

Evaluation of clinical and functional outcomes of arthroscopic single row rotator cuff repair in our institution; a retrospective study

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Abstract

Introduction: Various recent clinical literature and industrial commercial interests has shifted the focus from SR rotator cuff repair towards DR repair. The Aim of our study was to evaluate the functional outcomes of patients with rotator cuff tear treated in our institute by Arthroscopic SR Rotator cuff repair.

Materials and Methods: A total of 54 patients with full thickness rotator cuff tear treated with arthroscopic SR rotator cuff repair in our institute for a period from February 1, 2014 to October 31, 2016 were evaluated retrospectively after confirming the rotator cuff tear clinically and by MRI. Clinico-Functional assessment was done using UCLA score.

Results: Mean UCLA Score was 18.69 ± 3.7 preoperatively to 32.07 ± 1.47 postoperatively after more than 2 years of follow up and showed significant improvement in UCLA Scores. Results were Graded as Excellent in 42 (78%), Good in 10(19%) and Poor in 2(3%) patients. On comparison of our results with other published studies, our results was statistically significant ($P < 0.001$) but clinico-functionally same as other studies when compared with their individual UCLA Scores.

Conclusion : Results of Arthroscopic single row rotator Cuff repair in our Institute showed excellent results, is a cost effective technique with the Clinico-Functional results being Good to Excellent in majority of our cases as per UCLA score, comparable to any published series of SR RCR.

Keywords: Shoulder Arthroscopy, RCT (Rotator cuff tear), SR (Single Row repair), DR (Double Row repair), UCLA score.

Introduction

Incidence of Rotator cuff tear increases after the 4th decade of life with increasing frequency as the patient ages. With the availability of advanced diagnostic imaging like MRI more cases of rotator cuff tear are seen and diagnosed nowadays. Treatment of rotator cuff tear has evolved over the last two decades from open to mini open repair to the current technique of minimally invasive Arthroscopic rotator cuff repair. Arthroscopic rotator cuff repair resulted in equivalent or better Clinico-functional results when compared to open and mini open rotator cuff repair.¹ Many case studies after Arthroscopy rotator cuff repair have shown improved shoulder function, strength, pain relief and range of motion.²

Arthroscopic rotator cuff repair can be accomplished by both SR and DR techniques with each technique having its own proponents and various clinical publications quoting advantages and disadvantages of each technique.³ SR repair is done by placing suture anchors either double or triple loaded in a linear fashion from anterior to posterior on the rotator cuff footprint area on the greater tuberosity of humerus. SR rotator cuff repair is technically easier to perform and cost effective compared to DR cuff repair. Many studies have demonstrated the superior biomechanical results of DR repair compared to SR repair⁴⁻⁶ but there is no agreement regarding the superiority of DR rotator cuff repair with regard to clinic-functional results compared to SR repair. Todisco et al⁴ with various studies/meta-analysis and authors have not observed difference in clinico-functional results between single and DR rotator cuff repair.³

Many critics of arthroscopic technique have mentioned about the inferior mechanical strength of suture anchor repair when simple sutures are used.⁷⁻⁹ There are reports that suture anchor repair through SR techniques restores only 67% of the footprint compared to DR repair which restores 100% of the footprint.¹⁰

Therefore since there is no clear convergence among various shoulder surgeons regarding SR versus DR rotator cuff repair, we performed SR repairs in our Institution with the aim to evaluate the clinico-functional results of SR rotator cuff repair in our Hospital and compare it with other published data in various literatures of SR rotator cuff repair.

Materials and Methods

Ethical clearance was obtained before the study. 54 patients who presented to the orthopaedic department of our Hospital with RCT were treated with SR rotator cuff repair during the time period from February 1, 2014 to October 31, 2016 and were evaluated retrospectively. The surgery was performed by two accomplished Shoulder Arthroscopic Surgeons. The study commenced from November 1, 2018. The patient at the time of presenting to our hospital were evaluated thoroughly both clinically and by diagnostic MRI (Fig. 1) to confirm full thickness rotator cuff tear.

Clinico-functional results were evaluated preoperatively and at every year post-operatively as per UCLA Score^{11,12} for a minimum of 2 years postoperatively to be included in the study. Inclusion criteria were patients with full thickness Supraspinatus and Infraspinatus tear as per DeOrto & Cofield's classification.^{13,14} Exclusion criteria had patients

with associated Bankart lesion, SLAP tears, Patients with OA Changes, any RCT with Pattes Grade 3 and above retraction and patients with Goutallier grade 3 and above fatty infiltration as per MRI of Rotator cuff.

