

Clinical outcomes of arthroscopic rotator cuff surgery over-55 years of age patients with and without biceps tenotomy

Yıldırım Genc¹, Ozgur Korkmaz¹, Ali Seker², Adnan Kara²

¹Or-Ahayim Balat Hospital Department of Orthopedics and Traumatology, Istanbul, Turkey

²Istanbul Medipol University Department of Orthopedics and Traumatology, Istanbul, Turkey

Abstract. Degenerative changes of long head of biceps tendon are common with degenerative rotator cuff tears. Biceps tenotomy and tenodesis are surgical procedures that are performed mostly after 50 years of age. Biceps tenotomy may be more suitable for the treatment of long head biceps lesions in patients older than 55 years of age with reparable rotator cuff tears. In our study we aimed to compare the clinical result of the patients that had arthroscopic rotator cuff surgery with and without biceps tenotomy. *Material and method.* We evaluated 20 patients with rotator cuff tear that we have performed shoulder arthroscopy retrospectively. All the patients were evaluated pre operatively and at the last control with Oxford Shoulder Score. All the patients operated side elbow range of motion were determined post operatively. Patients were divided into two groups. First group contained the patients with biceps tenotomy and second group contained patients without biceps tenotomy. *Results.* Increase was detected in post-operative Oxford Shoulder Scores than preoperative values for all patients and for each group. There was no restriction of elbow range of motion in all patients. *Conclusion.* Tenotomy of long head of biceps tendon is short surgical procedure with pain relief in patients older than 55 years of age with reparable rotator cuff tears. Short term clinical results are good and there is no restriction in elbow range of motion after surgery.

Key words: shoulder arthroscopy, biceps tenotomy, rotator cuff.

Introduction

The proximal part of the long head of biceps tendon's vascular supply is from superior labrum tributaries. Distal part of the long head of the biceps tendon gets its vascular supply from ascending branches of the anterior humeral circumflex artery (1). An area of about 10-30 mm is less vascularized.

Rupture or fraying of the tendon is most commonly seen in this part (2). Degenerative changes of long head of biceps tendon are common with degenerative rotator cuff tears. Subluxation and dislocation of the biceps tendon are related to rotator cuff rupture and subscapularis tendon rupture with abnormal rotator interval (3). Tears of long head of biceps tendon with less than 25% of the tendon can be treated with partial debridement. Tears over 30% of the tendon must be treated with tenotomy or tenodesis (4- 8).

Indications for tenotomy or tenodesis are existing pain with conservative treatment, medial subluxation of the long head of the biceps tendon and limitation of shoulder motion. Acromioplasty and biceps tenotomy is an effective treatment modality for pain relief when shoulder stability is normal (4).

Biceps tenotomy and tenodesis are surgical procedures that are performed mostly after 50 years of age in the arthroscopic treatment of rotator cuff tears. Arthroscopic tenotomy of long head of biceps tendon is a simple surgical procedure with low morbidity (9). Elbow flexion and supination strength is an important issue after biceps tenotomy. Decrease in elbow supination strength was found as a result of some studies (10,11). Tenotomy is shorter surgical procedure with pain relief. Tenotomy may be more suitable for the treatment of long head biceps lesions in patients older than 55 years of age with reparable rotator cuff tears (12). In our study we aimed to compare the clinical result of the patients that had arthroscopic rotator cuff surgery with and without biceps tenotomy.

Material and Method

We received ethical approval for our research from İstanbul Medipol University Ethics Committee, under number 10840098- 604.01.01-E.11658 with the revised Helsinki Declaration of 2013. We evaluated 20 patients with rotator cuff tear that we have performed shoulder arthroscopy retrospectively. Mean age of the patients was 62.05 ± 4.29 years. Mean follow up period was 18.8 ± 3.2 month. All the patients were evaluated pre operatively and at the last control after operation with Oxford Shoulder Score (13). All the patients operated side elbow range of motion were determined post operatively. Patients with bicipital groove tenderness were determined. Inclusion criteria for the study was; patients older than 50 years who had degenerative full thickness rotator cuff tears with less than 3 cm. Traumatic rotator cuff tears are not included in the study. Patients that were treated with arthroscopy and mini open incision are not included in the study. All the operations were done in Fowler's position. Standard arthroscopic portals were used. Patients with tears over 30% of long head of biceps were treated with tenotomy. (Figure 1, 2) After biceps tenotomy, sub acromial decompression and rotator cuff repair were done arthroscopically. After surgery all the patients used arm sling for

3 weeks. Same physical therapy program were done to all patients. Passive and assisted exercises in forward flexion and external rotation were initiated. Strengthening exercises were restricted until 6 weeks after the surgical procedure. Patients were divided into two groups. First group contained the patients with biceps tenotomy and second group contained patients without biceps tenotomy. There were 10 patients in each group. Patients with Popeye deformities were identified in the group with tenotomy.

