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The Functional Outcome Ofarthroscopic Rotator Cuff Repair

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ABSTRACT: 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. Arthroscopic surgery allows for shorter recovery time and predictably less pain in the first few days following the procedure than does any open surgery.
METHODS: It's a retrospective and prospective study. Patients regardless of age operated by arthroscopy at followed up for a minimum of 6 months and pain, function and muscle power are assessed by U C L A scoring system and range of mobility. The functional outcome of arthroscopic rotator cuff repair in 28 patients is assessed by UCLA and ASES shoulder scoringsystem.
RESULTS: In our study, we have results showing preoperative and postoperative UCLA and ASES scores of 28 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 fewer chances of post-operative stiffness and early mobilization possible with strict post-operative physiotherapyprotocol.
CONCLUSION: Arthroscopic rotator cuff repair provides early pain relief and improves mobility, strength as well as patient satisfaction postoperatively.

I. INTRODUCTION

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 the youngest group (aged 50-59yrs) to 20% (aged 60-69yrs) 31% (aged 70-79yrs), and 51% in the oldest group (aged 80-89yrs)[2].In the recent past, small tears were treated arthroscopically while larger tears would require an open procedure. Arthroscopic surgery allows for shorter recovery time and predictably less pain in the first few days following the procedure than does any opensurgery[2].

During the past 3 decades, arthroscopy has dramatically changed the orthopedic 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 arthroscopy to assist in diagnosis, to determine prognosis, and often to provide treatment. Arthroscopic procedures should serve as adjuncts to and not as replacements for thorough clinical evaluation; arthroscopy is not a substitute for clinical skills. Progressive improvements in the lens systems of Arthroscopes and fiber optic systems, in miniaturization, and the accessory operative instruments have made possible advanced operative arthroscopic techniques for virtually every joint in the body, including the knee, shoulder, hip, ankle, elbow

II. MATERIALS ANDMETHODS

Study Design: Retrospective and prospective study.
Study Location: This was a tertiary care teaching hospital-based study done in the Department of Orthopedics in Narayana Medical College and Hospital, Nellore
Study Duration: between December 2018 and March 2020
Sample size: 28 patients.
Subjects & selection method: By follow up at intervals 3 weeks,6 weeks,12 weeks, 6 months,

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and1-year postoperatively. The cases at follow up were analyzed both clinically and radiologically, and
Protocols were filled

Inclusion Criteria
Patients who have atleast 6 weeks of conservative management from the onset of symptoms of
Patients with atleast 6 months follow up after the operation
Patients who were diagnosed to have cuff tears on M R I and suspected to have cuff tears on clinical evaluation.

Exclusion Criteria
Patients who had less than 6 months follow up.
Patients who had associated fractures with rotator cuff tears.

PROCEDURE OF THE STUDY
Pre-operative

All the patients fulfilling inclusion criteria were taken into study irrespective of age, sex, and gender. The protocol included the 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 preoperatively and on his subsequent visits postoperatively at 3 weeks,6 weeks,12 weeks, and 6 months. 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.

For this study purpose, we have employed U C L A (University of California Los Angeles) shoulder scoring and A S E S (American Shoulder and Elbow Surgeons) shoulder score index for evaluating the functional outcome.
Preoperative and post-operative U C L A and A S E S scores were taken and statistically analyzed if there was significant compared with other studies.

Follow up

Patients treated postoperatively was immobilized for 6 weeks in a shoulder immobilizer with 30-degree abduction and pendulum exercises started from the first postoperative day and the patient continues in a shoulder immobilizer for rest of the day for 6 weeks were followed up at 3 weeks,6 weeks, 12 weeks and at 6 months and 1year.

Patient functional assessment was done based on pain relief,ability to carry on activities of daily living,strength, and patient satisfaction postoperatively.

A protocol was designed which would be filled by the patient himself and shoulder scoring systems were calculated accordingly.

Postoperative radiographs were done at every visit to check for signs of screw loosening. Where ever possible ultrasound examination of the operated shoulder was done and cuff integrity was checked. The strength and range of movements were documented by the operating surgeon.

