systematic reviews conclude that despite improved structural healing, there is no statistically significant difference in patient outcomes between single-row and double-row rotator cuff repairs. Tissue strangulation, tension-mismatch repairs, the potential

for type 2 retears, and unfavorable cost analyses are all additionally relevant issues questioning double-row constructs.

Therefore, a well-performed single-row repair using 3 sutures per anchor with reduced lateral traction on the detached tendon will provide a favorable outcome, at reasonable expense, in most patients with a rotator cuff tear. It has been observed adherence to strict post-operative physiotherapy is key for achieving full range of movement and pain free activities of daily living.

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