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Original article

Early Period Results of Patients Undergoing Arthroscopic Repair with a Diagnosis of Full Thickness Rotator Cuff Tear

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Abstract

The aim of this study *is to evaluate the early results of patients who were diagnosed with full-thickness rotator cuff tear and underwent arthroscopic repair as a result of physical examination and radiological evaluation.*

Methods: *The study included patients undergoing arthroscopic rotator cuff repair. Biceps tenotomy was performed in accompanying biceps pathologies. Acromioplasty was performed in patients with type 2–3 acromion. Rotator cuff ruptures were repaired with a double row technique using a titanium anchor and a peek anchor. University of California at Los Angeles (UCLA) and Constant scoring were used to evaluate the patients who were called for final follow-up controls. The mean follow-up time was 14.6 months (6-24).*

Results. *Acromioplasty performed on 12 patients (30.7%); While biceps tenotomy was performed on 9 patients (23%); Acromioplasty and biceps tenotomy were performed on 4 (10.2%) patients. Preoperative UCLA score was 11.2, Constant score was 26.9, while postoperative UCLA score was 29.6 and Constant score was 83.2. The results were excellent in 13 (33.3%) patients, good in 16 (41%) patiens, moderate in 9 (23%) patients and poor in 2 (5.1%) patients. There was no significant difference between the groups with and without acromioplasty (p = 0.513). A similar situation was observed in the biceps tenotomy (p = 0.619) and acromioplasty + biceps tenotomy (p = 0.374) groups.*

Conclusion. *Arthroscopic rotator cuff surgery is an effective treatment option with a suitable patient and correct indication. Acromioplasty and / or biceps tenotomy does not affect early results.*

Keywords: *Rotator cuff, arthroscopic repair, acromioplasty.*

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Introduction

The rotator cuff is a dynamic stabilizer of the glenohumeral joint that allows multi-directional movements [1]. The incidence of rotator cuff tears increases with age and develops due to aging-related degeneration, traumas and repetitive overhead activities [1,2,3]. Rotator cuff pathologies negatively affect the quality of life of patients by causing shoulder pain and dysfunction [2,4]. Conservative and surgical treatment is applied to patients with pain and limitation in shoulder movements, depending on the size and type of RM tear, age and activity level of the patient [3]. There are open, mini-open and arthroscopic repair methods in surgical treatment [5]. Although successful results are obtained with each method, arthroscopic repair is more preferred due to the development of arthroscopic surgical technique and equipment [6]. With the arthroscopic method, smaller incisions, less damage to the deltiod muscle, and early healing are achieved [7]. There are many studies reporting successful results of arthroscopic rotator cuff repair [8-11]. Important factors affecting the success of surgical treatment are the age of the patient, the size and type of the RM tear, and the presence of tendon atrophy [1,12-14]. Biceps long head pathologies, labrum pathologies, impingement syndrome due to acromion marfology and distal clavicle problems may accompany with rotator cuff pathologies and in rotator cuff repair, it is evaluated in terms of additional pathologies and surgical intervention is performed when necessary [15-17]. In the pathologies of the long head of the biceps, tenotomy or tenodesis is performed according to the age and activity level of the patient. Localization of the pathology and decompression are performed in impingement syndrome [15-17].

The aim of this study is to evaluate the early results of patients who were diagnosed with full-thickness rotator cuff tear and underwent arthroscopic repair as a result of physical examination and radiological evaluation.

Material and methods

Patients who underwent arthroscopic repair with the diagnosis of full-thickness rotator cuff tear in Izmir Menemen State Hospital between September 2018 and March 2020 were retrospectively scanned. 39 patients aged 45-65 years, who had at least six months of regular follow-up and underwent arthroscopic RM repair, were included in the study. Patients who underwent open and mini-open surgery, patients with joint arthrosis and massive RM tears were excluded from the study. Ethics committee approval was received for this study from the Health Sciences University Izmir Tepecik Training and Research Hospital Non-Invasive Research Ethics Committee (Date: 17.05.2021. No: 2021/05-29).

Surgical operation. All patients were operated under the interscalene block in a sitting position (chaise lounge position) by the same surgeon. Posterior, anterior and lateral portals were studied. The glenohumeral and subacromial joints were evaluated. After evaluating the size and shape of the rotator cuff tear arthroscopically, the footprint of the tendon was determined. Soft tissues were cleaned with shaver and RF, then cortical bone was minimally decorticated with burr. Then, a double row tendon repair was performed using a 5.5 mm titanium anchor and a non-drop peek anchor. Acromioplasty was performed with the aid of a burr in patients with type 2 and 3 acromions. Tenotomy was performed on the biceps tendon pathologies with the help of punch and RF. Postoperatively, they were placed in a velpau bandage at 30 degrees of abduction. Hand, wrist and elbow exercises were started from the first day after the operation.