Mann-Whitney U test, a nonparametric method, was used to compare the results of both groups. Wilcoxon test, which is a non-parametric test, was used for comparison of values before and after operation. At the 95% confidence interval, $p < 0.05$ was considered statistically significant.

Results

Pre operatively mean Oxford Shoulder Score was 12.35 ± 4.74 . Post operatively mean Oxford Shoulder score was 45 ± 2.59 . Pre operatively mean Oxford Shoulder Score was 11.5 ± 3.89 in the group without tenotomy. Post operatively mean Oxford Shoulder score was 48 ± 2.66 in the group without tenotomy. Pre operatively mean Oxford Shoulder Score was 13.2 ± 5.55 in the group with tenotomy. Post operatively mean Oxford Shoulder score was 45 ± 2.66 in the group with tenotomy (Table 1).

There was no restriction of elbow range of motion in all patients. Mean extension/flexion was 135 ± 3.2 degrees, mean pronation was 65 ± 2.2 degrees and mean supination was 80 ± 2.3 degrees in the group without tenotomy. Mean extension/flexion was 136 ± 2.3 degrees, mean pronation was 65.2 ± 2.1 degrees and mean supination was 79.4 ± 2.2 degrees in the tenotomised group. Two male patients had Popeye deformity in the group with tenotomy. 8 patients had bicipital groove tenderness in the tenotomised group, 2 patients had bicipital groove tenderness in the group without tenotomy before surgery. None of the patients had bicipital groove tenderness at last control.

There was a statistically significant difference between pre- and post- operative Oxford Shoulder Scores for all patients and for each group. However there was no statistically significant difference between the Oxford Shoulder Scores of two groups. There was no statistically significant difference between two groups elbow range of motions.

Table 1 Pre and post operative values of Oxford Shoulder score

	Mean pre operative Oxford Shoulder Score	Mean post operative Oxford Shoulder Score
Total	12.35 ± 4.74	45 ± 2.59
Group without tenotomy	11.5 ± 3.89	48 ± 2.66
Group with tenotomy	13.2 ± 5.55	45 ± 2.66



Figure 1. Long head of biceps tendon before arthroscopic tenotomy



Figure 2. Glenohumeral joint after tenotomy

Discussion

Results of the biceps tenotomy and tenodesis are differ from various directions. In the study which compares the results of tenodesis and tenotomy that was done by Meraner et.al showed that both procedure have similar results for function, pain, and range of motion. But tenotomy group showed reduced strength in abduction (14). In another study that compares the elbow functions after biceps tenotomy or tenodesis, shows no statistically significant difference for forearm supination or elbow flexion strength between the two groups (15). But results of the study that was done by Almeida et al showed 13% loss of elbow flexion strength following arthroscopic tenotomy of the long head of biceps tendon, when they compared the operated side with the contralateral side and with a control group (16). Decrease in supination strength relative to the nonoperative side and tenodesis was detected in the study that was done by Wittstein et al (17). Lee et al. had found no significant differences in elbow motor power. They detected greater forearm supination power in the tenodesis group than tenotomy group (18). Almeida et al. determined similar muscle strength for elbow flexion between the patients with or without apparent clinical deformity from distal migration of biceps tendon after arthroscopic tenotomy (19). There was no restriction of elbow range of motion in our patients and there was no statistically significant difference between groups about elbow range of motion but we have not studied the muscle strength around elbow.

Popeye deformity and painful muscle spasm are unexpected result of the tenotomy of the long head of the biceps tendon (20). 45% prevalence of Popeye deformity and 8% cramplike arm pain was detected after tenotomy of the long head of biceps tendon.

