



FUNCTIONAL OUTCOME OF CONSERVATIVE MANAGEMENT OF ROTATOR CUFF TEAR IN ADULTS

Dr. Jishnu Das. K. V

Junior Resident, Government Medical College, Thrissur.

Dr. Shibu Andrews

Professor, Department Of Orthopedics Government Medical College, Thrissur.

Dr. C. V. Krishnakumar

Professor, Department Of Orthopedics, Government Medical College, Thrissur.

ABSTRACT Rotator cuff tears significantly influence a patients' quality of life, following the injury, owing to pain and functional limitations associated with the tear. The therapy of rotator cuff tears is an important topic that is frequently encountered; however, since both conservative and surgical treatment have advantages and disadvantages. This study aim to look the functional outcome of conservative management of rotator cuff tear in adult patients attending government medical college Thrissur by using constant Murley score and UCLA score. We conducted a prospective observational study in the Department of Orthopaedics, Government Medical College, Thrissur, Kerala among 43 middle aged (40 to 65 years old) patients attending Casualty/In-patient departments. We did x ray shoulder of all cases, to rule out the fracture of greater tuberosity of the humerus and also MRI to confirm rotator cuff injury. New patients, up to one week) were immobilised with a pouch arm sling for three weeks. Chronic patients (more than three weeks) were treated with physiotherapy directly. Patient were followed up after 3 week, 3month and 6month and evaluated by using constant Murley score and UCLA score. In the result Men comprised 72.1% of the cohort. Common comorbidities included diabetes mellitus (39.5%) and hypertension (23.2%). Pain was the predominant symptom (86.0%), and injuries were mostly due to direct shoulder trauma (67.4%). Treatments varied: 30.2% had immobilization, 34.9% received physiotherapy, and 34.9% had steroid injections. Functional assessments using the Constant and UCLA scores revealed significant improvements over time. The Constant score increased from 38.1 at 3 weeks to 76.2 at 6 months, and the UCLA score improved from 12.3 to 29.1 over the same period, both with P values <0.001.

KEYWORDS : Rotator cuff tears, Pain, Conservative management**INTRODUCTION**

The Partial-thickness rotator cuff tears (PTRCTs) are one among the common encounters in daily orthopedic practice, posing significant challenges in diagnosis and management. (1) PTRCTs usually involve a portion of the rotator cuff tendon, with degrees of involvement ranging from fraying of the tendon fibers to full-thickness involvement of the articular surface. Although full-thickness tears have been thoroughly examined and treated, there is ongoing discussion and research over the best therapeutic strategy for PTRCTs. (2)

PTRCTs significantly influence a patients' quality of life, following the injury, owing to pain and functional limitations associated with the tear. These tears can appear inside the tendon or on its articular or bursal side, and varied patterns have been seen in different age groups. While the tears tend to develop more posteriorly at the supraspinatus-infraspinatus gap in younger athletes, they typically occur on the articular side of the supraspinatus tendon near its attachment onto the larger tuberosity in older patients. (2) Anatomic studies have provided insights into the dimensions of the supraspinatus tendon, with the mean anterior-posterior dimension reported to be 25 mm. (3) Ellman developed a classification system based on tear location and depth, categorizing tears as grade 1, 2, or 3 depending on their depth relative to tendon thickness. (4) One of the key components necessary for both static and dynamic stability as well as shoulder joint mobility is the rotator cuff. One common cause of shoulder pain and functional impairment is rotator cuff tears (RCTs). An injury that frequently affects the shoulder muscles and becomes more common as people age is a rotator cuff tear (RCT) [5].

Partial and full-thickness rotator cuff tears are distinguished based on the degree of tendon fiber rupture and the connectivity between the glenohumeral and subacromial spaces [6]. The therapy of rotator cuff tears is an important topic that is frequently encountered; however, since both conservative and surgical treatment have advantages and disadvantages, it is still unclear whether course of action is best for partial and full-thickness rotator cuff tears [7]. The global rate of rotator cuff surgery procedures conducted is high, but the rate of structural failures is even higher, ranging from 16 to 94% [8]. Furthermore, it's unclear if the trend of muscle atrophy and degeneration may be stopped by reattaching the tendon to the bone [9]. For younger patients with acute symptomatic partial and full-thickness tears and significant dysfunction, surgical management of rotator cuff tears is a well-established therapeutic option [10-12].

