



Research Article

Evaluation of Short Term Functional Outcome of Rotator Cuff Repair in Indian Population

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Abstract

Background: Rotator cuff tears are increasing due to an ageing Indian population. Arthroscopic rotator cuff repair (RCR) is the most opted method for surgical management of such injuries. Superiority of double row versus single row repairs has been proven by the studies done in the past. The present study aims to determine short term functional outcome of arthroscopic RCR in the Indian population.

Method: A total of 45 patients with double row RCR were studied over a 6 month period using UCLA and Constant scores at regular intervals of 6 weeks, 3 months and 6 months.

Results: The findings show significant improvement of both scores at each follow-up and compared to baseline. Additionally males have a faster initial recovery than females with outcomes similar at 6 months postoperatively. No significant difference of outcome in male or female patients. In our study 3 patients with postoperative stiffness were put into aggressive rehabilitation.

Conclusion: The study adds to data for Indian patients and is comparable to international data on functional outcomes of RCR.

Keywords: RCR; UCLA; CMS

1. Introduction

Rotator cuff tears are among the most common conditions affecting the shoulder joint. There is an age-dependent increase in incidence of rotator cuff tears and the prevalence of full thickness rotator cuff tears range from 7 to 40% [1]. With an ageing population, the global trend has shifted towards earlier operative treatment to maximise functional outcomes. The current choice of surgeons all over the world, for surgical management of cuff tears is arthroscopic rotator cuff repair (RCR). RCR seeks to achieve adequate tendon fixation and to secure the fixation during the process of biological healing of tendon to bone.

One of the earliest defined arthroscopic technique is single-row repair but the inadequacy of it to precisely restore the anatomical footprint as well as the significant rates of re-tear associated with this technique strongly favours the use of double row repair [2, 3]. Biomechanical studies have showed increased load to failure, improved contact areas and decreased gap formation at the tendon-bone interface with arthroscopic double row technique [4-7]. Further Bisson et al showed that double row repair might decrease the cost by decreasing the revision rates with better healing capacity in cost benefit analysis [8]. Some of the studies have shown that regardless of the repair technique there is no significant difference for functional outcome at 6 months versus 12 months post repair [9].

Till date there are very few studies [1, 9, 10] done for functional outcome of RCR in Indian population and the majority are limited by small sample size. The

purpose of this study is to evaluate the short term functional outcomes after arthroscopic double row repair of rotator cuff tears, using the UCLA score (University of California, Los Angeles) and Constant-Murley score (CMS) in a larger group of Indian population.

2. Methodology

This prospective study was conducted from October 2018 – April 2019 for patients undergoing standard double row arthroscopic RCR. A total of 45 consecutive patients were recruited for the study according to inclusion and exclusion criteria set out below. UCLA and Constant score was calculated preoperatively and during the follow up at 6 weeks, 3 months and 6 months. Revision rate and complication were also assessed during the follow-up period. Ethics approval was obtained from the institutional review ethics committee board.

2.1 Inclusion criteria

MR report suggestive of full thickness tear (medium, large and massive) operated with arthroscopic double row technique using anchor sutures.

2.2 Exclusion criteria

- Partial tear, small full thickness tear
- Rotator cuff arthropathy
- Concurrent shoulder pathology.
- Revision Rotator cuff repair
- Single row repair
- Patients who lost to follow up.
- Lack of informed consent for participation

2.2.1 Preoperative assessment: Written informed consent was taken from all patients for participation in the study. UCLA and Constant score was taken for all the patients on the day of surgery.

2.2.2 Surgical technique: All the patients were operated by a single surgeon in beach chair position, under general anaesthesia and interscalene block. Posterior portal was used to do the diagnostic arthroscopy. Anterior and lateral portals were created by outside-in technique. Adequate subacromial decompression was performed through the lateral and anterior portals using shaver, burr and wand.