Assessment of results
The results were finally evaluated using 2 shoulder scoring systems.
U C L A (University of California LosAngeles)
ASES (American Shoulder and Elbow surgeons) Shoulder Scoring Index.

III. RESULTS

Study Design: A Retrospective Prospective study functional outcome with 28 patients is undertaken to study the functional outcome and evaluation of UCLA and ASESscore

Table 1: Age distribution of patients studied

Age in years	Number of patients	%
<30	1	3.6
31-40	1	3.6
41-50	8	28.6
51-60	12	42.9
61-70	3	10.7
>70	3	10.7
Total	28	100.0

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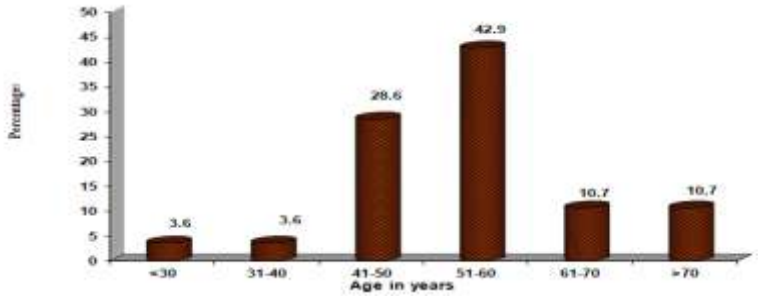


mean age in is 54.61 between 51-60 yrs
Mean ± SD: 54.61±12.05

Table 2: Gender distribution of patients studied

Gender	Number of patients	%
Male	18	64.3
Female	10	35.7
Total	28	100.0

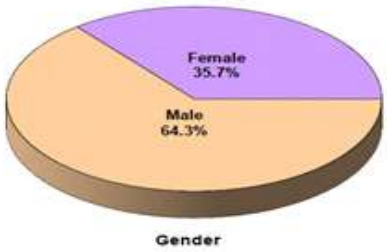
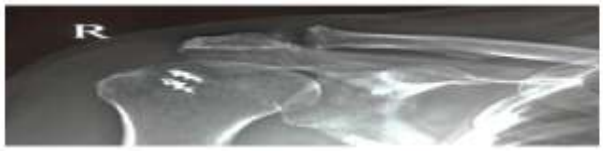


Table 3: Distribution of type of tear of patients studied

Type of tear	Number of patients	%
Full-thickness	12	42.9
Partial	16	57.1
Total	28	100.0



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Follow up X-ray and R O M at 1 year with B/L Rotator Cuff tear

Ultrasound image showing cuff tear

Table 4: Distribution of technique of patients studied

Technique	Number of patients	%
Single row technique	2	7.1
Double row	26	92.9
Total	28	100.0

