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Original Article

Evaluation of short-term clinical outcomes of subacromial impingement patients with performed arthroscopic subacromial decompression

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Abstract

Aim: In this study, it was aimed to evaluate short-term clinical outcomes of arthroscopic subacromial decompression procedure which was performed on patients who had subacromial impingement syndrome and did not respond to conservative treatment.

Material ans Methods: Patients who did not have any shoulder disorder including rotator cuff rupture or capsulolabral pathologies, but subacromial impingement syndrome were evaluated retrospectively. The patients were evaluated clinically according to the Constant-Murley scoring system and visual analog scale (VAS). Active and passive ranges of motion of the joint of the patients were evaluated both preoperatively and at the final follow-up.

Results: A total of 64 patients were evaluated. Of the patients; 22 were male and 42 were female and 54 (29-77) was determined to be the mean age. Mean follow-up duration was 17.4 months (7-25 months). The preoperative mean Constant-Murley score was 52 (36-79), whereas it was determined to be a mean of 79 (48-98) at the final follow-up. VAS was determined to be 7.2 (5-9) preoperatively, whereas it was determined to be 2 (0-5) at the final follow-up. Statistically significant differences were determined for both scoring systems at the final follow-up compared with the preoperative period ($p<0.001$).

Conclusion: Satisfactory short-term outcomes may be acquired after arthroscopic subacromial decompression procedure which is performed due to subacromial impingement syndrome for patients who do not respond to conservative treatment.

Keywords: Subacromial; Impingement; Arthroscopic.

INTRODUCTION

Subacromial impingement syndrome (SIS) is one of the commonly encountered shoulder pathologies (1). Neer classically defined subacromial impingement as compression of rotator cuff and subacromial bursa under coracoacromial ligament and anterosuperior acromion (2). Neer staged SIS in a spectrum starting with chronic bursitis and ending with development of rotator cuff rupture and, ultimately, long head of biceps problems (2).

The major cause of the pain occurs by impingement of structures including subacromial bursa, subdeltoid bursa, rotator cuff and long head of biceps between coracoacromial arch and humeral head (3). The relationship between SIS and rotator cuff injury is controversial. There are individuals suggesting that Subacromial impingement has damaging effect on rotator cuff, however, there are ones suggesting that an intrinsic injury occurring in the rotator cuff leads to weakness and results in subacromial impingement through upward displacement of the humeral head, as well (4-6).

There are disputes on treatment of SIS (7). As a surgical treatment option, whereas open acromioplasty and decompression procedures were performed initially, arthroscopic acromioplasty and decompression have begun to replace the open surgery (2,7,8). There are studies comparing arthroscopic surgery and open surgery (9, 10). Being minimally invasive, shorter return-to-work time, leading to less cosmetic problems seem to be major advantages of arthroscopic surgery (9). No obvious superiority of arthroscopic treatment has been observed in studies comparing conservative treatment and arthroscopic surgery (11-13).

Neer examined subacromial impingement in 3 stages. Stage 1 is the reversible stage accompanied by edema and hemorrhage. Stage 2 is the stage characterized by chronic impingement, which is accompanied by edema and

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fibrosis and involves recurrences. Stage 3, however, is the stage in which bony structure alterations and rotator cuff ruptures may occur (2). In this study, short-term outcomes of arthroscopic subacromial decompression procedure which was performed for the patients with SIS, who did not benefit from conservative treatment, were scrutinized. Target patient group in the study was determined to be patients with stage 2 impingement syndrome who did not have rotator cuff rupture or capsulolabral pathologies and patients with acromion morphology causing the impingement.

MATERIAL and METHODS

64 patients who had arthroscopic subacromial decompression due to subacromial impingement and came to follow-ups regularly were examined retrospectively. The patients in the study were the patient group who did not respond to conservative treatment methods and had Neer Stage 2 impingement. All the patients received physiotherapy and subacromial steroid injection was applied to 18 patients. Subacromial injection treatment consisted of one (12 patients) or two steroids (6 patients) injections.

Classic complaint of the patients was pain radiating towards the anterior side of the arm and the pain occurring during frontward elevation and abduction of the arm. Hawkins and Neer tests were positive in all patients.