Mobility of retracted cuff tissue is checked with grasper for repositioning and adhesions were released if present. Footprint at greater tuberosity was prepared. After visualising the tear in supraspinatus-infraspinatus complex (Figure-1), scope was shifted to the lateral portal. Accessory lateral portals were created to insert the anchors in correct angle. For

medial row TWINFIX (Smith and Nephew, USA) anchors were used, with number of anchors and anchor configuration dependent on tear morphology. The first anchor was placed in the posterior part of footprint just lateral to the articular cartilage margin (Figure-2). The second anchor was inserted in the anterior part of the footprint, in the same distance from the articular cartilage margin. Additional anchors were inserted as necessary. The sutures were passed through the rotator cuff tendon approximately 10-15 mm medial to the edge of rotator cuff tear, using the FIRSTPASS (Smith and Nephew USA) device. The tying of the knots was done from posterior to anterior direction. A sliding Chula knot was used for primary fixation followed by four half hitches to secure the locking of knot. All or near all suture limbs were appropriately tensioned and passed through lateral row anchors (Swivel lock, Arthrex USA) and fixed in suture bridge configuration (Figure-3). Stability of repair was checked with rotation movements and probing of the interface.



Figure-1

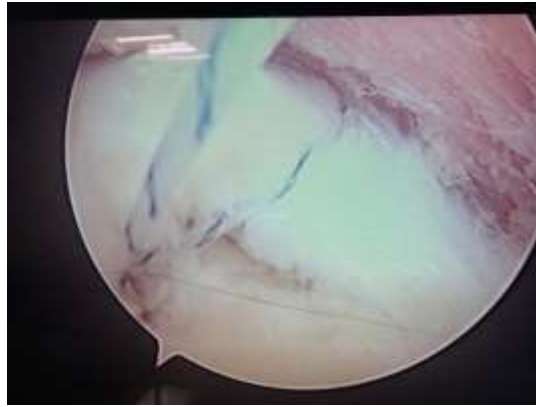


Figure-2



Figure-3

2.2.3 Postoperative rehabilitation: Common physiotherapy protocol was prepared for all the patients. For first 2 weeks, only shoulder circles exercise and elbow active flexion-extension exercise was advised. From week 3 to 6, home based exercises like crawling in forward flexion and abduction along

with the pendular movements of shoulder were started. Physiotherapist assisted protocol was for trapezius release during the 3rd week followed by active and passive assisted movements of shoulder after 3rd week onwards.

UCLA score

	Score		Score
Pain		Active forward flexion	
Present always and unbearable; strong medication frequently	1	Greater than 150°	5
Present always but bearable; strong medication occasionally	2	120° to 150°	4
None or little at rest, present during light activities; salicylates frequently	4	90° to 120°	3
Present during heavy or particular activities only; salicylates occasionally	6	45° to 90°	2
Occasional and slight	8	30° to 45°	1
None	10	Less than 30°	0
		Strength of forward flexion (manual muscle-testing)	
		Grade 5 (normal)	5
		Grade 4 (good)	4
		Grade 3 (fair)	3
		Grade 2 (poor)	2
		Grade 1 (muscle contraction)	1
		Grade 0 (nothing)	0
Function		Satisfaction of the patient	
Unable to use limb	1	Satisfied and better	5
Only light activities possible	2	Dissatisfied and worse	0
Able to do light housework or most activities of daily living	4		
Most housework, shopping, and driving possible; able to do hair and to dress and undress, including fastening brassière	6		
Slight restriction only; able to work above shoulder level	8		
Normal activities	10		
Maximum score 35 points:			
Excellent = 34 to 35	} Satisfactory	Fair = 21 to 27	} Unsatisfactory
Good = 28 to 33		Poor = 20 or less	