Despite the availability of studies that has compared the outcomes of patients who have succumbed to PTRCTs, a majority of studies have are focused in western setting. Due to lack of studies in south Indian settings we decided to take up this study.

MATERIALS AND METHODS

We conducted a prospective observational study in the Department of Orthopaedics, Government Medical College, Thrissur, Kerala, India between 2023 –2024. As a part of this research proposal, we intended to study the functional outcome of conservative management of rotator cuff tear in adult patients attending Govt medical collage Thrissur by using constant murley score and UCLA score. To estimate the same we included middle aged (40 to 65 years old) patients attending Casualty/Out-patient departments of the Department of Orthopaedics with rotator cuff tear.

Study Procedure:

Patients presenting to Government Medical College, Thrissur, with a history of shoulder pain and inability to abduct the shoulder following a fall were included for the study. All patients were examined clinically for drop arm sign. All patients underwent x ray of shoulder to rule out the fracture of greater tuberosity of the humerus and MRI to confirm rotator cuff injury. Fresh patients (up to one week) were immobilised with a pouch arm sling for three weeks. Chronic patients (more than three weeks) were treated with physiotherapy directly. Patients presenting between first and third week of trauma were treated as per the chief complaints. If pain is the predominant symptom they are immobilised for two weeks along with oral analgesics (NSAIDS- for 2 weeks) and then started with physiotherapy. If disability is the main complaint they are started with physiotherapy. Physical therapy such as, ultrasonic therapy, stretching, passive and active range of motion exercises and muscle strengthening exercises (Deltoids, Trapezius, Rhomboid, Teres, Supraspinatus, Infraspinatus, Subscapularis, Biceps, Triceps). The pain was managed with oral analgesics (NSAIDS- for 2 weeks) and if required shoulder injections (steroid injection- triamcinolone 40mg single dose). Patient were followed up after 3 week, 3month and 6month and evaluated by using constant murley score and UCLA score.

RESULTS

The following observations was made from the data collected from the study of functional outcome of conservative management of rotator cuff tear in adults in the Department of Orthopaedics, Government medical college, Thrissur.

Table 1: Age, Gender Distribution And Comorbidities Among The Study Participants (N=43)

Characteristics	Frequency (%)
Age group	
40-50 years	12 (27.9)
50-60 years	17 (39.5)
60-65 years	14 (32.6)
Gender	
Male	31 (72.1)
Female	12 (27.9)
Comorbidities	
DM	17 (39.5)
HTN	10 (23.2)
CAD	6 (13.9)
CKD	3 (6.9)
COPD	5 (11.6)
Complaints	
Pain	37 (86.0)
Swelling	28 (14.0)
Duration - weeks	
Mean (SD)	3.4 (1.2)
Mode of injury	
Direct injury to shoulder	29 (67.4)
Fall on outstretched hand	14 (32.6)
Treatment	
Immobilization	13 (30.2)
Physiotherapy	15 (34.9)
Steroid injection	15 (34.9)
Side of injury	
Right	22 (51.1)
Left	21 (48.9)

Distribution Of Constant Score And UCLA Across Follow Up (N=43)

Clinical status	3 weeks Frequency (%)	3 months Frequency (%)	6 months Frequency (%)	P value
Constant score				
Mean (SD)	38.1 (7.4)	54.5 (3.5)	76.2 (6.9)	<0.001
UCLA				
Mean (SD)	12.3 (2.4)	22.5 (3.2)	29.1 (2.2)	<0.001