The patient group was comprised of patients who had pain that could not be cured completely despite of preoperative application of conservative treatments including NSIADs, physiotherapy, exercises and subacromial steroid injections. For all patients, anteroposterior, axillary and supraspinatus outlet x-rays were taken and shoulder MRIs were performed. Patients' preoperative and postoperative shoulder-joint motions were measured both actively and passively. For the patients, preoperative and postoperative Constant-Murley shoulder score and visual analogue scale were measured (14).

Surgical Technique

The patients were performed shoulder arthroscopy under general anesthesia by applying traction to the previously operated arm in lateral decubitus position. Initially, diagnostic arthroscopy was performed for glenohumeral joints of all patients and then it is continued with subacromial arthroscopy procedure. Subacromial bursectomy was routinely performed for all patients.

After that, coracoacromial ligament was identified and acromioplasty was performed for patients who had degenerations in this ligament and who had type 2-3 acromion causing impingement by releasing of the coracoacromial ligament (Figure 1 and 2).

Acromioplasty was performed through the lateral portal. Velpau bandage was applied after the surgery. On the postoperative day 1, pendulum exercises were initiated and it is gradually continued with passive and active joint movements.

Statistical Analysis

The normality of distribution of the continuous variables was tested with the Kolmogorov-Smirnov test. Wilcoxon's signed-rank test was used for comparisons of the pre-operative and post-operative Constant-Murley scores and visual analog scale. A p value of <0.05 was considered statistically significant. Statistical analysis was performed with SPSS Statistics as of version 22.0 and a p value < 0,05 was accepted as statistically significant.

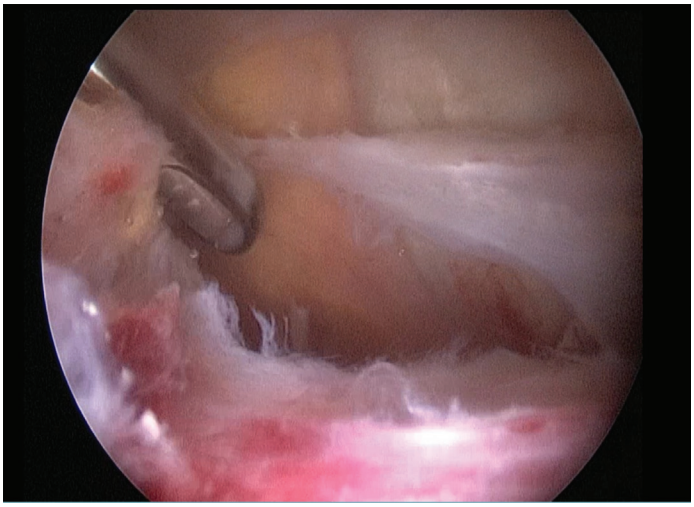

Figure 1. Arthroscopic view of bursectomy.

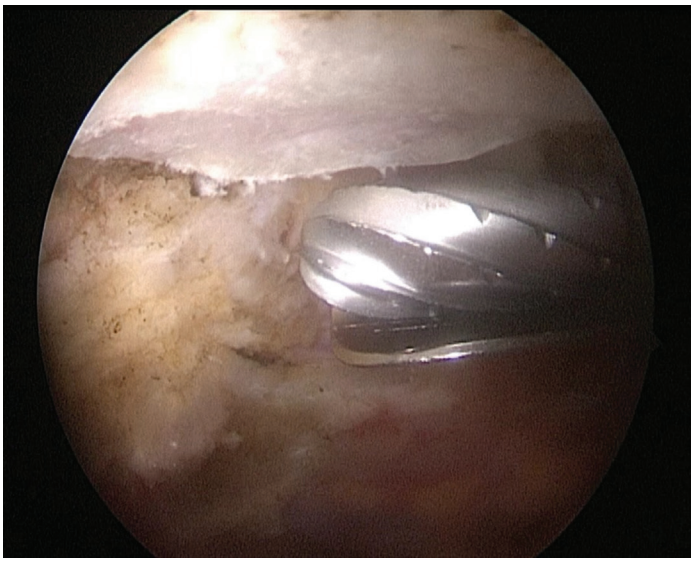

Figure 2. Arthroscopic view of acromioplasty.