All Patient were operated under General Anaesthesia with Interscalene block in Beach Chair Position (Fig. 2) with the arm hanging in neutral abduction and 20 degree of flexion with 1 kg of traction. Gleno-humeral joint diagnostic Arthroscopy was done and any intraarticular pathology like Biceps tear or Tendinitis and Subscapularis tear was treated by tenotomy, tenodesis of biceps tendon and repair of subscapularis tendon tear. Subsequently the arthroscopy of the subacromial space was done and preoperative diagnosis of rotator cuff tear was confirmed after debridement of the bursa and mobilisation of the tendon. The tear was classified according to Cofield's classification as small (<1 cm), medium (1-3cm), Large (3-5 cm), or massive (>5 cm). Mobility of the torn cuff to the footprint was assessed (Fig. 3) Two to three 5mm Smith and Nephew double loaded

titanium metal anchors was inserted based on the dimension of RCT in the rotator cuff footprint 8-10 mm from the articular margin and cuff repair done with mattress sutures passed by antegrade suture passing devices (Fig. 4&5). Patient was immobilised in a sling in neutral rotation for 4 weeks. Passive movements in plane of scapula was started from 4-6 weeks up to 90degree of elevation. Active and Active Assisted movements was started at 6-12 weeks and strengthening exercises was started at 12 weeks after the surgery. Patient were assessed for the Clinico functional assessment with UCLA Score Preoperatively and every year after the Surgery. Patients with a minimum follow up of 2 years were included in the study. Results were graded as Excellent if UCLA Score is ≥ 33 , good if Score is 28-32, Poor if score is ≤ 27 . Comparison of our study was done with other published series of study of SR rotator cuff repair. The statistical analysis was done by ANOVA method.



Fig. 1

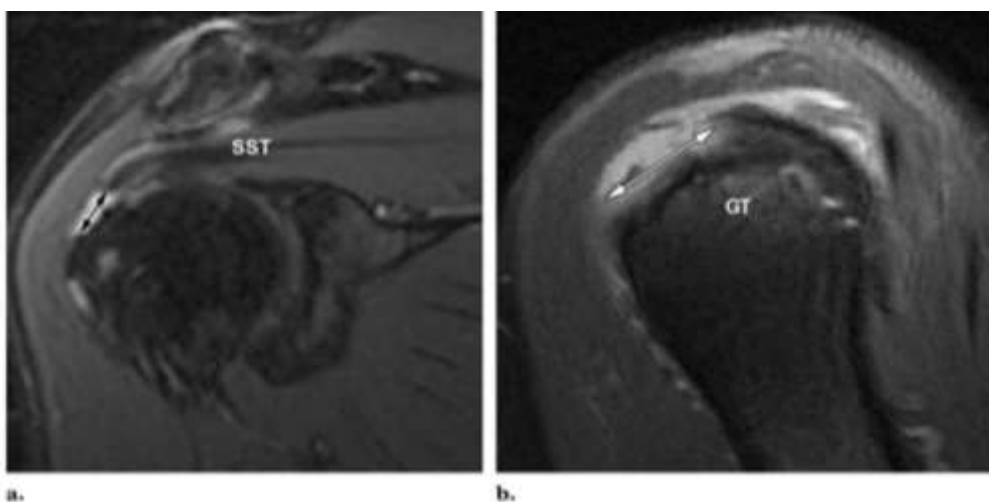


Fig. 2



Fig. 3



Fig. 4



Fig. 5

Results

The study included 37 male and 17 female patients (Fig. 6). Cause of lesion was Traumatic in 34 patients and Degenerative in 20 patients (Fig. 7). Mean age was 51.68 years. 33 was dominant limb and 17 was non dominant (Fig.

8). Smoking history was seen in 11 patients, Systemic factors Diabetes and Steroid intake were present in 7 and 3 patients respectively (Fig. 9). Concomitant procedures like biceps tenotomy, tenodesis, and subscapularis repair and subacromial decompression was done in 10 patients.

Patients mean follow-up was 28.74 months with minimum and maximum follow up of 24 & 37 months respectively. Patient was evaluated every year postoperatively with UCLA Score. Injury size classified by Cofields Grading, ranging from 1-4 with mean Cofields grading of 2.22. The mean post-operative UCLA score was 32.07 ± 1.47 after 2 years follow-up. The UCLA Scores for various Cofields grade in our patients is illustrated in Table 1. Results were graded as Excellent in 42 patients (78%), Good in 10 patients (19%) and poor in 2 patients (3%) (Fig. 10). In the 2 patients with poor results in our study, one patient with Cofield grade 2 tear had a history of smoking while the other patient had grade 4 tear with no associated comorbidities.