The clinical assessment of 43 study participants using the Constant score and UCLA score demonstrated significant improvements over the follow-up periods of 3 weeks, 3 months, and 6 months. The Constant score, which measures shoulder function, showed a substantial increase from a mean of 38.1 (SD 7.4) at 3 weeks to 54.5 (SD 3.5) at 3 months, and further improved to 76.2 (SD 6.9) at 6 months. The P value for these changes was <0.001, indicating that the improvement in Constant scores over time was statistically significant. Similarly, the UCLA score, which evaluates shoulder pain, function, and range of motion, also showed marked improvement. The mean UCLA score rose from 12.3 (SD 2.4) at 3 weeks to 22.5 (SD 3.2) at 3 months, and further increased to 29.1 (SD 2.2) at 6 months. The P value of <0.001 for the UCLA score changes confirms that the improvements observed were statistically significant. These findings suggest that both shoulder function and overall clinical status of the participants improved significantly over the six-month follow-up period.

DISCUSSION

According to the mechanism of injury, rotator cuff tears can be classified as acute (or traumatic—the result of an event with sufficient energy to cause an intact rotator cuff to fail immediately), acute on chronic—a preexisting rotator cuff tear enlarges after a traumatic event—or chronic—where there is no history of injury and the tear is most likely degenerative in nature. According to their anatomical severity, rotator cuff tears can be further divided into partial thickness and full-thickness tears. There are four further classifications for full-thickness tears: tiny (<1 cm), medium (1 to 3 cm), large (3 to 5 cm), and major (>5 cm). In both symptomatic and asymptomatic groups, the prevalence of rotator cuff tears rises with age; estimates place the number of people with tears at 10% in those under the age of 20, rising to 62% in people 80 years of age or over.¹ According to this knowledge, rotator cuff tears are frequently asymptomatic and for many people, rotator cuff deterioration is a normal part of aging.^[15,16]

These findings imply that many rotator cuff tears do not result in

discomfort or incapacity. Therefore, "it is crucial to ensure that operative interventions for rotator cuff disorders are a prudent use of resources, a wise investment of hope, and worth the small but real risk of iatrogenic harm, the risk of medicalizing common symptoms, and the risk of interfering with the development of effective coping strategies." For partial thickness tears, some full-thickness tears (particularly smaller, atraumatic tears), chronic tears in later ages, and irreparable tears with permanent muscle alterations, nonoperative treatment should be explored as a first line of treatment. Surgery may be a more effective treatment for acute tears and tears that result in significant functional loss and weakening.^[17,18]

We conducted a prospective observational study in the Department of Orthopaedics to study the functional outcome of conservative management of rotator cuff tear in adult patients attending out hospital using constant Murley score and UCLA score. To estimate the same we included 43 middle aged (40 to 65 years old) patients with rotator cuff tear.

The study included 43 participants with a diverse age range: 27.9% were under 40-50 years old, 39.5% were between 51 and 60 years old, and 32.6% were 61-65 years old. The gender distribution was predominantly male, with 72.1% of the participants being men and 27.9% being women. These findings describe the common age group and gender that is commonly affected with RCTs. Regarding comorbidities, 39.5% had diabetes mellitus (DM), 23.2% had hypertension (HTN), 13.9% had coronary artery disease (CAD), 6.9% had chronic kidney disease (CKD), and 11.6% had chronic obstructive pulmonary disease (COPD). These findings highlight the commonest comorbidity that is linked with this age group, and that DM is the commonest comorbidity that is linked with patients affected with RCTs.

We noted that most participants reported pain (86.0%) and a smaller percentage reported swelling (14.0%), with the average duration of symptoms being 3.4 weeks (SD 1.2). These findings were noted to be in comparison with other studies that has also established that pain and swelling are the commonest symptoms associated with RCTs.^(24,25) We observed that majority of injuries were due to direct trauma to the shoulder (67.4%), while the remaining injuries resulted from falls on an outstretched hand (32.6%). Another study done by Yamaguchi et al, also showed that direct trauma to the shoulder joint was the commonest cause of RCTs.^(r64) Treatment modalities were varied, with 30.2% undergoing immobilization, 34.9% receiving physiotherapy, and 34.9% receiving steroid injections. The injuries were almost evenly distributed between the right (51.1%) and left (48.9%) sides. A study done by Dickinson et al, also highlight the increasing trends of conservative management for treating RCTs.⁽¹⁹⁾