Factors such as sex, age, dominant arm relation, and body mass index were not related with Popeye deformity, elbow flexion strength and muscle spasm. The male sex was the only factor correlated with Popeye deformity (21). Popeye deformity was detected in two male patients after biceps tenotomy. As a result of our study the prevalence of Popeye deformity is less than literature. There can be correlation between male sex and Popeye deformity because all the patients with Popeye deformity in our study group were male.

In another study that compares the treatment of long head of biceps tendon lesions with tenotomy and tenodesis the incidence of Popeye deformity was detected 3-times higher in tenotomy group (22). We have not performed tenodesis of the long head of the biceps tendon for this reason our study has a restriction about comparison of the Popeye deformity after tenotomy and tenodesis.

Karataglis et. al have evaluated 52 patients with a mean age of 60.7 years underwent arthroscopic repair of the rotator cuff and simple tenotomy of the long head of biceps tendon. All the patients were evaluated about the position of the tenotomised biceps tendon. 43 patients (82.7%) tendon was inside the bicipital groove and nine patients (17.3%) tendon was outside the bicipital groove. 6 of 9 patients the tendon was lying outside the Groove and 3 of 9 patients tendon was in a remote position with a positive Popeye Sign. Natural history of the tenotomised long head of biceps tendon is to tenodese itself inside or outside the bicipital groove. Occurrence of a Popeye sign is related with its pre-operative condition and coexistent subscapularis tears (23). The long head of biceps has an effect on anterior stabilization the shoulder. Biceps tenotomy can be a reason for radiographic changes on shoulder. But in a study that is about arthroscopic biceps tenotomy in the treatment of rotator cuff tears showed that this surgical procedure has no effect on the radiographic changes that occur with long-standing rotator cuff tears (4). Our follow up period is short for the natural history of the tenotomised long head of the biceps tendon. Short term results of the tenotomy of long head of the biceps tendon are favorable.

Age is an important subject about the decision of tenotomy of the long head of the biceps tendon. A decrease in the muscle power was detected in patients under 60 years of age, but no significant differences was detected over 60 years' patients (24). But in another study that compare isolated tenotomy of the long head of the biceps tendon in young and active patients with elderly and sedentary patients showed that both group had similar and well accepted results (25). Fatty degeneration or substantial atrophy in the anterior musculature of the arm was not detected after long head of biceps tendon tenotomy in active men of working age (26). Our patient group has an average age of 62 years. We prefer perform tenotomy to the patients older than 55 years and our clinical results are good for this age group.

Tenotomy is a simple and has low surgical morbidity. Operation time is less than tenodesis. After tenotomy postoperative rehabilitation program does not change (9, 10). Higher reoperation rates have been detected at 1 year between the patients who have been performed biceps tenodesis when compared with the patients who have not been performed tenodesis (27). De Carli et.al performed long head of the biceps tenotomy combined with tenodesis in 65 patient in their study. Biceps tenotomy combined with tenodesis did not provide any significant clinical or functional improvement than isolated tenotomy (28). We have not a control group with tenodesis of the long head of the biceps tendon in this age group. This an important restriction of our study.

Bicipital groove tenderness is an important physical examination finding for the long head of biceps tendon pathology. According to the study that was done by Friedman at al. pain at the bicipital groove can be related to subpectoral biceps tenodesis (29). But the study that was done by Oh et.al biceps tenotomy can be performed for patients with definite bicipital groove tenderness and tenodesis is good surgical procedure for male patients who have bicipital groove tenderness (30). 8 patients in the tenotomised group had bicipital groove tenderness and 2 patients had bicipital tenderness in the group without tenotomy before the surgery in our study. None of the patients had bicipital tenderness after surgery. Rotator cuff repair can be the reason to resolve the bicipital groove tenderness in the patients without tenotomy.

Conclusion

Tenotomy of long head biceps lesions is shorter surgical procedure with pain relief in patients older than 55 years of age with reparable rotator cuff tears. Short term clinical results are good and there is no restriction in elbow range of motion after surgery.

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Corresponding author

Ozgur Korkmaz

Or Ahayim Balat Hospital

Department of Orthopedics and Traumatology Ayvansaray cad.No:2 Fatih

Istanbul, Turkey

E-mail:ozkorkmaz00@yahoo.com

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