Passive shoulder exercises were started in the third postoperative week. Active shoulder exercises were started in the sixth week. At the last control of the patients, clinical and radiological evaluations were made. University of California at Los Angeles (UCLA) and Constant scoring questionnaire were applied to all patients. Radiological evaluation was performed with direct X-ray and MRI (Figure 1. A1-2 and B1-2).

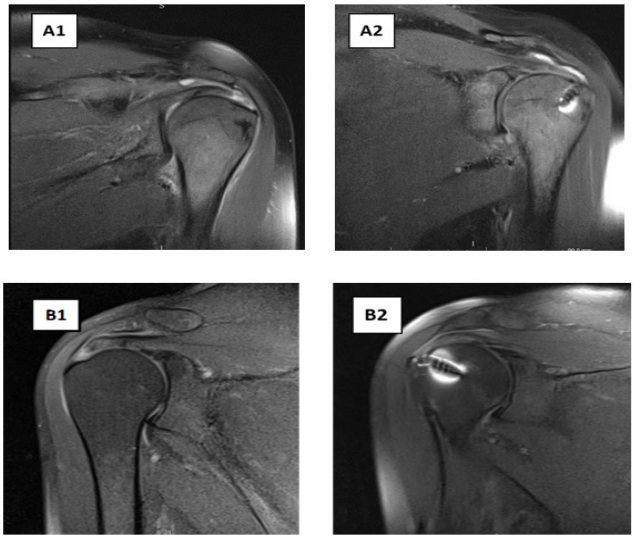

Figure 1 - Preoperative (A1and B1) and postoperative (A2 and B2) MR images of the patients

The mean age of the patients is 55.7 (40-59). The mean follow-up of patients was 14.6 months (6-24). 28 of the patients were female, 11 were male, and 24 were right shoulder and 5 were left shoulder. Acromioplasty in

12 patients (30.7%) with type 2 and 3 acromions; Biceps tenotomy was performed in 9 patients (23%) with biceps tendon degeneration; 4 (10.2%) patients underwent acromioplasty and biceps tenotomy (Table 1).

Table 1 - Basic demographic information of patients

Number of patients (n)	39
Average age (age)	55,7 (45-65)
Gender women/man	28/11
Side right/left	24/5
Follow-up period (month)	14,6 (6-24)
Akromioplasty (n)	12
Biceps tenotomy (n)	9

Statistical analysis of all data of the patients was performed. Statistical analyzes were carried out in IBM SPSS Statistics 22.0 program. Significance level was taken as α=0.05. Whether the variables are suitable for normal distribution or not was tested with skewness and kurtosis values. Variables with normal distribution were given with mean and standard deviation, and independent sample t-test was used for comparisons between two independent groups, and paired sample t-test was used for comparison of two dependent groups.

Results

While the mean UCLA score of the patients was 11.2 (7-13) preoperatively, it increased to 29.6 (15-35) in the postoperative follow-up. While the Constant score was 26.9 (19-31) preoperatively, it increased to 83.2 (62-98) postoperatively. The results were excellent in 13 (33.3%), good in 16 (41%), moderate in 9 (23%), and poor in 2 (5.1%) patients. Arthroscopic debridement was performed in one patient due to deep infection at postoperative 2nd week. One patient was included in the physical therapy program due to the development of painful stiff shoulder. All of the patients who underwent biceps tenotomy were over 55 (Table 2).

Table 2 - Clinical findings of the patients

Rotator cuff repair	39
Akromioplasty	12 (30.7%)
Biceps tenotomy	9 (23%)
Akromoiplasty + biceps tenotomy	4 (10.4%)
UCLA	Preop: 11.2 (7-13) Postop: 29.6 (15-35)
Constant	Preop: 26.9 (19-31) Postop: 83.2 (62-98)
Excellent	13 (33.3%)
Good	16 (41%)
Moderate	9 (23%)
Poor	2 (5.1%)

**Preop – preoperative; Postop - postoperative*

Preoperative and postoperative VAS pain score, abduction range of motion, forward flexion range of motion, Constant score and UCLA score differ in all patients ($p<0.05$). Postoperative abduction range of motion, forward flexion range of motion, Constant score and UCLA score values of the patients were higher than before the surgery. Postoperative VAS pain scores are lower than before surgery (Table 3).