On comparison of our SR study with other published data of SR, our results were statistically significant ($P < 0.001$) with equal to no difference in clinical and functional outcomes (Table 2).

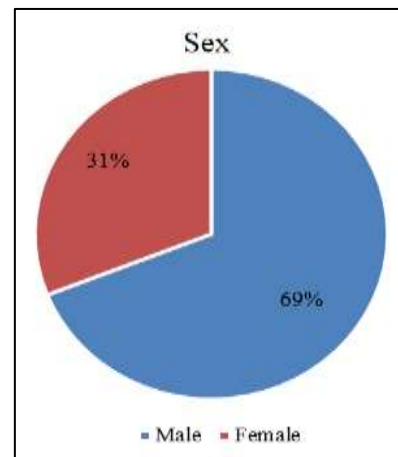


Fig. 6

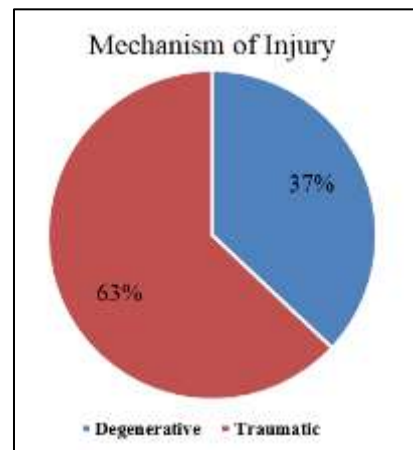


Fig. 7

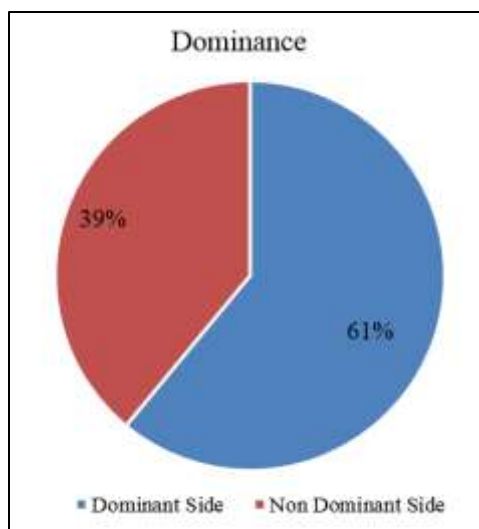


Fig. 8

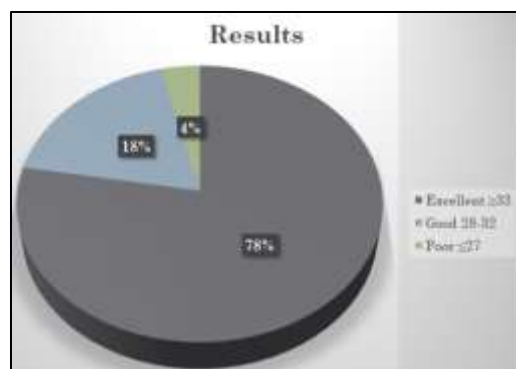


Fig. 10

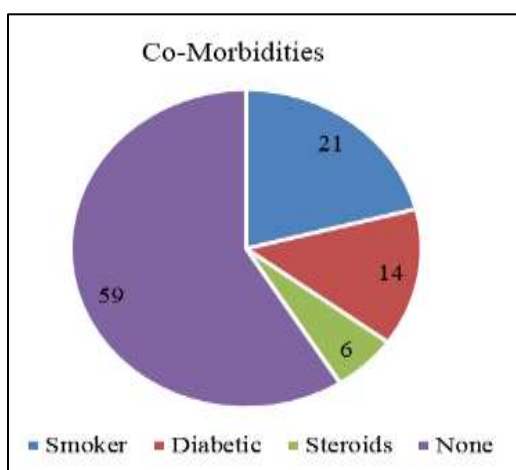


Fig. 9

Table 1: UCLA Scores with respect to cofields grade

Cofield Grade	Result			Total
	Excellent	Good	Poor	
1	1	0	0	1
2	37	6	1	44
3	3	2	0	5
4	1	2	1	4
Total	42	10	2	54