Table 5: Distribution of etiology of patients studied

Etiology	Number of patients	%
Degenerative	4	14.3
Trauma	24	85.7
Total	28	100.0

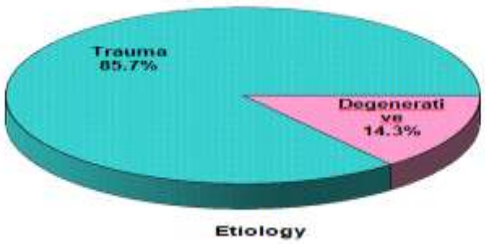

Table 6: Distribution of intraarticular steroid of patients studied

Intra articular steroid	Number of patients	%
No	27	96.4
Yes	1	3.6
Total	28	100.0

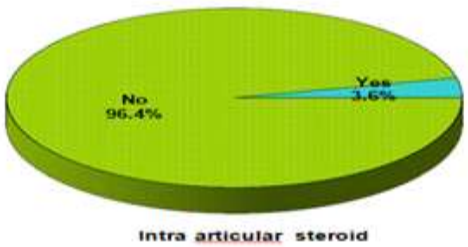

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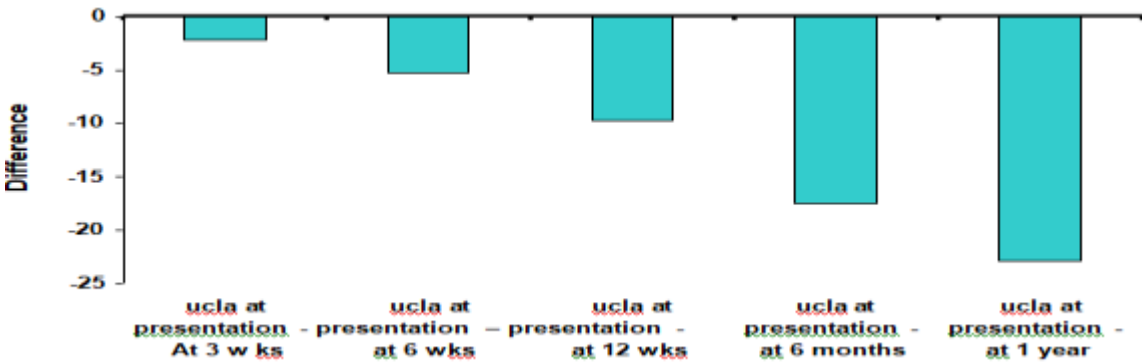
Table7: Evaluation of UCLA score

	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 ±SD	9.93±3.50	12.07±2.41	15.19±2.48	19.54±3.74	27.35±3.65	32.65±1.41
95 % CI	8.54-11.31	11.12-13.03	14.19-16.19	18.03-21.05	25.87-28.82	32.08-33.22

Table 8: Difference of ULCA and pairwise significance

Difference	UCLA at presentation -At 3 wks	UCLA at presentation – at 6 wks	UCLA at presentation - at 12 wks	UCLA at presentation - at 6 months	UCLA at presentation - at 1 year
Mean ±SD	-2.14±2.34	-5.38±0.96	-9.73±4.88	-17.53±4.95	-22.84±3.82
P value	<0.001**	<0.001**	<0.001**	<0.001**	<0.001**



IV. 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. 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 the youngest group (aged 50-59yrs) to 20% (aged 60-69yrs) 31% (aged 70-79yrs), and 51% in the oldest group (aged 80-89yrs) [2]. In the recent past, small tears were treated arthroscopically while larger tears would require an open procedure. Advances in the procedure now allow arthroscopic repair of even the largest tears and arthroscopic techniques are required to mobilize many of retracted tears arthroscopic results now match open surgical techniques and allow for a more thorough evaluation of the shoulder at the time of surgery increasing the diagnostic value of the procedure as several other conditions may cause shoulder pain. Arthroscopic surgery allows for shorter recovery time and predictably less pain in the first few days following the 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. The functional outcome was assessed by using U C L A and A S E S shoulder scoring system. The preoperative and postoperative values were obtained and were compared to those of previous similar studies.

General observations

The majority of patients were between age 51-60 years who had difficulty in carrying out their activities of dailyliving.

The majority of them were men forming 64.3 % whereas the rest of themwere women forming35.7%.

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The majority of patients the etiology was due to a history of falls on the affectedshoulder 85.7%.
The majority of patients complained of an inability to lift the shoulder followingtrauma.
The incidence of partial-thickness tears was 16 out of 28 evaluated and full-thickness tears noted in rest12.
Acromioplasty and subacromial decompression provided better pain reliefin patients who had positive impingement signs preoperatively.
Bilateral rotator cuff tears were noted in onepatient.
The technique and number of suture anchors used did not alter theclinical outcomeresults.
When our study was compared to a study conducted by Kyung Cheon Kim et al, Chunganam National University, SouthKorea.

	Number of patients	Followup	Pre-op UCLA	At end of the follow-up	Pre-op ASES	At end of the follow-up	P-value	
KyunCheon Kim et al	79	30.6 months	21.6	30.9	50.4	86.2	<0.001	
Our study	28	12 months	9.93	32.6	20.78	92.94	<0.001	

In comparison to the above study, we have followed up for 12 months of 28 patients whereas in the above study 79 patients were followed up for 30.6 months on average and both studies have statistically significant outcomes (p <0.001).

We have compared our study results with the Cochrane review article which was conducted by Paul Saridikas,BS,and Grant Jones at Ohio State University. In this systematic review, ten articles were reviewed.