RESULTS

Of the patients; 22 were male and 42 were female. Mean age was determined to be 54 (29-77). Mean follow-up duration was 17.4 months (7-25 months). None of the patients included in the study had a radiologically proven rotator cuff rupture of SLAP lesion. There was type 3 acromion in total of 5 patients and type 2 acromion in 30 patients. Preoperative mean Constant-Murley score was 52 (36-79), whereas it was determined to be a mean of 79 (48-98) at the final follow-up. VAS was determined to be 7.2 (5-9) preoperatively, whereas it was determined to be 2 (0-5) at the final follow-up (table 1).

Table 1. Demographic characteristics and shoulder scores of all patients

Male	Female	Age	Follow-up	Constant-Murley score		Visual analog scale		Acromion type		
22	42	54(29-77)	17.4(7-25)	Preoperative	Final follow-up	Preoperative	Final follow-up	Type 1	Type 2	Type 3
				52 (36-79)	79 (48-98)	2 (0-5)	7.2 (5-9)	29	30	5

DISCUSSION

There is no gold standard treatment for subacromial impingement. When the literature is reviewed, treatment options, including physiotherapy applications, open surgery and arthroscopic surgery, are encountered (11). Along with increasing of experiences in arthroscopic surgery, arthroscopic surgery applications have become more popular compared with the open surgery. As arthroscopy is used as a diagnostic intervention, its popularity is getting increased with every passing day. When the cases in this study are examined, it is found that for all patients glenohumeral joint arthroscopy was performed prior to subacromial arthroscopy. In many patients for whom SIS was suspected as a result of clinical examination and MRI findings, capsulolabral and biceps pathologies were detected and treated in the same session. However, these patients were not included in the study group. MRI and clinical examination alone are not always able to provide definitive information about the disease. One of the most important reasons for why arthroscopic surgery has been popularized compared with the open surgery in SIS is the feasibility of performing a diagnostic arthroscopy for glenohumeral joint.

For shoulder patients, there are various scoring systems demonstrating functional strength of the shoulder and patient satisfaction (15). Constant-Murley score is also frequently used within these scoring systems. When the patients in the study are considered, improvements were observed in Costant-Murlay scores. When the obtained results were scrutinized, it was observed that it gave similar results with those of some studies investigating effect of arthroscopic surgery (12, 16).

For the patients in this study, initially conservative treatment was administered. However, patients reported that they did not benefit or sufficiently benefit from conservative treatment. In a previous study, why the patients who did not benefit from conservative treatment did not benefit was examined, and main reasons according to this were shown to be mistrust to conservative treatment, painfulness of exercise programs and the thought that there could be a more rapid recovery with surgical treatment (17). Why the patients in this study did not benefit from conservative treatment was not scrutinized in details, however, when retrospective records were investigated, the major complaint was incomplete relief of pains occurring at rest and during motion. When the literature is reviewed, there are various studies suggesting that conservative treatment modalities were extremely effective in SIS treatment and even it gave similar results compared with the surgery (11-13,18,19).