Table 3 - The results of the statistical analysis of the patients' pre- and postoperative VAS pain score; abduction range of motion; forward flexion range of motion; Constant score and UCLA score

	N	$\bar{x}$	ss	p
VAS pain score preop	39	6,79	0,98	<0,001
VAS pain score postop	39	1,72	1,17	
Abduction range of motion preop	39	56,15	12,69	<0,001
Abduction range of motion postop	39	161,28	18,09	
Forward flexion range of motion preop	39	96,67	11,08	<0,001
Forward flexion range of motion potop	39	162,56	17,28	

**Preop – preoperative; Postop - postoperative*

Table 3 - The results of the statistical analysis of the patients' pre- and postoperative VAS pain score; abduction range of motion; forward flexion range of motion; Constant score and UCLA score

	N	$\bar{x}$	ss	p
Shoulder Constant Score preop	39	26,90	3,78	<0,001
Shoulder Constant Score postop	39	84,51	8,99	
UCLA score preop	39	11,18	1,57	<0,001
UCLA score postop	39	29,54	4,77	
p<0.05; Paired Sample t-Test				

**Preop – preoperative; Postop - postoperative*

There was no significant difference between the two groups in terms of VAS pain score, abduction range of motion, forward flexion range of motion, Constant score and UCLA score in patients with and without acromioplasty (p>0.05) (Table 4).

Table 4 - Statistical analysis of VAS pain score, abduction range of motion, forward flexion range of motion, Constant score and UCLA score of patients who underwent and did not undergo acromioplasty

	AP	N	x	ss	p
VAS pain score	Yes	12	2,00	0,95	0,321
VAS pain score	No	27	1,59	1,25	
Abduction range of motion	Yes	12	161,67	11,93	0,931
Abduction range of motion	No	27	161,11	20,44	
Forward flexion range of motion	Yes	12	161,67	11,93	0,832
Forward flexion range of motion	No	27	162,96	19,38	
Constant score	Yes	12	82,25	8,76	0,301
Constant score	No	27	85,52	9,07	
UCLA score	Yes	12	28,58	4,40	0,412
UCLA score	No	27	29,96	4,95	
p<0.05; Independent Sample t-Test					

**AP-akromiyoplasty*

Discussion

Arthroscopic method is frequently preferred in rotator cuff ruptures thanks to the development of arthroscopic techniques and surgical equipments. Even with massive tears, good results have been reported over 80% [18]. In our study, excellent and good results were evaluated as 74.3%.

With the help of arthroscopy, the shoulder joint is better evaluated and allows intervention in intra-articular pathologies other than rotator cuff tears [19-21]. The most commonly used methods in rotator cuff repair are single-row and double-row repair methods. Although there are studies showing that both suture techniques are not superior to each other in rotator cuff repair [22-24], bio-mechanical studies have shown that the footprint compression and suture durability of the transosseous double-row technique are better [25-28]. In this context, we believe that the double row technique is effective in achieving more successful results.

MacDonald et al. (2011) showed that there was no significant difference between patients with and without acromioplasty who underwent rotator cuff repair [29]. However, they reported that re-operation rates were higher in patients who did not undergo acromioplasty. Accordingly, we prefer acromioplasty to reduce the risk of revision in patients with Type 2 and 3 acromion in our clinical experience. In this context, subacromial decompression and acromioplasty were applied to 12 of 39 patients in the present study. Keong et al. (2018) reported that tenotomy added for biceps tendon pathologies in patients who underwent rotator cuff repair did not affect clinical results [30]. Similarly, we observed in the present study that biceps tenotomy did not affect clinical results.

The weaknesses of our study are that it is retrospective, the number of patients is small, and there is no control group.

Conclusion

As a result, arthroscopic rotator cuff surgery is an effective treatment option with a suitable patient and correct indication. We think that acromioplasty and / or biceps tenotomy in arthroscopic rotator cuff repair does not affect the early results of the surgery.

The authors declare no **conflict of interest**.

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Иықтың айналмалы манжетінің толық жарылуы бар науқастарға жүргізілген артроскопиялық түзетудің ерте кезеңдегі нәтижелері

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Түйіндеме

Зерттеудің мақсаты артроскопиялық түзетуді қолдана отырып, айналмалы манжеттің толық жарылуы бар науқастарды емдеудің ерте нәтижелерін бағалау болып табылады.