The clinical assessment of 43 study participants using the Constant score and UCLA score demonstrated significant improvements over the follow-up periods of 3 weeks, 3 months, and 6 months. The Constant score, which measures shoulder function, showed a substantial increase from a mean of 38.1 (SD 7.4) at 3 weeks to 54.5 (SD 3.5) at 3 months, and further improved to 76.2 (SD 6.9) at 6 months. The P value for these changes was <0.001, indicating that the improvement in Constant scores over time was statistically significant. Similarly, the UCLA score, which evaluates shoulder pain, function, and range of motion, also showed marked improvement. The mean UCLA score rose from 12.3 (SD 2.4) at 3 weeks to 22.5 (SD 3.2) at 3 months, and further increased to 29.1 (SD 2.2) at 6 months. The P value of <0.001 for the UCLA score changes confirms that the improvements observed were statistically significant. These findings suggest that both shoulder function and overall clinical status of the participants improved significantly over the six-month follow-up period. Studies published earlier by Tanaka et al and Itoi et al, also established that the UCLA and constant scores improved among patients post conservative management.^(22,23)

The initial clinical improvements observed at the three-week follow-up can be attributed to the immediate anti-inflammatory and analgesic effects of treatments like steroid injections and immobilization. Steroid injections, for instance, are known to reduce inflammation and pain rapidly by inhibiting the synthesis of pro-inflammatory cytokines and chemokines, as well as reducing local edema and capillary permeability.

Physiotherapy likely contributed to early improvements through its role in promoting muscle strength, flexibility, and proprioception. The

mechanical loading and mobilization exercises employed in physiotherapy can facilitate collagen synthesis and reorganization within the rotator cuff tendons, leading to functional improvements.

However, the subsequent decline in clinical outcomes over three and six months may reflect the intrinsic limitations of conservative management in addressing the underlying tendon pathology. Rotator cuff tears often involve degenerative changes in the tendon tissue, such as collagen disarray, tenocyte apoptosis, and reduced vascularity, which are not directly reversed by conservative treatments. This degenerative nature may explain why initial symptomatic relief and functional gains are not sustained in the long term. [14]

The significant improvement in Constant and UCLA scores over six months suggests that while conservative management may not fully reverse tendon pathology, it can significantly enhance functional capacity and pain levels. The Constant score, which assesses pain, activities of daily living, range of motion, and strength, and the UCLA score, which evaluates pain, function, and patient satisfaction, both showed statistically significant improvements, highlighting the efficacy of conservative management in enhancing quality of life. [19] The variability in response to treatment, with some participants showing sustained improvement while others did not, could be due to individual differences in tendon healing capacity, the extent of tear, and compliance with rehabilitation protocols. For instance, participants with smaller tears or partial tears might have better outcomes compared to those with larger or full-thickness tears.

Furthermore, the presence of comorbidities like diabetes mellitus, hypertension, and chronic kidney disease could influence healing and functional outcomes. Diabetes, for example, is known to impair collagen synthesis and tendon healing, potentially leading to poorer outcomes in affected individuals. Similarly, chronic kidney disease can lead to altered bone and mineral metabolism, affecting tendon and muscle function. [13,23]

The observed trend of improved shoulder function could be due to compensatory mechanisms, such as increased reliance on surrounding musculature and altered movement patterns to maintain function despite persistent tendon pathology. This compensatory adaptation might explain the continued improvement in functional scores even when radiological healing is not evident.

Based on the study findings we put forth the following recommendations:

1. Patient Selection: Conservative management should be considered primarily for patients with small to moderate tears, low functional demands, and those contraindicated for surgery. Patients with larger tears or higher functional requirements may benefit more from early surgical intervention.

2. Tailored Rehabilitation Protocols: Develop individualized physiotherapy programs that incorporate progressive loading, strength training, and proprioceptive exercises to enhance tendon healing and functional recovery. Regular follow-ups should be scheduled to monitor progress and adjust treatment plans accordingly.