All the patients with symptoms for over six months due to subacromial impingement of the shoulder, who were being treated with conservative treatment, were included in this study. Approximately one-third of the patients underwent subacromial steroid injection. When steroid-applied patients were questioned, it was found that steroid application provided temporary relief and the pain recurred within approximately one month. When the patients who did not benefit from conservative treatment were evaluated, no relation was found between conservative treatment method and arthroscopic treatment results in terms of Constant-Murley scores and VAS values. In some studies, it was shown that physiotherapy was more often used after surgery than as part of initial non-surgical treatment, where less than half of the patients received physiotherapy (20, 21). The patients in this study did not receive a special physiotherapy after surgery. Only home exercise programs were given and satisfactory results were obtained in Constant-Murley scores and VAS values. Morphology of acromion has an important place in SIS etiology (2, 22). Biglianini described acromion morphology as type 1- flat, type 2-curved and type 3-hooked (23). Acromial slope, acromial tilt, lateral acromial angle and acromial index are other factors affecting subacromial impingement. In this study, acromion morphology was evaluated only according to Biglianini's criteria and in approximately half of the patients, type 2 and type 3 acromions were detected. Acromioplasty was performed for the patients in whom acromion morphology causing impingement was detected. Morphology of acromion should be preoperatively evaluated in details in both plain x-rays and MRI slices. Presence of type 3 acromion, in particular, has been found to be associated with rotator cuff pathologies, however there are also studies suggesting the opposite (24). Subacromial-subdeltoid bursitis are included in causes of SIS (25). Presence of an association between bursa and glenohumeral joint has importance in regard to rotator cuff pathologies. Bursectomy was routinely performed for the patients in this study. However, acromioplasty was not performed for each patient for whom bursectomy was performed. While making decision for acromioplasty, type of the acromion and degree of degeneration in the coracoacromial ligament were evaluated. Excessive degeneration was evaluated on behalf of impingement syndrome. Thus, coracoacromial ligament degeneration was staged by Royal Berkshire Hospital (stage 0: normal, stage 1: minor scuffing, stage 2: marked damage and stage 3: bare bone areas) (3). In this study, acromioplasty was performed generally for patients with stage 2 or more advanced impingement. However,

In a study evaluating patients for whom arthroscopy was performed due to subacromial impingement, when patients for whom only bursectomy procedure was performed and patients for whom bursectomy and acromioplasty were performed together were compared, it was determined that there was no statistical significance between Constant scores and VAS scores (26). In another study, it was reported that successful outcomes were acquired by decompression of the coracoacromial arch that may cause impingement (27).

CONCLUSION

There are various causes that may lead to subacromial impingement. Conservative treatment should be the first option in patients with subacromial impingement syndrome which is not accompanied by cuff rupture, instability or capsulolabral pathologies. In case that improvement is not detected after conservative treatment, arthroscopic subacromial decompression procedure may give favourable short-term outcomes. It should be remembered that arthroscopic procedure is a diagnostic procedure as well. Long-term follow-up outcomes are required in order to make clearer deductions.