Әдістері. Зерттеуге иықтың айналмалы манжетінің толық жарылуы кезінде артроскопиялық түзету жасалған науқастар қатысты. Бицепс патологиясы болған жағдайда тенотомия, 2 және 3 типті акромион болған жағдайда акромиопластика орындалды. 12 науқасқа акромиопластика жасалды (30,7%); ал бицепс бұлшықетінің тенотомиясы 9 науқаста (23%) жасалды. 4 (10,2%) науқаста бицепсқа акромиопластика және тенотомия жасалды. Иықтың айналмалы манжетінің жыртылуы екі қатарлы әдіспен, яғни титан анкар және Peek анкарын қолдану арқылы коррекцияланды. Емдеу нәтижелерін бағалау Лос-Анджелестің Калифорния университетінің шкаласы (UCLA) арқылы жүргізілді. Сонымен қатар, қорытынды тексерулерге шақырылған науқастарда үздіксіз бағалау жүргізілді. Орташа бақылау кезеңі 14,6 айды (6-24) құрады.

Нәтижесі. Ота алдындағы UCLA баллы - 11,2, ал үздіксіз тексеру бойынша балл - 26,9 болды. Артроскопиядан кейінгі UCLA баллы - 29,6; үздіксіз тексеру бойынша балл 83,2 құрады. Жалпы емдеу нәтижелері 13 (33,3%) науқаста өте жақсы; 16 (41%) науқаста - жақсы, 9 (23%) науқаста орташа және 2 (5,1%) науқаста нашар болды. Акромиопластикасы бар және жоқ топтар арасында айтарлықтай статистикалық маңызы бар айырмашылық болмады (p = 0,513). Ұқсас нәтиже бицепс тенотомия (p = 0,619) және акромиопластика + бицепс тенотомия (p = 0,374) жасалған топтарда байқалды.

Қорытынды. Иықтың айналмалы манжеті хирургиясындағы артроскопия пластика әдісі сәйкес көрсеткіштері бар науқас дұрыс таңдалған жағдайда тиімді емдеу жолы болып табылады. Акромиопластика және/ немесе бицепс тенотомиясы ерте нәтижелерге әсер етпейді.

Түйін сөздер: *айналмалы манжет, артроскопиялық пластика, акромиопластика.*

Ранние результаты применения артроскопической пластики у пациентов с полнослойным разрывом вращательной манжеты плеча

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Резюме

Целью данного исследования является оценка ранних результатов лечения пациентов с полнослойным разрывом вращательной манжеты плеча с применением артроскопической коррекции.

Методы: В исследование были включены пациенты, перенесшие артроскопическую пластику вращательной манжеты плеча. Тенотомию бицепса выполняли при сопутствующей патологии бицепса, акромиопластику – при акромионе 2 и 3 типов. Разрывы ротаторной манжеты были восстановлены двухрядной техникой с использованием титанового анкера и анкера Peek. Оценка проводилась с использованием шкал Калифорнийского университета Лос-Анджелеса (UCLA). Пациентам, которые были проходили контрольные осмотры проводилась постоянная оценка. Средний срок наблюдения составил 14,6 месяцев (6-24).

Результаты. Акромиопластика выполнена 12 больным (30,7%); при этом тенотомия двуглавой мышцы выполнена 9 больным (23%). Акромиопластика и тенотомия бицепса выполнены 4 (10,2%) пациентам. Предоперационная оценка по шкале UCLA составила 11,2, постоянная оценка — 26,9, в то время как послеоперационная оценка по шкале UCLA составила 29,6, постоянная оценка - 83,2. Результаты были отличными у 13 (33,3%), хорошими - у 16 (41%), средними - у 9 (23%) и плохими - у 2 (5,1%) пациентов. Достоверной разницы между группами с акромиопластикой и без нее не было (p = 0,513). Аналогичная ситуация наблюдалась в группах тенотомии бицепса (p = 0,619) и акромиопластики + тенотомии бицепса (p = 0,374).

Выводы. Артроскопическая хирургия вращательной манжеты плеча является эффективным методом лечения при наличии соответствующего пациента и правильных показаний. Акромиопластика и/или тенотомия бицепса не влияют на ранние результаты.

Ключевые слова: *вращательная манжета плеча, артроскопическая пластика, акромиопластика.*