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Original Research Article

Results of Arthroscopic Rotator Cuff Repair Vs Mini Open Rotator Cuff Repair: Study of 50 Cases

Haresh Fatesinh Chaudhary[1], Manthan Soni[2]

[1]Assistant Professor, Department of Orthopaedics, GMERS Medical College, Vadnagar, Gujarat
[2]Assistant Professor, Department of Orthopaedics, Banas Medical College and Research Institute, Palanpur, Gujarat

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Corresponding author: Dr. Manthan Soni
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Abstract:

Background and Aim: Rotator cuff tears have long been known to produce discomfort and impairment. The method of treating rotator cuff tears has changed throughout the years, moving from an open operation to a mini-open technique to an all-arthroscopic approach. This study compared the results of individuals who had rotator cuff repairs utilising mini-open versus all arthroscopic methods on a similar patient population.

Material and Methods: The results of 50 patients who underwent arthroscopic and mini-open rotator cuff surgeries were compared in the current study. All preoperative and postoperative clinical and physical evaluations were completed, and the following information was collected: Demographics, the Simple Shoulder Test, the UCLA Rating Scale, the Visual Analogue Pain Assessment (VAS), and the Preoperative SF12 Assessment are the first five variables. Each patient's outcome was evaluated using the modified ASES score.

Results: Patients in the arthroscopic group had an average initial modified ASES score of 41, which increased to an average final score of 86 (P0.05). The average initial score for patients in the mini-open group was 51, while the average final score was 91 (P 0.05). The modified ASES ratings at preoperative and postoperative time points did not substantially differ between groups. Overall, shoulder pain, shoulder function as assessed by the UCLA Shoulder Form and the Simple Shoulder test, all significantly improved from pre-operative status.

Conclusion: Patients who failed nonoperative treatment both had their function enhanced by mini-open and arthroscopic rotator cuff surgery, but there was no difference between the groups. Both methods worked well on individuals who had tears ranging in size from 1 cm2 to 12 cm2. The patient, physical therapist, and surgeon will work together to a great extent to determine the patient's pleasure and outcome as the field of orthopaedics, particularly rotator cuff repair, continues to embrace new technologies.

Keywords: Arthroscopic, Mini-open, Rotator cuff tears, Shoulder.

Introduction

One of the most frequent disorders affecting the shoulder is rotator cuff pathology. The prevalence of rotator cuff tears in cadavers was reported in anatomic studies to range from 17% to 72%. [1-6] The standard course of care for rotator cuff full thickness rips has been open surgical repair. Reports of successful open repairs have varied between 70% and 95%. Despite the fact that open rotator cuff repair is beneficial, there is a possibility of substantial pain and morbidity. [7-10]

Concerns have been raised about the effectiveness of arthroscopic surgery and the treatment of patients as a result of the ability to examine, mobilise, prepare, and secure the torn tendons. Despite the difficulties of this method, arthroscopic rotator cuff restoration has shown encouraging short-term results that favourably contrast with those of the open and mini-open methods. [11-14] At an average of 39 months after surgery, Kim et al. retrospectively assessed 76 patients who underwent arthroscopic versus miniopen salvage rotator cuff repair. The authors found no statistically significant difference between the two procedures in terms of shoulder ratings, discomfort, or activity. [15]

This study compared the results of individuals who had rotator cuff repairs utilising mini-open versus all arthroscopic methods on a similar patient population.

Material and Methods

The results of 50 patients who underwent arthroscopic and mini-open rotator cuff surgeries were compared in the current study. Patients who reported shoulder pain and/or weakness, had undergone at least six weeks of physical therapy

without success, and had received at least one subacromial injection from the senior author were candidates for surgery. 25 of the 50 patients who were a part of the final study got arthroscopic cuff repair, and 25 had mini-open cuff repair.

