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Corresponding Author

Jyoti Prakash Padhihari,
Department of Orthopaedic, I.Q City
Medical College and Hospital,
Durgapur, Burdwan, West Bengal,
India
jyoti.Padhihari@gmail.com

Author Designation

^{1,2}Senior Resident

³Assistant Professor

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An Assessment of Functional Outcome of Arthroscopic and Arthroscopic Assisted Mini-Open Rotator Cuff Repair: A Hospital Based Prospective Study

¹Gourav Ramuka, ²Jyoti Prakash Padhihari and ³Amol Goverdhanrao Gite

¹⁻³Department of Orthopaedic, I.Q City Medical College and Hospital, Durgapur, Burdwan, West Bengal, India.

ABSTRACT

Shoulder pain is one of the common causes of presentation to orthopedic clinics. The purpose of the study was to evaluate the functional outcome of arthroscopic and arthroscopic assisted mini open rotator cuff repair in rotator cuff tear patients. This prospective study included 21 cases of rotator cuff tear patients of either sex fitting the inclusion criteria at the orthopedic department of I.Q City Medical College and Hospital, Durgapur, west Bengal were included in the present study from May 2023 to December 2023 (8 months). Patients admitted with MRI proven Rotator cuff tear after meeting the inclusion and exclusion criteria are selected for the study. They will undergo detailed history, clinical and radiological evaluation. Arthroscopic rotator cuff repair by single row or double row technique using suture anchors by a single trained surgeon. Postoperative rehabilitation as per standard protocol. Postoperative evaluation done at, 3rd month, 6th month and 8th month. Range of motion, UCLA and ASES scoring done at preoperative and postoperative follow-ups. A Prospective study with 21 patients is undertaken to study the functional outcome of Arthroscopic rotator cuff repair. The mean age in our study is 53.5years. Majorities are in the age group 40 to 60yrs. Out of 21 patients, 13 were male, 9 were female. Major part of our study contained partial thickness tears (58.2%) rather than full thickness tears (41.8%). 76.19 % (16) patients in our study had traumatic tears and 23.80% (5) patients had degenerative tears.

INTRODUCTION

In the human body, shoulder is the most mobile and least constrained joint^[1]. Functional stability is balanced by a complex combination of static and dynamic stabilizers about the glenohumeral joint. For those above the age of 60 years, rotator cuff injuries are common and hence overall health status and quality of life of patients with shoulder function is affected^[2]. Approximately 25% of up-to-date knowledge has the potential to facilitate better understanding of rotator cuff repair. This prompted us to assess functional outcome of mini-open rotator cuff repair of shoulder joint in adult patients. Rotator cuff tears are common cause in patients complaining shoulder pain. The rotator cuff undergoes progressive degenerative changes with increasing age and may lead to partial tear of cuff and finally to complete rupture of the rotator cuff. The spectrum of these disorder ranges from inflammation to massive tearing of the rotator cuff musculo-tendinous unit. Rotator cuff repair is the one of the most frequent procedures performed in the shoulder joint. Surgical treatment of chronic rotator cuff tears is indicated when non operative treatment fails. The techniques of rotator cuff repair have evolved from traditional open repair, to arthroscopically assisted mini-open rotator cuff repair (MRCR), to complete arthroscopic rotator cuff repair (ARCR). Though mini open rotator cuff is commonly performed in many centres, arthroscopic rotator cuff repair is now becoming standard surgery for rotator cuff tear^[3]. Arthroscopic techniques are now used to repair even large tears and also to mobilize retracted tears. Arthroscopic repair match open and mini open repair in results and also helps in thorough evaluation of joint thereby increasing diagnostic value of procedure. Arthroscopic technique is a less invasive approach which may have advantageous for postoperative rehabilitation and outcome. The study is meant to evaluate the functional outcome of arthroscopic rotator cuff repair in rotator cuff tear patients.

Aims and Objective: This study aimed to investigate the functional outcomes of arthroscopic and arthroscopic assisted Mini-Open Rotator Cuff Repair.

