



## FUNCTIONAL OUTCOME OF ARTHROSCOPIC REPAIR OF ISOLATED SUPRASPINATUS TEAR – A PROSPECTIVE OBSERVATIONAL STUDY

<b>Dr. Prasanth Srinivasan*</b>	Department of Orthopaedics, St James Hospital, Chalakudy, Thrissur, Kerala, India, Pincode:680307. *Corresponding Author
<b>Dr. Sandeep Ramola</b>	Department of Orthopaedics, St James Hospital, Chalakudy, Thrissur, Kerala, India, Pincode:680307.
<b>Dr. Vidyanand M Makani</b>	Department of Orthopaedics, St James Hospital, Chalakudy, Thrissur, Kerala, India, Pincode:680307.

**ABSTRACT** **Background:** Rotator cuff lesions are one of the more common conditions affecting the shoulder joint. The management of rotator cuff tears has changed dramatically from open procedures to less invasive procedures like arthroscopy. The results of arthroscopic rotator cuff repair have not been studied as extensively as open repair. The purpose of this study is to evaluate functional outcome of arthroscopic repair of isolated supraspinatus tear. **Methods:** A prospective observational study conducted on twenty patients with supraspinatus tendon tear who underwent arthroscopic supraspinatus repair between September 2017 and June 2018. Patients with tear of supraspinatus tendon, age between 45 and 70 years, repair performed solely with arthroscopic technique, consent to participate and follow up in post-operative rehabilitation were included. Patients with associated superior labrum anterior to posterior lesion, cuff tear arthropathy, acromioclavicular arthritis, tears involving other rotator cuff tendons and revision of rotator cuff repair were excluded. There were 15 female and 5 male with average mean age of 56.4 years. After assessing the tear pattern and subacromial decompression, the tear was repaired by either single row or double row techniques. All patients were assessed by University of California, Los Angeles scoring system preoperatively, postoperatively 6 months and 1 year. **Results:** 10% patients had excellent results, 85% had good results and 5% had poor results. Mean University of California, Los Angeles score increased from 6.55 preoperatively to 31.15 at the end of one year. **Conclusion:** Arthroscopic repair for isolated Supraspinatus tendon tears gave good to excellent functional results in large percentage of patients.

**KEYWORDS :** rotator cuff repair, arthroscopic rotator cuff repair

### INTRODUCTION

The rotator cuff is formed by the tendinous insertions of the supraspinatus, infraspinatus, subscapularis, and teres minor muscles. The important role played by the rotator cuff in the stability and mobility of the glenohumeral joint makes it susceptible to damage and injuries [1]. The spectrum of rotator cuff disorders ranges from inflammation to massive tearing of the rotator cuff. The management of rotator cuff tears has changed dramatically during the recent past as there is progression towards less invasive procedures like arthroscopy to obtain equivalent or better results when compared to the traditional open procedures.

### MATERIAL AND METHODS

A prospective observational study was conducted on twenty patients with supraspinatus tendon tear who underwent arthroscopic supraspinatus repair between September 2017 and June 2018. Patients with tear of supraspinatus tendon, age between 45 and 70 years, repair performed solely with arthroscopic technique, consent to participate and follow up in post-operative rehabilitation were included. Patients with associated SLAP lesion, cuff tear arthropathy, acromioclavicular arthritis, tears involving other rotator cuff tendons and revision of rotator cuff repair were excluded. All twenty patients underwent preoperative evaluation including history, clinical examination, X ray antero-posterior view of affected shoulder, ultrasound scan and/or MRI. Final diagnosis made by intraoperative findings. All patients received general anaesthesia and arthroscopic supraspinatus repair done in lateral decubitus position. After assessing the tear pattern and subacromial decompression, the tear was repaired by either single row or double row techniques. Small tears (<1cm) were treated with single row technique whereas medium and large tears (>1cm to <5cm) were treated with double row technique. The operated arm was placed at the side in a sling with abduction pillow and arm-chest strapping for 3 weeks. All patients were assessed by UCLA scoring system preoperatively, postoperatively 6 months and 1 year.