Before any surgical intervention was started, all patients—regardless of age—had to have failed conservative treatment for at least six weeks. To check for a rotator cuff tear, every patient had their afflicted shoulder imaged using magnetic resonance imaging (MRI) without gadolinium. Any patient who met the inclusion criteria and had a rotator cuff injury at the time of the arthroscopy was included. The following were study inclusion criteria: 1) a rotator cuff tear that is between 1 and 5 centimetres in length (measured arthroscopically at its greatest anterior-posterior width); 2) a minimum follow-up of 24 months following surgery; and 3) finished preoperative and postoperative evaluations. In the analysis of the study, patients who received concurrent biceps tenolysis, glenohumeral debridement, and distal clavicle excision were included.

All pre and post-operative clinical and physical evaluations were performed and included the following data: 1) demographics; 2) Simple Shoulder test (SST); 3) UCLA rating scale; 4) visual analog pain assessment (VAS); and 5) pre-op SF12 assessment. The UCLA Shoulder Score is a 35-point scale including 5 points for patient satisfaction, 5 points for motion, and 10 points each for pain and function. Increased shoulder function is indicated by a higher score. Although it was initially intended to evaluate results following a shoulder arthroplasty, it is frequently used in the shoulder literature to evaluate outcomes following rotator cuff repair.[16,17]

Patients with severe discomfort and/or loss of function who did not respond to at least three months of conservative treatment were advised to undergo surgery. Non-operative treatment options included physical therapy, nonsteroidal anti-inflammatory drugs, and subacromial steroid injection. After a bursectomy and full rotator cuff exposure, the size of the tear was measured. All measurements were carried out with a calibrated probe.

Surgical Technique

All patients were positioned in a beach chair after receiving an interscalene block and starting general anaesthesia. Standard anterior and posterior portals were utilised for both methods to assess the glenohumeral joint and treat intra-articular abnormalities when required. An anteromedial portal along the anterior clavicular border was established as the working portal after the arthroscope was inserted into the subacromial area. Before rotator cuff repair, acromioplasty and, if necessary, distal clavicle excisions were carried out. As previously mentioned, the mini-open procedure with acromioplasty was used. The rotator cuff was always stitched through bone to the tuberosity for the mini-open repair.

For the arthroscopic repair, the rotator cuff was seen through a posterolateral portal, which was positioned halfway between the anterolateral and posterior portals. A thorough bursectomy was done. Arthroscopy was used to release the coracohumeral ligament and the articular-sided capsular when necessary. To provide a smooth edge for repair, the edge of the tear was debrided to remove macroscopically friable and deteriorated tissue. By using electrocautery or a razor to remove soft tissue, the tuberosity was then delicately shaped with an arthroscopy burr to expose bleeding bone without making a trough. In order to identify whether side-to-side sutures and anchor insertion were necessary, the configuration of the rotator cuff tear had to be assessed.

Patients required side-to-side sutures using anterior or posterior rotator interval slides or the margin convergence approach described by Burkhart et al. for arthroscopic repairs and seven mini-open repairs.12 In every instance, nonabsorbable simple sutures were used as anchors to fasten the edge of the rotator cuff to the tuberosity. The repair site was never medialized onto the surface of the joint. In every situation, the arm could be held at the side to complete the repair.

Postoperative Management

Patients with tiny and medium-sized tears were slung. Patients with significant tears were placed in an abduction pillow for 4 to 6 weeks to assist safeguard the repair. A physical therapist gave each patient home exercise instructions prior to surgery. Two patients who had mini-open repairs were kept overnight in the hospital. They were instructed by a therapist on pendulum and passive range of motion exercises while they were in the hospital. For all patients, passive range-of-motion exercises included external rotation and forward elevation. On the day of surgery, all patients who underwent arthroscopic rotator cuff repair were released with written instructions for pendulum and passive range of motion exercises.