MATERIAL AND METHODS:

This prospective study included 21 cases of rotator cuff tear patients of either sex fitting the inclusion criteria at the orthopedic department of I.Q City Medical College and Hospital, Durgapur, west Bengal were included in the present study from May 2023 to December 2023 (8 months). Patients included after giving consent for the study were between 20 to 65 years. of age with MRI proven rotator cuff tear who underwent all arthroscopic rotator cuff repair and willing to participate in study.

Patients admitted with MRI proven Rotator cuff tear after meeting the inclusion and exclusion criteria are selected for the study. They will undergo detailed history, clinical and radiological evaluation. Arthroscopic rotator cuff repair by single row or double row technique using suture anchors by a single trained surgeon. Postoperative rehabilitation as per standard protocol. Postoperative evaluation done at, 3rd month, 6th month and 8th month. Range of motion, UCLA and ASES scoring done at preoperative and postoperative follow-ups (Fig. 1 and 2).

Inclusion Criteria:

- Adult patients aged above 20 and below 65 years of age
- Degenerative, traumatic, sports injury patients diagnosed radiologically and clinically with rotator cuff tear of the shoulder joint



Fig. 1: MRI showing cuff tear with Gap



Fig. 2: Showing portal placement for arthroscopic cuff repair

Exclusion Criteria:

- Associated shoulder lesions
- Revision rotator cuff repair
- Irreparable tears
- Arthritis and
- Rotator cuff tears arthropathy
- Frozen shoulder
- Calcific tendonitis

Study Duration: From May 2023 to December 2023 (8 months). Operative procedures Same technique followed for all patients. Patients kept in beach chair position under General anesthesia. Three standard portals are used during arthroscopic rotator cuff repair (anterior, lateral sub acromial, posterior). After arthroscopic inspection and treatment of the glenohumeral joint, the arthroscope is introduced into the sub acromial space through the posterior portal, and a lateral sub acromial portal is established. An anterior portal is also established for inflow and as a working portal. Before assessing and classifying the rotator cuff tear, all bursal and fibro fatty tissue must be debrided from the margins of the rotator cuff. The tear size and pattern were evaluated and the mobility and reparability of the torn cuff were estimated. Inverted mattress suture is made through the tendon with fibretape suture using suture passer. Both limbs of fibretape suture are loaded into the Suture anchor eyelet using the attached threaded loop. Driver handle is gently tapped to create bone socket and swivelock sp. suture anchor is inserted until the anchor body contacts bone. it is rotated in clockwise direction until the anchor body is flush with the bone. Tip retention suture is unwrapped and pulled it out. Fibretape tails are cut with an open-ended fibretape suture cutter. More anchors are used in same manner when large tears are present. Partial thickness tears are usually repaired in a single row fashion after converting into full thickness tear (Fig. 3 and 4).

Mini-open Rotator Cuff Repair: To accomplish the mini-open repair, the arthroscopic portal is extended by 1 to 2 cm, and the fibers of the deltoid are split in line to obtain access for secure bone-tendon fixation. With this approach, rotator cuff preparations, including debridement of tendon edges, releases, mobilization, and, in some cases, single row anchor placement are all performed arthroscopically. Because most of the procedure is done arthroscopically, both the time requirement and exposure for the deltoid-splitting approach should be limited, potentially minimizing deltoid injury.

Postoperative Management: Same postoperative rehabilitation protocol followed for all patients. Extremities were immobilized in a sling for 6 weeks. During the initial 6 weeks, only pendulum exercises was allowed followed by gentle active exercises after



Fig. 3: Showing repaired cuff tear



Fig. 4: Showing marking of portal and mini open incision

6 weeks deltoid and biceps strengthening after 8 weeks. Scapular stabilization exercises allowed after 12 weeks. Patients returned to normal activity and work after 4 to 6 months.

Statistical Analysis: Data obtained was coded and entered into Microsoft Excel spreadsheet. The comparison of mean range of motion was tested by using one way analysis of variance (ANOVA). A 'p' value of less than or equal to 0.05 was considered as statistically significant.