**Operative procedure:** The patients were operated under general anaesthesia in the lateral decubitus position with standard posterior (Fig 1), posterolateral, lateral and anterosuperior arthroscopic portals.

After arthroscopic examination, tear pattern were assessed by determining the mobility of the tear margins in medio-lateral and antero-posterior directions. After subacromial decompression the tear was repaired by single row and double row techniques arthroscopically.

In single row technique, the tendon was fixed to the footprint of the greater tuberosity with bioabsorbable/ non-bioabsorbable suture anchors (Arthrex cork screw 5.5 x 16.3 mm and swivel lock 4.75 x 24.5 mm). Each anchor was loaded with suture number 2 and the number of anchors used depended upon the tear size. In double row technique, suture bridge configuration was used (Arthrex Speed bridge implant system- Fig 2). The biocomposite speed bridge implant system which included 4.75 x 19.1 mm vented biocomposite swivelock anchors with preloaded FiberTape loops (to ease suture passage for the medial row) and biocomposite swivelock / swivelock SP (self punching anchors for lateral row) were used. Supraspinatus tear of size <1cm (small tears) were treated with single row technique and tear size >1cm to <5cm (medium and large tears) were treated with double row technique.



Figure 1: Establishment of posterior portal

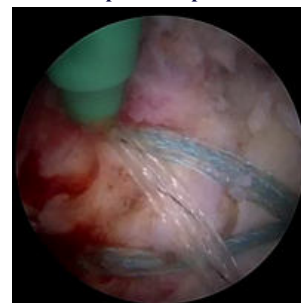


Figure 2 : Supraspinatus tear repair with Speed bridge technique



**Figure 3: Post operative Xray of shoulder**

After surgery, the rehabilitation was carried out in the same manner for all patients; this included the arm in a sling with abduction pillow and arm-chest strapping for 3 weeks. Neck, elbow, wrist movements were started between 0 and 2 weeks. At 3 to 6 weeks, shoulder and scapula holding exercise were started. Capsular stretching exercise started at 6 weeks and strengthening exercise by 12 weeks, thereafter normal activity.

**Statistical method**

The data was entered in Microsoft Excel and was cleaned for errors and missing values. Data analysis was done using licensed SPSS software version 21.0. Data was presented in the form of tables and appropriate diagrams. Qualitative data was summarized as proportions while quantitative data as mean, median and appropriate measures of dispersion including confidence intervals. Quantitative data was analysed using paired t-test and Wilcoxon Signed Rank test based on the assumption of Normality of data distribution for statistical comparison of pre and post UCLA values for all the parameters. Qualitative data was analysed using chisquare/ Fisher Exact test. A p value of <0.05 was considered statistically significant.

**Ethical concerns**

The study conformed to the guidelines of Declaration of Helsinki 1964 (revised in 1975). Study protocol was subjected to approval of the Institutional Ethics Committee and clearance obtained. Patients right to opt out of the study without prior notice was explained and written consent was obtained from the patient, and first degree relatives for his/her inclusion in the study. Only necessary investigations required for the evaluation and treatment were done. No financial burden was put upon the patient as a part of study.

**RESULTS**

50% patients were treated by single row technique and 50% patients were treated by double row technique. Analysis of functional outcome by UCLA score showed that 10% had excellent results, 85% had good and 5% had poor results. Mean UCLA score increased from 6.55 preoperatively to 31.15 at the end of one year. Two patient had postoperative shoulder stiffness and underwent manipulation under anaesthesia and continued physiotherapy till 6 months after surgery. One patient obtained good functional outcome and another patient obtained poor functional outcome at the end of 12 months. No revision surgery was done for any patient. No infections or neurovascular injuries were noted.

