Arthroscopic treatment of Subacromial Impingement Syndrome with acromioplasty versus bursectomy

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The Egyptian Orthopedic Journal; 2021 supplement (2), December, 56: 54-58

Abstract

Background
Subacromial impingement syndrome is one of commonest shoulder disease. Patients presented by shoulder pain and impaired normal activity. Patients can be treated conservatively and if not improved surgical intervention is indicated which could be arthroscopically with variable results.

Aim and objective
This study was conducted to compare effectiveness and benefits between arthroscopic buesectomy versus acromioplasty in treatment of syndrome of subacromial impingement.

Patients & Method
The study was approved by the local ethics committee, and a written consent was taken for each subject, and included 60 patients; 30 patients was treated by arthroscopicbursectomy alone and the other 30 were treated by acromioplasty. Follow up period was one year.

Results
clinical outcome was assessed after the American shoulder and elbow surgeons' score. The acromioplasty group (A) had higher score at three months after operation. And after 6 months the deference between the two groups decreased till one year after operation at which there was no significant deference.

Conclusion
Our results revealed that arthroscopic acomioplasty for subacromial impingement syndrome were effective and safe than bursectomy alone during the first year after operation then both have equal results.

Key words
Subacromial Impingement- acromioplasty – Subacromial decompression –Arthroscopic-bursectomy.

Introduction

Subacromial impingement syndrome (SAIS) is a common disease including the subacromial space soft tissue; accounting for 44-65% of all shoulder complaints [1]. This syndrome resulting from an impingement on supraspinatus muscle, the covering bursa and at times the tendon of the long head of biceps aginst the anterior part of the acromion and coracoacromial arch [2].The subacromial space is bounded by head of the humerus below, the anterior third of the acromion(anterior edge and bottom), the acromioclavicular joint and coracoacromial ligament above. In 1972, Neer [3] had described the as a mechanical impingement of the rotator cuff tendons under the acromion anterior inferior part occurring when the shoulder is moved in the forwardly flexed and internally rotated direction. Neer described three progressive stages in the spectrum of impingement rotator cuff. Stage I subacromial bursa oedema and haemorrhage.Stage II proceeding of stage I to thickening and fibrosis of the bursa and tendinitis of the cuff, this stage may need operative intervention. Stage III continuous impingement results in degeneration and cuff tears complete or incomplete. There has been a controversy about the relation between SAIS and rotator cuff disease. some authors [4] think that mechanical compression by any structures external to the tendon lead to inflammation and rotator cuff degeneration. On other hand, others [5] believe that the disease a result of intrinsic tendon degeneration and the subacromial impingement is the result of cuff weakness and migration of the humeral head toward covering structures. Clinically night pain is the main complain, increased by sleeping on the affected shoulder orputting the arm overhead. The pain usually have insidious onset over weeks and localized to the anterolateral shoulder. Painful normal daily activities also is a usual patient complaint [6]. History, physical examination and radiological examination are essential for adequate diagnosis [7]. Non-surgical management of SAIS includes modification of activities, non-

steroidal anti-inflammatory medications, subacromial injection of steroids and physiotherapy programs [8]. Surgical management includes open acromioplasty which described by Neer with subacromialbursaremovaland cutting of coracoacromial ligament performed good long-term results [3]. However, arthroscopic subacromial decompression has been proven to make similar outcomes without affection of the deltoid insertion [9]. The management of acromioplasty is based on extrinsic impingement theory of Neer, which explain the irritation of the subacromial tissue by impingement of the rotator cuff under the coracoacromial arch [10]. Bursectomy only without acromioplasty is considered satisfactory to those who support the intrinsic theory, as symptoms results from tendinopathy and associated inflammation of the bursa while acromion affection felt to be secondary [11]. In this study we treated SAIS by arthroscopic bursectomy versus acromioplasty aiming to find out which technique safe and effective.

Patient and Methods

From June 2016 to February 2018, 60 patients with 60 shoulders with subacromial impingement syndrome underwent arthroscopic decompression in two groups one acromioplasty (A) and the other bursectomy (B) after approval from the local ethical committee and taking an informed consent. Full history, examination, radiological evaluation by plain X-ray and MRI, laboratory investigation and clinically by ***American shoulder and elbow surgeons scoring system (ASES)*** [12]. Inclusion criteria included: Subacromial impingement syndrome in adult patients. The exclusion criteria were: Other associated shoulder pathology e.g rotator cuff tear and, glenohumeral joint arthritis, infection,calcific tendonitis, neurological disorder, adhesive capsulitis and previous operation or infection on the diseased shoulder girdle.MRI shoulder was done to illustrate the pathology,other cofactors of impingement as AC arthritis, subacromial bursitis and type III acromion and exclude the presence of rotator cuff tear.Patients in this study were treated arthroscopically with acromioplasty or bursectomy.

Techniques:

Arthroscopic subacromial decompression made as **Ellman** method [13] the patient positioned in semi-setting position. Tension to the arm applied using traction device. The shoulder was in 40° of abduction and 10° of flexion. Marking of The bony landmarks (the acromion, the clavicle, the acromioclavicular joint, the coracoids and the coracoacromial ligament) was done with a pen. A posterior portal for the arthroscope was used.The glenohumeral joint was first visualized for cartilage changes, labrumdisorder of the biceps tendon, and the rotator cuff. The subacromial space then explored using the same portal and a bursectomy done from a lateral portalwith a shaver. Excision of the acromion anterior edge (about 5–8 mm) followed by excision of the same thickness from the inferior surface of the acromion all the way to the AC joint.