Table 2: Our SR vs other studies SR

Study	No of Patients	Pre-Op UCLA	Post-Op UCLA
Our Study	54	18.69 ± 3.7	32.07±1.47
Philipp R. Heuberer MD, Daniel Smolen	30	17.71±7.28	31.99±5.6
Michael E. Hantes MD, Yohei Ono	34	17	30.1
Rohit Kumar D'Ortho, Umesh Jadhav	25	15.84±3.30	30.28±2.26

Discussion

There has been a gradual shift from open technique to Arthroscopic rotator cuff repair which has become a gold standard method of treatment now. Strength of fixation of RCT has been improved by using double and triple loaded anchors with high pull-out strength.¹⁵ Current techniques of discussion among shoulder arthroscopy surgeons pertains to whether to use SR repair or DR repair for better clinico functional results.

Different studies by various authors have shown increased strength of fixation and better footprint coverage in DR repair compared to SR repair.^{4-6,8,16} In spite of the mentioned literature quoting better fixation and re-tear rates with DR as against SR, on clinico functional studies using

UCLA, ASES and constant score did not show any statistically significant differences between DR and SR repair.¹⁷

Our Study aimed at confirming the above statement. 54 patients who came under our inclusion criteria were operated for SR RCR. On retrospective analysis we observed that the UCLA Scores pre-operatively when compared to the post-operative scores was higher and showed better clinico-functional outcome. The same patient outcomes when compared with the SR repair of other SR repair published data showed similar results with respect to clinical and functional outcomes with respect to UCLA scoring. The size of the lesion (Cofields Grading) and co-morbid conditions like Diabetes, Smoking history and

Steroid intake influenced the outcome showing poorer results when compared to the other patients without history of the same. Out of the 54 patients, 10 patients required an additional procedure like Subscapularis repair, Biceps Tenodesis/Tenotomy & or Sub acromial Decompression.

In a study done by Rohit Kumar et al, there was noted a significant increase in UCLA Scores post operatively with a P Value of <0.001.¹⁸ Hantes et al.¹⁹ showed difference in post-operative scores between their SR Studies with a mean pre-operative and post-operative score of 17 and 30 showing results similar to our study. Heuberer et al²⁰ in a similar 2 year follow up showed comparable results of UCLA Scores which remained significantly increased over a follow up period of 10 years.

We did not encounter any post-operative complications such as Infection, stiffness or any repeat complaints of the same during our study. The few drawbacks that can be mentioned would be the retrospective type of study with a short duration of follow up undertaken for the study. Hence long term (>10 years) complications such as re-tear could not be evaluated. Our data was compared with other studies conducted not only for SR repairs but even for SR & DR repairs. A study conducted by Vastamaki ET al²¹ with a follow up for 20 years showed significant deterioration of tendon integrity and clinical outcome with time. We also did not perform any post-operative scan like a MRI to view the rotator cuff and even though functionally the patient outcomes were good to excellent in majority of cases, chances of minor re-tears of the Rotator cuff can be missed.

Thus on comparison of our study with other similar studies of SR repair we found that our study results were similar to other known studies of SR rotator cuff repair with regard to clinico-functional results but on statistical analysis our results were statistically significant ($p < 0.001$) compared to other studies of SR rotator cuff repair. These results were consistent with other published studies which showed significant difference in the scores post-operatively. Our results were parallel to the clinical findings of Dodson et al.²² who suggested that a good function was more important and prevailed with time even when presence of re-tear was present. SR RCR is technically easy to perform, requires less operative time hence have lower complication rates like post-operative pain and infection.

Conclusion

SR repairs are economically cheaper due to a lesser number of implant usage which is the most important factor when considering operative intervention in Indian patients as majority of our patients are poor / uninsured. Furthermore based on the review of available literature and our own study, the functional and clinical results are not compromised by doing SR RCR. Therefore we propose that Arthroscopic SR rotator cuff repair is an excellent procedure for treating rotator cuff tears.

Conflict of Interest: None.