Patients and a therapist went over the home exercise regimen during the first postoperative session. Exercises for passive range of motion continued for six weeks. Starting at 6 weeks, active range of motion exercises and gradual strengthening with Therabands were performed until the last follow-up. complete exercise was permitted after 5 to 6 months if the patient showed complete range of motion and adequate rotator cuff function. Each patient's outcome was evaluated using the modified ASES score. The combined

scores for function (60 points), satisfaction (10 points), and pain (30 points) make up the modified ASES score, which is a 100-point total. A 10-point visual analogue pain scale, with 10 denoting no pain and 0 denoting severe pain, was used to ask patients to rate their discomfort while at rest, while engaging in daily activities, and while engaging in intense activity. The three results were added to get the pain score. From 0 (not satisfied) to 10 (totally satisfied), patients were asked to score their general satisfaction with their present level of shoulder function. Based on their ability to carry out tasks with the affected shoulder, patients evaluated their level of function. Response options ranged from cannot do at all to no trouble on a 4-point Likert scale with a 0–3 scale. Among the activities were the ability to tuck in one's shirt tail, dress (including donning a coat), wash one's opposite shoulder, comb one's hair, use one's arm at shoulder level, carry objects with one's arm out to the side, use one's hand overhead, engage in sports requiring overhead movement, carry out household tasks, do the usual work, and engage in the usual sport. These numerical replies were added up to produce each patient's function score.

Statistical analysis

The collected data was organised, inputted, and exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA) after being combined and entered into a spreadsheet programme (Microsoft Excel 2007). The level of significance and confidence level for each test were set at 5% and 95%, respectively.

Results

Following surgery, the modified ASES scores of all patients improved. Patients in the arthroscopic group had an average initial modified ASES score of 41, which increased to an average final score of 86 (P0.05). The average initial score for patients in the mini-open group was 51, while the average final score was 91 (P 0.05). The adjusted ASES ratings at preoperative and postoperative time points did not differ substantially between groups (P>0.05). Table 2 provides the typical preoperative and postoperative scores based on tear size. Additionally, groups' individual pain, pleasure, and function levels shown a considerable improvement. The average pain, satisfaction, and function scores improved for patients who received arthroscopic repair from 12 to 26 (P.05), 2 to 9 (P.05), and 28 to 51 (P.05), respectively. The average pain, satisfaction, and function scores for patients who underwent mini-open repair increased from 17 to 27 (P.05), 3 to 9 (P.05), and 32 to 53 (P.05), respectively.

16 patients (57%) in the arthroscopic group and 15 patients (58%) in the mini-open group underwent additional surgeries at the time of rotator cuff surgery. Patients from both groups underwent multiple additional procedures at the same time as the rotator cuff repair. Five patients in each group underwent distal clavicle excision. Three patients underwent arthroscopic capsular release in the arthroscopic group, and two patients underwent arthroscopic capsular release in the mini-open group. In both groups, nine patients underwent biceps-related surgeries. Three patients underwent tenotomy, four underwent arthroscopic tenodesis, and two underwent type 1 SLAP lesion debridement in the arthroscopic group. Seven patients underwent open tenodesis in the mini-open group, and two underwent type 1 SLAP debridement. Debridement of a 2 to 3 cm osteochondral defect of the humeral head was performed on one patient in the arthroscopic group. The average tear size for the arthroscopic group was 2.0 cm2 (with a range of 1 to 12 cm2) and for the mini-open group it was 2.7 cm2 (with a range of 1 to 8 cm2). The tear diameters did not differ across groups substantially (P.754). The arthroscopic group's average mediolateral tear size was 1.3 cm, while the average anteroposterior tear size was 1.5 cm.

The average mediolateral tear dimension for the mini-open group was 1.5 cm, while the average anteroposterior tear diameter was 1.8 cm. Side-to-side repairs were necessary in 7 patients who underwent mini-open surgery and 4 patients who underwent arthroscopic surgery.