**TABLE 1: Comparison of pre-operative and postoperative UCLA score**

	Pre-operative UCLA	UCLA at 6 months postoperative	UCLA at 1 year postoperative
N	20	20	20
Mean	6.55	22.30	31.15
Median	6	23.00	32.00
Standard deviation	2.064	5.222	2.681
Range	7	20	12
Minimum	4	12	22
Maximum	11	32	34

UCLA:University of California, Los Angles

**TABLE 2: Descriptive Statistics of UCLA scores**

	N	Percentiles		
		25th	50th (Median)	75th
Pre-operative UCLA	20	5.00	6.00	7.75
UCLA at 6months	20	21.25	23.00	25.00
UCLA at 1year	20	30.00	32.00	33.00

UCLA: University of California, Los Angles

The tests of Normality (Kolmogorov-Smirnov and Shapiro Wilk tests) showed that the Pre-operative UCLA and UCLA scores measures at 1 year were not normality distributed as the Null hypothesis is rejected(p<0.05). Hence Non parametric test was conducted to study the significance between UCLA scores over time.

The Friedman test was used as a non-parametric alternative of one way ANOVA repeated measures test.

Conducting the Friedman's test to study the significance of UCLA scores showed that there was a statistically significant difference in UCLA scores measures over a 3 time points, Chi-square(2)=40.0, p=0.000. Post hoc analysis with Wilcoxon signed rank tests was conducted with a Bonferroni correction. A Wilcoxon signed rank test for measurement of UCLA scores before surgery and 6 months after surgery showed statistically significant difference (Z=-3.929,p=0.000). A Wilcoxon signed rank test for measurement of UCLA scores before surgery and 1 year after surgery showed statistically significant difference (Z=-3.942,p=0.000) and measurement of UCLA scores at 6 months after surgery and 1 year after surgery showed statistically significant difference (Z=-3.925,p=0.000). Hence there was a statistically significant increase in UCLA scores over successive time periods.

**DISCUSSION**

Arthroscopic repair of rotator cuff tears is technically demanding and still in the developmental phase. Studies on outcome of arthroscopic repair of isolated supraspinatus tears are few [2].

In this series, 65% (13) patients were less than 60 years of age and the mean age of the patients in the study was 56.4 years. Similar findings were noted in studies conducted by Burks et al[3], and Flanagan B et al [4] with mean age of 56yrs and 56.3yrs respectively.

Out of 20 patients, 75% (15) were female and 25% (5) were male. However, studies conducted by Gartsman GM et al[5] in 73 patients showed almost equal gender distribution of 53.4% in males and 46.6% in females. The lesser number of males in the study could be due to smaller or non-representative sample size of the study population.

75% (15) patients had right side involvement and 25% (5) patients had left side involvement. 55% (11) patients had symptoms for < 3 months, 30% (6) patients had symptoms for 4 to 6 months and 15% (3) patients had symptoms for 7 to 12 months. 85% (17) patients in the study had traumatic tears and 15% (3) patients had degenerative tears. Full thickness tears were seen in 60% (12) patients and partial thickness tears were seen in 40% (8) patients.

In this study, 50% (10) patients were treated by single row technique and 50% (10) patients were treated by double row technique which was similar to studies conducted by Franceschi et al [6], Burks et al [3], Koh et al [7] and Carbonel et al[8]

Analysis of functional outcome by UCLA score showed that out of 20 patients, 95 % of patients came with good/excellent UCLA score which was comparable with studies conducted by Burkhart SS et al [9] in 59 patients and Liu SH et al [10] in 33 patients. They had 95% and 86% good/excellent results respectively. Mean UCLA score increased from 6.55 preoperatively to 31.15 at the end of one year which is similar to studies conducted by Xiao J et al [11], Kim K C et al [12] and Gartsman GM et al [5].

**LIMITATIONS OF THE STUDY**

The sample size of twenty patients was a small one and the follow-up duration was one year which was a short period. The association of coexisting injuries and lesions in the shoulder joint complex and the requirement for conversion of arthroscopic to open procedure narrows down the number of isolated supraspinatus tears.

**CONCLUSION**

Arthroscopic repair for isolated Supraspinatus tendon tears gave good to excellent functional results in large percentage of patients.

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