REFERENCES

1. Nasca RJ, Salter EG, Weil CE. Current concepts review. Subacromial impingement syndrome (79-A: 1854-1868, Dec. 1997). J Bone Joint Surg Am1998;80(12):1852-3.
2. Neer CS, 2nd. Anterior acromioplasty for the chronic impingement syndrome in the shoulder: a preliminary report. J Bone Joint Surg Am 1972;54(1):41-50.
3. Kanatlı U, Ataoğlu MB, Uğurlu M. Subakromial Sıkışma Sendromu. Kanatlı U, editör. Omuz Hastalıkları ve Artroskopisi. US Akademi, İzmir 2017, pp. 291-305.
4. Bigliani LU, Levine WN. Subacromial impingement syndrome. J Bone Joint Surg Am 1997;79(12):1854-68.
5. Neer CS, 2nd. Impingement lesions. Clin Orthop Relat Res 1983;(173):70-7.
6. Chansky HA, Iannotti JP. The vascularity of the rotator cuff. Clin Sports Med 1991;10(4):807-22.
7. Farfaras S, Sernert N, Hallstrom E, Kartus J. Comparison of open acromioplasty, arthroscopic acromioplasty and physiotherapy in patients with subacromial impingement syndrome: a prospective randomised study. Knee Surg Sports Traumatol Arthrosc 2016;24(7):2181-91.
8. Yu E, Cil A, Harmsen WS, Schleck C, Sperling JW, Cofield RH. Arthroscopy and the dramatic increase in frequency of anterior acromioplasty from 1980 to 2005: an epidemiologic study. Arthroscopy 2010;26(9 Supp l):S142-7.
9. Davis AD, Kakar S, Moros C, Kaye EK, Schepsis AA, Voloshin I. Arthroscopic versus open acromioplasty: a meta-analysis. Am J Sports Med 2010;38(3):613-8.
10. Husby T, Haugstvedt JR, Brandt M, Holm I, Steen H. Open versus arthroscopic subacromial decompression: a prospective, randomized study of 34 patients followed for 8 years. Acta Orthop Scand 2003;74(4):408-14.
11. Dorrestijn O, Stevens M, Winters JC, van der Meer K, Diercks RL. Conservative or surgical treatment for subacromial impingement syndrome? A systematic review. J Shoulder Elb Surg 2009;18(4):652-60.
12. Haahr JP, Ostergaard S, Dalsgaard J, Norup K, Frost P, Lausen S, Holm EA, Andersen JH. Exercises versus arthroscopic decompression in patients with subacromial impingement: a randomised, controlled study in 90 cases with a one year follow up. Ann Rheum Dis 2005;64(5):760-4.
13. Diercks R, Bron C, Dorrestijn O, Meskers C, Naber R, de Ruiter T, Willems J, Winters J, van der Woude HJ, Dutch Orthopaedic A. Guideline for diagnosis and treatment of subacromial pain syndrome: a multidisciplinary review by the Dutch Orthopaedic Association. Acta Orthop 2014;85(3):314-22.
14. Constant CR, Murley AH (1987) A clinical method of functional assessment of the shoulder. Clin Orthop Relat Res 1987;214:160-4.
15. Kirkley A, Griffin S, Dainty K. Scoring systems for the functional assessment of the shoulder. Arthroscopy 2003;19(10):1109-20.
16. Lunsjo K, Bengtsson M, Nordqvist A, Abu-Zidan FM. Patients with shoulder impingement remain satisfied 6 years after arthroscopic subacromial decompression: a prospective study of 46 patients. Acta Orthop 2011;82(6):711-3.
17. Dorum IH, Heir S, Solheim E, Magnussen LH. Implementation of conservative treatment prior to arthroscopic subacromial decompression of the shoulder. Knee Surg Sports Traumatol Arthrosc 2017;25(7)2060-66
18. Jonsson P, Wahlstrom P, Ohberg L, Alfredson H. Eccentric training in chronic painful impingement syndrome of the shoulder: results of a pilot study. Knee Surg Sports Traumatol Arthrosc 2006;14(1):76-81.
19. Michener LA, Walsworth MK, Burnet EN. Effectiveness of rehabilitation for patients with subacromial impingement syndrome: a systematic review. J Hand Ther 2004;17(2):152-64.
20. David Hoyrup Christiansen, Poul Frost, Lars Henrik Frich, Deborah Falla, Susanne Wulff SvendsenThe Use of Physiotherapy among Patients with Subacromial Impingement Syndrome: Impact of Sex, Socio-Demographic and Clinical Factors. PLoS One 2016;11(3):e0151077.
21. Ylinen J, Vuorenmaa M, Paloneva J, Kiviranta I, Kautiainen H, Oikari M, et al. Exercise therapy is evidence-based treatment of shoulder impingement syndrome. Current practice or recommendation only. Eur J Phys Rehabil Med 2013;49:499-505.
22. Balke M, Schmidt C, Dedy N, Banerjee M, Bouillon B, Liem D. Correlation of acromial morphology with impingement syndrome and rotator cuff tears. Acta Orthop 2013;84(2):178-83.
23. Bigliani LU, Morrison DS, April EW. The morphology of the acromion and its relationship to rotator cuff tears. Orthop Trans 1986;10:228.
24. Mohamed RE, Abo-Seisha DM. Assessment of acromial morphology in association with rotator cuff tear using magnetic resonance imaging. Egyptian J Radiol Nuc Med 2014;45:169-80.
25. Draghi F, Scudeller L, Draghi AG, Bortolotto C. Prevalence of subacromial-subdeltoid bursitis in shoulder pain: an ultrasonographic study. J Ultrasound 2015;18(2):151-8.
26. Kolk A, Thomassen BJW, Hund H, de Witte PB, Henkus HE, Wassenaar WG, et al. Does acromioplasty result in favorable clinical and radiologic outcomes in the management of chronic subacromial pain syndrome? A double-blinded randomized clinical trial with 9 to 14 years' follow-up. J Shoulder Elbow Surg. 2017;26(8):1407-15.
27. Masood Umer, Irfan Qadir, and Mohsin Azam. Subacromial impingement syndrome. Orthop Rev (Pavia). 2012;9;4(2):e18.