RESULT AND DISCUSSIONS

A Prospective study with 21 patients is undertaken to study the functional outcome of Arthroscopic and arthroscopic assisted mini open rotator cuff repair. The mean age in our study is 53.5 years. Majorities are in the age group 40 to 60 years. Out of 21 patients, 13 were male, 9 were female. Major part of our study contained partial thickness tears (58.2%) rather than full thickness tears (41.8%). 76.19 % (16) patients in our study had traumatic tears and 23.80% (5) patients had degenerative tears. There is significant improvement of flexion from 125.7° preoperatively to



Fig. 5: Pic showing mini open technique and suture anchor placement for cuff repair

146.0° postoperatively at 1year, abduction from 123.2° to 148.4°, external rotation from 50.2° to 80.2°, internal rotation from 40.44° to 66.4°. In our study according to UCLA Score, out of 21 patients, 2 patients had poor outcome, 6 patients had average outcome, 7 patients had good outcome and 6 patients had excellent outcome. Mean UCLA score increased from 8.09 preoperatively to 27.40 postoperatively at the end of 8 months. Mean ASES score improved from 21.64 preoperatively to 85.40 postoperatively (Fig. 5).

In this study, majority were in the age group between 40 to 60yrs with the mean age of 53.5±9.21. Similarly studies conducted by Sugaya *et al.*,^[4] Park *et al.*,^[5] Brian. Cole *et al.*, 4 Burks *et al.*^[6] also had mean age of 57.7 years, 57 years, 57 years, 56years respectively. In our study, age of the patient was not found to be a significant factor which affects the clinical outcome of the rotator cuff repairs. Similar observations were made by Bennet WF *et al.*,^[6] Stollsteimer and Savoie *et al.*^[7]. One reason why age has not found to have any major affect in our series could be because of mean age less than 60 years. This group is known to have good outcome after cuff repair. However, if age exceeds more than 70 years, the results could have been poorer or age would have shown it affect over the outcome. Age has been proved to be the most important predictor of clinical and radiological outcomes after the rotator cuff repair, as age is a predictor of tissue viability, and therefore, probably predicts success of cuff repair. Many studies have shown that the success of cuff repair decreases with advancing age especially after 65 years, and retear rates may be higher after 65 years. Millar *et al.*^[8] reported that mean ASES score and range of motion is better in arthroscopic repair than open repair. Tauro^[9] reported lesser hospital stay, small scar, less postoperative pain in arthroscopic group compared to open repair. In this review they have analyzed the rotator cuff tears depending on technique and

post-operative UCLA and ASES were analyzed. They found no significance in outcome of patients treated by both techniques which was similar to our study results^[10,11]. The patients in the analysis were mostly in age group 51-60 which was also seen in our study group. We were not able to compare between the techniques in our study as the most of the cases were single row and comparison cannot be done due to inadequate cases in group operated by double row technique. Mini-open rotator cuff repair has been shown by several authors to provide predictable results similar to open repair. Multiple studies have shown 80% to 88% of patients having good to excellent results at long-term follow-up^[12-15]. In a study of 21 patients who were treated with mini-open cuff repair, Severud *et al.* noted that 93% of patients had good to excellent results at 44-month followup. The specific rehabilitation used by Severud *et al.* is typical for mini-open cuff repair and included, sling immobilization and passive ROM for the first 6 weeks postsurgery, active assisted ROM exercises and progression to active motion between 6 to 12 weeks postoperatively, resistive exercises starting at 12 weeks, and return to full activity at 6 months.

CONCLUSION

Arthroscopic rotator cuff repair is as good as mini open repair in outcome. Advantages of arthroscopic rotator cuff repair include less postoperative pain, small scar and ability to diagnose other shoulder pathologies. There is no difference in functional outcome between partial and full thickness tear treated arthroscopically. Patients with degenerative tears and especially elderly woman will have less satisfactory outcome compared to patients with traumatic tears and young age.

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