Constant score

Item No.	Variable	Right CMS Score	Left CMS Score
1	Pain		
	None	15	
	Mild	10	
	Moderate	5	
	Severe	0	
	Activities of daily living		
2	Full work	4	
3	Full recreation/sport	4	
4	Unaffected sleep	2	
5	Positioning		
	Up to waist	2	
	Up to xiphoid	4	
	Up to neck	6	
	Up to top of head	8	
	Above head	10	
6	Forward elevation (°)		
	0-30	0	
	31-60	2	
	61-90	4	
	91-120	6	
	121-150	8	
	151-180	10	
7	Lateral elevation (°)		
	0-30	0	
	31-60	2	
	61-90	4	
	91-120	6	
	121-150	8	
	151-180	10	
	External rotation		
8	Hand behind head with elbow held forward	2	
9	Hand behind head with elbow held back	2	
10	Hand on top of head with elbow held forward	2	
11	Hand on top of head with elbow held back	2	
12	Full elevation from on top of head	2	
13	Internal rotation		
	Dorsum of hand to lateral thigh	0	
	Dorsum of hand to buttock	2	
	Dorsum of hand to lumbosacral junction	4	
	Dorsum of hand to waist (3 rd lumbar vertebra)	6	
	Dorsum of hand to 12 th dorsal vertebra	8	
	Dorsum of hand to interscapular region (D7)	10	
14	Power (25 lbs = 25 points)		
	Total		

2.2.4 Postoperative assessment: UCLA and Constant score was assessed at 6 weeks, 3 months and 6 months follow-up and comparison was done.

2.3 Statistical plan

Qualitative data was represented in form of frequency and percentage. Quantitative data was represented using Mean \pm SD and Median. Results were graphically represented wherever deemed necessary. SPSS Version 19 was used for most of the analysis and MS Excel for graphs. Paired, Unpaired-t test and Bonferroni tests were used for the comparison. P-value < 0.05 was considered statistically significant.

3. Results

Out of 45 patients, 26 male (58%) and 19 female (42%) were included. 33 patients (73%) had right sided tear while 12 had left sided tear (27%).

Mean UCLA score at preoperative assessment was 10.53. Minimum score was 7 while maximum score was 17. At 6 weeks postoperatively, mean UCLA score was 23.18 with minimum score being 13 and maximum being 29. At 3 months postoperatively, mean UCLA score was 27.91 with minimum score being 17 and maximum being 32. At 6 months postoperatively, mean UCLA score was 32.22 with minimum score being 22 and maximum was 34.

Mean Constant score at preoperative assessment was 29.96. Minimum score was 19 while maximum score was 48. At 6 weeks postoperatively, mean Constant score was 48.71 with minimum score being 34 and maximum being 67. At 3 months postoperatively,

mean Constant score was 65.07 with minimum score being 48 and maximum being 81. At 6 months postoperatively, mean Constant score is 80.0 with minimum score being 55 and maximum was 92.

There was statistically significant difference in Constant score between male and female patients during 6 weeks and 3 months follow-up while there was no such difference of at 6 months follow-up. (Table 1)

There was statistically no significant difference in UCLA score between males and females throughout the study period. (Table 2)

There was statistically no significant difference in UCLA and Constant scores assessment of right and left sided tear throughout the study period. There was statistically significant difference in Constant and UCLA score in pairwise comparison at subsequent follow-up. (Tables 3, 4). At each follow-up interval there was a statistically significant difference of both scores when compared to the pre-op score as well as the preceding time period score. 3 patients had shoulder stiffness at 6 weeks postop and were put into aggressive rehabilitation with improvement during next follow-up.

Sex		N	Mean	Std. Deviation	t-value	p-value
Constant Score preop	Male	26	30.73	6.06	1.066	.292
	Female	19	28.89	5.17	-	-
6 weeks	Male	26	51.15	7.94	2.482	.017*
	Female	19	45.37	7.42	-	-
3 months	Male	26	67.77	8.75	2.524	.015*
	Female	19	61.37	7.89	-	-
6 months	Male	26	81.54	8.34	1.521	.136
	Female	19	77.89	7.35	-	-

Table 1: Gender wise comparison of constant score.