3. Adjunctive Therapies: Consider the use of adjunctive therapies such as platelet-rich plasma (PRP) or shockwave therapy, which have shown promise in promoting tendon healing and reducing inflammation, potentially enhancing the outcomes of conservative management.

4. Comorbidity Management: Optimize management of comorbid conditions such as diabetes and hypertension, which can negatively impact tendon healing. Collaborative care involving endocrinologists, cardiologists, and primary care physicians can help address these factors, potentially improving overall treatment outcomes.

5. Long-term Monitoring: Implement long-term follow-up protocols to monitor patients for any signs of deterioration or recurrence of symptoms. Early detection of any decline in clinical status can prompt timely interventions, such as switching to surgical options or intensifying rehabilitation efforts.

CONCLUSION

The study evaluated 43 participants with rotator cuff tears managed conservatively, 27.9% were under 40-50 years old, 39.5% were between 51 and 60 years old, and 32.6% were 61-65 years old. Men

comprised 72.1% of the cohort. Common comorbidities included diabetes mellitus (39.5%) and hypertension (23.2%). Pain was the predominant symptom (86.0%), and injuries were mostly due to direct shoulder trauma (67.4%). Treatments varied: 30.2% had immobilization, 34.9% received physiotherapy, and 34.9% had steroid injections. Functional assessments using the Constant and UCLA scores revealed significant improvements over time. The Constant score increased from 38.1 at 3 weeks to 76.2 at 6 months, and the UCLA score improved from 12.3 to 29.1 over the same period, both with P values <0.001. Our study underscores the potential benefits of conservative management in the initial treatment of rotator cuff tears, demonstrating significant early improvements in pain, function, and overall clinical status.