	Technique used	Number of patients	Meanage	Follow up	UCLA at end of follow up	ASES a tend to follow up
Burks et al.	Single row	20	56	12 months	28.6(27.0-30.2)	85.9(79.8-92.0)
	Doublerow	20	57		29.5(27.0-32.0)	85.5(76.7-94.3)
Charousset a.l	Single row	35	58	27.6(24-37) months	Not reported	Not reported
	Double row	31	60	28.7(24-40) months	Not reported	Not reported
Franceschi et al.	Single row	26	63.5	22.5(18-25) months	32.9(32.4-33.4)	Not reported
	Double row	26	59.6		33.3(32.8-33.8)	Not reported
Grasso et al	Single row	37	58.3	24.8	Not reported	Not reported
	Double	35	55.2		Not reported	Not reported

In this review they have analyzed the rotator cuff tears depending on the technique and post-operative UCLA and ASES were analyzed .they found no significance in the outcome of patients treated by both techniques which were similar to our study results. The patients in the analysis were mostly in the age group 51-60 which was also seen in our study group. We were not able to compare the techniques in our study as most of the cases were double row and comparison cannot be done due to inadequate cases in the group operated by single-row technique.
One other study where post-op function assessed by Ganesh Kamath et al at Barnes – Jewish Hospital and preoperative and postoperative ASES results were analyzed

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	Numberof patients	Meanage	Follow up	Preoperative ASES	ASES a tend to follow up	P-value
Ganesh Kamath et Al	42	53	24 months	47.01+17.9	82.7+21.0	<0.0001
Our study	28	54.6	12 months	20.78+10.14	92.94+7.16	<0.001

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 statisticallysignificant.

In one other study conducted by Christopher K Jones and Felix H. Savoie 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 the 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 the UCLA scoringsystem.

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 the ASES shoulder scoring system preoperatively and at 6 months .they hypothesized that partial thickness tear has a higher incidence of retears and shoulder stiffness compared to the full-thicknessgroup. At6months follow up they found there was no statistical significance.

V. CONCLUSION

In comparison to other studies, our study shows the mean age of incidence of rotator cuff tears is between the age group 51-60 years.

In comparison to other studies, our study shows that there is no difference infunctional outcome between partial and full-thickness tear treatedarthroscopically.

In comparison to other studies, the outcome following a single row or a doublerow technique is cannot be determined due to an inadequate comparisongroup.

As seen with other studies the first symptom to recover following arthroscopic repair is pain and significant improvement is seen at 6 weeks follow up.

The full range of shoulder function is observed at end of 1 year which in comparison to preoperative values was statistically significant.

It has been observed from our study patient‘s ability to carry his daily activities like sweeping and washing face by 6 weeks and activities reaching out for a shelf and washing the back himself would require 1 year.

It has been observed adherence to strict post-operative physiotherapy is key for achieving a full range of movement and pain-free activities of daily living.

The study requires longer follow up for coming to specific guidelines and similar comparison groups

VI. SUMMARY

A retrospective and prospective study were done in Narayana medical college which included patients who were treated arthroscopically between December 2018 and March 2020. Patients were followed up at 3 weeks 6 weeks 12 weeks, 6 months, and 1 year. The patient was evaluated at presentation and at follow up. At follow up patient is asked to fill proforma and functional outcome was assessed using UCLA and ASES shoulder scoring system . the study showed that there was a significant improvement in pain,strength,patient satisfaction, range of motion, and ability to carry activities of daily living irrespective of the type of tear and technique used when strict post-operative physiotherapy is followed. Further, there is minimal hospital stay and early return to their activities. A study with a larger sample size, with more number of cases in each group to make definite recommendations.

		Numberof patients	Meanage	Followup	Preoperative ASES	ASES a t end of 6 months	P-valueat end of 6 months
Karin S.Peters et al	Full thickness	105	59	2 years	47+1	67+2	<0.05
	Partial thickness	64	62		46+1	60+2	
Our study		28	54.6	12 months	20.78+10.14	77.13+6.91	<0.001

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