Sex		N	Mean	Std. Deviation	t-value	p-value
UCLA Score preop	Male	26	11.12	2.61	1.740	.089
	Female	19	9.74	2.64	-	-
6 weeks	Male	26	23.46	3.33	.692	.493
	Female	19	22.79	3.07	-	-
3 months	Male	26	28.15	3.43	.642	.524
	Female	19	27.58	2.17	-	-
6 months	Male	26	32.46	2.47	.834	.409
	Female	19	31.89	1.91	-	-

Table 2: Gender wise comparison of UCLA score.

		N	Mean	Std. Deviation	Mean difference	t-value	p-value
Pair 1	Constant Score preop	45	29.96	5.72	18.76	18.280	.0001**
	6 weeks	45	48.71	8.16	-	-	-
Pair 2	Constant Score preop	45	29.96	5.72	35.11	24.470	.0001**
	3 months	45	65.07	8.90	-	-	-
Pair 3	Constant Score preop	45	29.96	5.72	50.04	36.394	.0001**
	6 months	45	80.00	8.06	-	-	-

Table 3: Pairwise comparison of Constant score.

		N	Mean	Std. Deviation	Mean difference	t-value	p-value
Pair 1	UCLA Score preop	45	10.53	2.68	12.64	26.224	.0001**
	6 weeks	45	23.18	3.20	-	-	-
Pair 2	UCLA Score preop	45	10.53	2.68	17.38	34.493	.0001**
	3 months	45	27.91	2.95	-	-	-
Pair 3	UCLA Score preop	45	10.53	2.68	21.69	49.795	.0001**
	6 months	45	32.22	2.25	-	-	-

Table 4: Pairwise comparison of UCLA score.

4. Discussion

Our study for the purpose of evaluation of short term functional outcome after arthroscopic double row RCR in Indian patients showed that there was a significant improvement in functional outcome for all patients as assessed by UCLA and Constant score when compared to their baseline scores as well as their progression between the two follow-up with males having superior outcomes at 6 weeks and 3 months however these differences became insignificant at 6 months follow-up. Razmjou and Cho have also reported similar results showing females have inferior results when compared to males over their study duration [11, 12]. The possible reason for this can be attributed to better tolerance of pain by male patients during early rehabilitation.

Direct comparison between male and female patients done in our study is an avenue of potential future research. However a limitation in our study is that UCLA scores could not reflect the difference between male and females because it is mainly based on subjective assessment [13]. The more objective Constant score is able to eliminate subjective bias

although strength measurement increases the possibilities of inter-observer bias [14]. There was no significant difference of outcome between right and left sided shoulders as expected considering single surgeon and standard technique for all patients.

When comparing our outcomes with fellow Indian studies we found that Constant scores were comparable to study of Kamat et al [10] however UCLA scores were higher on average comparison to other Indian studies. In addition the current study represents the largest series of Indian patients to date. When compared to similar international studies like Gartsman et al and Burks et al [15, 16], our pre-operative Constant scores were on average lower than other studies with more significant increases in the Constant score over the study duration. With respect to UCLA our study data was on par with international data from other studies. The limitation of our study was small sample as compared to other international studies because being a country of low socioeconomic status most of the patients did not opt for surgery as it shown by small sample size of other Indian studies. Some variables like duration of symptoms and

comorbidities were not considered as our study was a short term analysis. Future work in the Indian scenario dictates larger studies with longer follow-up and better inter-study and cross study comparisons with evaluating more factors affecting the outcome. Further we need to define reasons why Indian females are slower for recovery and also understand variables.

5. Conclusion

Double row arthroscopic RCR leads to significant improvement in pain and functional outcomes as assessed by UCLA and Constant scores over a 6 month study period. Male patients have faster recovery in the near short term however outcomes equal those of females at six months post-operatively. Further studies should aim at longer follow-up and larger sample size in the Indian population and analysis of segmented variables to determine relationship to outcome measures.

Conflict of Interest

We have nothing to disclose in relation to this study. There is no conflict of interest.

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