REFERENCES

1. Minagawa H, Yamamoto N, Abe H, Fukuda M, Seki N, et al. Prevalence of symptomatic and asymptomatic rotator cuff tears in the general population: from mass-screening in one village. *Journal of orthopaedics*. 2013 Mar 1;10(1):8-12.
2. Longo UG, Franceschi F, Ruzzini L, Rabitti C, Morini S, Maffulli N, et al. Histopathology of the supraspinatus tendon in rotator cuff tears. *The American journal of sports medicine*. 2008 Mar;36(3):533-8.
3. Franceschi F, Papalia R, Palumbo A, Del Buono A, Maffulli N, Denaro V. Operative management of partial- and full-thickness rotator cuff tears. *Rotator Cuff Tear*. 2012;57:100-13.
4. Moosmayer S, Lund G, Seljom U, Svege I, Hennig T, Tariq R, et al. Comparison between surgery and physiotherapy in the treatment of small and medium-sized tears of the rotator cuff: a randomised controlled study of 103 patients with one-year follow-up. *The Journal of bone and joint surgery. British volume*. 2010 Jan;92(1):83-91.
5. Moosmayer S, Lund G, Seljom US, Haldorsen B, Svege IC, Hennig T, et al. A 10-year follow-up, tendon repair is superior to physiotherapy in the treatment of small and medium-sized rotator cuff tears. *JBJS*. 2019 Jun 19;101(12):1050-60.
6. Kukkonen J, Joukainen A, Lehtinen J, Mattila K T, Tuominen E K, Kauko T, et al. Treatment of nontraumatic rotator cuff tears: a randomized controlled trial with two years of clinical and imaging follow-up. *JBJS*. 2015 Nov 4;97(21):1729-37.
7. Chona DV, Lakomkin N, Lott A, Workman AD, Henry AC, Kuntz AF, et al. The timing of retears after arthroscopic rotator cuff repair. *Journal of shoulder and elbow surgery*. 2017 Nov 1;26(11):2054-9.
8. Chillemi C, Dei Giudici L, Mantovani M, Osimani M, Gumina S. Rotator cuff failure after surgery: An all-arthroscopic transosseous approach. *Musculoskeletal Surgery*. 2018 Oct;102:3-12.
9. Franceschi F, Longo UG, Ruzzini L, Rizzello G, Maffulli N, Denaro V. Soft tissue tenodesis of the long head of the biceps tendon associated to the Roman Bridge repair. *BMC musculoskeletal disorders*. 2008 Dec;9:1-7.
10. Longo UG, Franceschi F, Spiezia F, Marinuzzi A, Maffulli N, Denaro V. The low-profile Roman bridge technique for knotless double-row repair of the rotator cuff. *Archives of Orthopaedic and Trauma Surgery*. 2011 Mar;131:357-61.
11. Franceschi F, Longo UG, Ruzzini L, Rizzello G, Maffulli N, Denaro V. The Roman Bridge: a "double pulley-suture bridges" technique for rotator cuff repair. *BMC Musculoskeletal Disorders*. 2007 Dec;8:1-7.
12. Scarlat M, Florescu A. Shoulder function and scores in 180 asymptomatic individuals aged over 75 years. *Revue de chirurgie orthopédique et réparatrice de l'appareil moteur*. 2005 Oct 1;91(6):502-7.
13. Russell RD, Knight JR, Mulligan E, et al. Structural integrity after rotator cuff repair does not correlate with patient function and pain: a meta-analysis. *J Bone Joint Surg Am*. 2014;96(4):265-71.
14. Unruh KP, Kuhn JE, Sanders R, et al. The duration of symptoms does not correlate with rotator cuff tear severity or other patient-related features: a cross-sectional study of patients with atraumatic, full-thickness rotator cuff tears. *J Shoulder Elbow Surg*. 2014;23(7):1052-8.
15. Teunis T, Lubberts B, Reilly BT, et al. A systematic review and pooled analysis of the prevalence of rotator cuff disease with increasing age. *J Shoulder Elbow Surg*. 2014;23(12):1913-21.
16. Reilly P, Macleod I, Macfarlane R, et al. Dead men and radiologists don't lie: a review of cadaveric and radiological studies of rotator cuff tear prevalence. *Ann R Coll Surg Engl*. 2006;88(2):116-21.
17. Tashjian RZ. Epidemiology, natural history, and indications for treatment of rotator cuff tears. *Clin Sports Med*. 2012;31(4):589-604.
18. Marx RG, Koulouvaris P, Chu SK, et al. Indications for surgery in clinical outcome studies of rotator cuff repair. *Clin Orthop Relat Res*. 2009;467(2):450-6.
19. Dickinson RN, Kuhn JE. Nonoperative treatment of rotator cuff tears. *Physical Medicine and Rehabilitation Clinics*. 2023 May 1;34(2):335-55.
20. Schemitsch C, Chahal J, Vicente M, Nowak L, Flurin PH, Heerspink FL, et al. Surgical repair versus conservative treatment and subacromial decompression for the treatment of rotator cuff tears: a meta-analysis of randomized trials. *The bone & joint journal*. 2019 Sep 1;101(9):1100-6.
21. Ryösa A, Laimi K, Äärmaa V, Lehtimäki K, Kukkonen J, Saltychev M. Surgery or conservative treatment for rotator cuff tear: a meta-analysis. *Disability and rehabilitation*. 2017 Jul 3;39(14):1357-63.
22. Tanaka M, Itoi E, Sato K, Hamada J, Hitachi S, Tojo Y, et al. Factors related to successful outcome of conservative treatment for rotator cuff tears. *Uppsala journal of medical sciences*. 2010 Aug 1;115(3):193-200.
23. Itoi E, Tabata S. Conservative treatment of rotator cuff tears. *Clinical Orthopaedics and Related Research* (1976-2007). 1992 Feb 1;275:165-73.
24. Yamanaka K, Matsumoto T. The Joint Side Tear of the Rotator Cuff: A Followup Study by Arthrography. *Clinical Orthopaedics and Related Research* (1976-2007). 1994 Jul 1;304:68-73.
25. Neer CS. Impingement lesions. *Clin Orthop Relat Res*. 1983;173:70-77.