References

1. Buess E, Steuber KU, Wibl B. Open versus arthroscopic rotator cuff repair: a comparative view of 96 cases. *Arthrosc* 2005;21:597-604.
2. Bennet WF. Arthroscopic repair of full thickness supraspinatus tear (small to medium): a prospective study with 2 to 4 year follow up. *Arthrosc* 2003;19:249-256.
3. Spiegl U.J, Eueler S.A., Millett P.J., Hepp P. Summary of a meta-analyses dealing with single row versus double row repair techniques for rotator cuff tears. *Open Orthop J* 2016;10(s9):330-338.
4. Tudisco C, Bisichhia S, Savarese E, Fiori R, Bartolucci D.A., Masala S. Single-row versus Double-row R otator cuff repair: Clinical and 3 Tesla MR Arthrography results. *BMC Musculoskeletal Discord* 2013;14:43.
5. Smith C.D., Alexander S., Hill A.M., Huijsmans P.E., Bull A.M., Amis A.A. A biomechanical comparison of single and double-row fixation in arthroscopic rotator cuff repair. *J Bone Joint Surg Am* 2006;88(11):2425-2431.
6. Park M.C., Idjadi J.A., Elattrache N.S., Tibone J.E., McGarry M.H., Lee T.Q. The effect of dynamic external rotation comparing 2 footprint restoring rotator cuff techniques. *Am J Sports Med* 2008;36(5):893-900.
7. Gerber C, Fuchs B, Hodler J. The clinical and structural results of direct repair of massive tears of rotator cuff. *J Bone Joint Surg Br* 1994;76:371-380.
8. Lo IKY, Burkhart SS. Double-row arthroscopic rotator cuff repair: repair establishing the footprint of the rotator cuff. *Arthrosc* 2003;19:1035-1072.
9. Schneeberger AG, von Roll A, Kalberer F, Jacob HA, Gerber C. Mechanical strength of arthroscopic rotator cuff repair techniques. *J Bone Joint Surg Am* 2002;84:2152-2160.
10. Apreleva M, Ozbaydar M, Fitzgibbons PG, Warner JJ. Rotator cuff tears: the effect of reconstruction methods on three-dimensional repair site area. *Arthrosc* 2002;18:519-526.
11. Amstutz, HARLAN, AL Hoy Sew, and Ian C. Clarke. UCLA anatomic total shoulder arthroplasty. *Clin Orthop Relat Res* 155(1981):7-20.
12. Provencher, Mathew T. General and disease specific use of outcome scores for shoulder. A survey of AOSSM, AANA, and ISAKOS members. *Phys Sportsmed* 2014;42(3):120-130.
13. Cofield RH. Rotator cuff diseases of the Shoulder. *J Bone Joint Surg Am* 1985;67(6):974-979.
14. DeOrto JK, Cofield RH. Results of a second attempt at surgical repair of a failed initial rotator cuff repair. *JBJS Am* 1984;64(4):563-567.
15. Burkhart SS. A stepwise approach to arthroscopic rotator cuff repairs based on biomechanical principles. *Arthroscopy* 2000 ;16 :82-90.
16. Kim DH, Elattrache NS, Tibone JE, Jun BJ, DeLa Mora SN, Kvitne RS. Biomechanical comparison of single row versus double row suture anchor technique for rotator cuff repair. *Am J Sports Med* 2006;34(3):407-414.
17. Millett PJ, Warth RJ, Dornan GJ, Lee JT, Spiegl UJ. Clinical and structural outcomes after arthroscopic single row versus double row rotator cuff repair: a systematic review and meta analysis of Level I randomised clinical trials. *J Shoulder Elbow Surg* 2014;23(4):586-597.
18. Kumar, R., & Jadhav, U. Functional evaluation of patients after arthroscopic repair of rotator cuff tears. *J Clin Orthop Trauma* 2014;5(2),84-90.
19. Hantes M.E., Ono Y., Raulis V.A., Doxariotis N., Venouziou A., Zibis A., & Vlychou M. Arthroscopic Single-row versus double-row suture bridge technique for rotator cuff tears in patients younger than 55 years. A Prospective comparative study. *Am J Sports Med* 2017;46(1),116-121.

20. Heuberger P. R., Smolen D., Pauzenberger L., Plachel F., Salem S., Laky B., et al. Longitudinal Long term Magnetic Resonance Imaging and Clinical Follow up after single-row arthroscopic rotator cuff repair: Clinical Superiority of structural tendon integrity. *Am J Sports Med* 2017;45(6):1283-1288.
21. Vastamaki M, Lohman M, Borgmesters N. Rotator cuff integrity correlates with clinical and functional results at a minimum 16 years after open repair. *Clin Orthop Relat Res* 2013;471(2):554-561.
22. Dodson CC, Kitay A, Verma NN. The long-term outcome of recurrent defects after rotator cuff repair. *Am J Sports Med* 2010;38(1):35-3919.

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