Table 1: Preoperative and Postoperative Modified ASES Scores (range) for Each Group

	Arthroscopic		Mini-Open	
Variables	**Preoperative**	**Postoperative**	**Preoperative**	**Postoperative**
Pain (30 points)	12 (1-27)	25 (15-30)	16 (4-26)	27 (16-30)
Satisfaction (10 points)	3 (0-10)	8 (1-10)	4 (0-9)	9 (5-10)
Function (60 points)	26 (7-47)	53 (18-60)	31 (14-46)	55 (25-60)
Total (100 points)	41 (9-47)	86 (43-100)	51 (17-75)	91 (56-100)

Table 2: Preoperative and Postoperative Scores for Varying Rotator Cuff Tear Sizes for Each Technique

Variables	**Tear Size and Modified ASES Score**		
	1-3 cm2	**>3-6 cm2**	**>6-12 cm2**
Arthroscopic (preop/postop)	44/84 (21)*	55/91 (2)	17/99 (2)
Mini-open (preop/postop)	52/92 (16)	43/80 (6)	67/93 (3)

*Number of Patients

Discussion

Open rotator cuff repair, which was invented by Codman, has historically been the gold standard for treating symptomatic full thickness rotator cuff injuries. [18] The validity and reproducibility of this approach have been proven by Klepps et al and others. [19-22] Despite the positive outcomes associated with open rotator cuff repair, the necessary deltoid take-down and repair have been linked to considerable morbidity and protracted rehabilitation. The arthroscopically assisted "mini-open" or "portal-extension" approach gained popularity in response to reports of prolonged discomfort and recovery following open rotator cuff surgery. [23-25] 73 patients who underwent arthroscopic rotator cuff surgery and were monitored for at least two years were the subject of a paper by Gartsman et al. in 2011. The ASES scores of the patients increased from an average of 30.7 to 87.6. Constant and Murley ratings indicated that 84% of patients had results that were good or exceptional. [11]

These outcomes, which were comparable to those attained with open or mini-open repair, have given rise to a case for the continued application of this method. [26,27 35] patients who underwent mini-open surgery and 29 patients who underwent arthroscopic repair were compared by Servud and his coworkers. [28] No discernible difference in function or range of motion was present at the last follow-up, which lasted an average of 44.6 months. They did note, however, that 4 of the 29 individuals experienced stiffness. The final result, as determined by the ASES, UCLA, and SST scores, was comparable. According to Harryman et al. [29], even if an open rotator cuff surgery does not succeed, patients report improved symptoms. However, patients who have their repairs healed see better outcomes than those who do not.

There isn't a single way to categorise rotator cuff tears. Reporting the number of tendons involved or the anterior to posterior dimension are two typical techniques. In this study, the area of the tear, which reflects both the degree of retraction and the anterior to posterior dimension, is used to describe tear size.

Results could have been affected in a number of ways by the use of bone tunnels during mini-open repair. It's unknown how transosseous repair healing differs from suture anchor healing in terms of how the cuff heals, but this presents yet another difference between the two methods. The decision to utilise the mini-open technique to mend larger tears may have been influenced by familiarity with the bone tunnel repair method. All small-sized tears, 88% of medium-sized tears, and 90% of large-sized tears had good results according to Alejandro Posada et al.'s 2000 research. [30] Stephen H. Liu reported excellent or good results in all cases of small tears, in 15 of 17 cases (88.2%) of medium-sized tears, and in 12 of 15 cases (80%) of large tears. [31]

Because there were so few patients with tears bigger than 3 cm2, there was no practical way to compare patients within groups. Similarly, due to the small sample size, it was unable to compare patients with tears that were equal in size between groups.

The present study had a variety of flaws, including variations in follow-up time, tear size, patient demographics, and the small patient population. The duration of follow-up was shorter for patients who received arthroscopic rotator cuff surgery.

Conclusion

Patients who failed nonoperative treatment both had their function enhanced by mini-open and arthroscopic rotator cuff surgery, but there was no difference between the groups. Both methods worked well on individuals who had tears ranging in size from 1 cm2 to 12 cm2. The patient, physical therapist, and surgeon will work together to a great extent to determine the patient's pleasure and outcome as the field of orthopaedics, particularly rotator cuff repair, continues to embrace new technologies.

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