Postoperative care, All patients were assessed clinically by scoring system and radiologically by x-ray AP view, outlet view and axillary view .The follow up was scedulaed at 2 weeks, 1 month, 3 months, 6 months and 1 year postoperative. Passive movement of the affected shoulder was provided by the other arm if needed. Pendulum exercises were begun the next day. Range of motion exercises were started at the first week at home. Physiotherapy may or may not be prescribed depending on the patient's progress with the home program. Sports activities are individualized and variable.

Results

Preoperative evaluation and functional scorring of all patients and as regard the ASES scoring system data obtained included in table [1]

In comparison of pre and postoperative results of each group there was clinical significance in all variables

of the scoring system as regard VAS, ADL, ROM, strength and total ASES score as showed in tables (2 and 3).

As regarding total ASES score post operative results showing clinical significance between both groups as the total ASES score was high inacromioplasty group than in bursectomy group in 2 weeks, one month and three months while less or no significance in 6 months and one year post operative as showed in table [4].

Discussion

SAIS is one of the most often qualified pathological shoulder situations in general practice and in sports medicine [14]. Early literature qualified impingement as a pathology or a diagnosis [15] but nowadays impingement is believed to be a group of symptoms, rather than a pathology itself. Deferent investigations have proven the association between impingement symptoms and assortment of implied pathological mechanisms. Rotator cuff pathology [16], scapular dyskinesis [17], shoulder instability [18], biceps pathology and superior labrum anterior posterior lesions and glenohumeral internal rotation deficit have been

submitted to cause shoulder impingement symptoms [19]. Treatment of SAIS including conservative treatment which includes; analgesia, steroid injection, shock wave therapy and physical therapy. And if no improvement for at least 6 months patient should undergo surgical treatment to prevent progression of the pathology and rotator cuff tear [20]. The surgery can be operated using arthroscopic approach (ASD), which give good results in the long term follow up [21]. In our study after treatment of 30 patients in group A arthroscopically by acromioplasty and treatment the other 30 patients in group B by bursectomy alone, we found out that the total ASES score at 2 weeks, 1 month and three months was statistically significant between group A and B with better results in arthroscopic group (A) as the score after 2 weeks was adequate (68.5±11.1) in group A and poor (54.1±10.7) in group B, after 1 month was satisfactory (79.8±12.8) in group A and adequate (62.2±9.5) in group B and after 3 months the score was good (86.2±13.4) in group A and satisfactory (72.0±11.0) in group B. At six months and 1 year of follow up there was no statistically significant deference in total ASES score between both groups. Henkus et al. published a randomized controlled study concerned with treatment of impingement syndrome with no rotator cuff tears. 55 patients were randomized either into arthroscopic bursectomy (26 patients) orbursectomy with acromioplasty groups (30 patients); one patient lost to follow up. At a mean follow-up of 2.5 years (range, 1–5 years), both bursectomy and acromioplasty groups had good clinical results, and there were no significant variance between the groups [22]. other study conducted in Brazile for 18 patients found no superiority of acromioplasty over cases treated only with bursectomy [23]. More over in systemic review of Jonathan[24] for six studies comparing bursectomy to acromioplasty found that a bursectomy alone provided similar results to bursectomy with acromioplasty[24]. This conclusion is based on that the intrinsic theory of impingement is the primary cause not extrinsic, rotator cuff pathology predates acromion pathology, rotator cuff dysfunction may be the cause of acromion spurring, and that functional outcome of subacromial decompression does not correlate with the amount of acromion resection. [25] The strongest support for an intrinsic over an extrinsic etiology for impingement are the effectiveness of conservative treatment in managing impingement syndrome. Clearly, rehabilitation and therapy cannot remove osseous structures.[26] bursectomy alone removes an inflamed and thickened bursa that generates pain.[27] On the other hand this study conclude the superiority only in the first year to acromioplasty as decompression and spur removal were associated with good score and more patient satisfaction. This was explained by the important role of extrinsic compression in the pathology and symptoms of the patient. However some authors hypothesis that destruction of the CA arch by acromioplasy may predispose to loss of active glenohumeral elevation and anterosuperior migration of the humeral head. [28,29] The CA ligament and acromion are secondary stabilizers of the humeral head against anterosuperior migration. [30] An increase in translation of the humeral head supposed to predispose to rotator cuff pathology. Arthroscopic acromioplasty nowadays recommends CA ligament preservation, however, excision of spurring inevitably harvest some CA ligament results in thinning and disruption. [31]

Table 1: Preoperative examinations and functional assessment of all patients and as regard the ASES scoring system data

Variables	Items	Group A (n=30)	Group B (n=30)	P value
Subjective	**Pain (VAS)** Range Median ±SD	6-9 8±0.9	7-9 8 ±0.8	0.553
	ADL (30) Range Median ±SD	10-17 13±2.0	10-17 13±2.2	0.854
Objective	**Range (50)** Range Median ±SD	12-28 19±5.0	12-28 18±4.7	0.672
	Strength (20) Range Median±SD	16-18 16±1.0	16-18 17±1.0	0.800
Total score Range Median ±SD		21.7-48.3 31.8±7.2	21.7-41.7 31.3±4.7	0.724

SD: Standard deviation ***:** P-value < 0.05 (Significant) ****:** P-value < 0.01 (Significant) P-value > 0.05 (Non significant)

Table 2: Comparison between preoperative and post operative in group A

	Preoperative	**Post operative**				
		2 weeks	1 month	3 month	6 month	1 year
Pain (VAS) Range Median ±SD	6-9 8±0.9	1-8 3.0±1.5^{+}	0-7 2.0±1.7^{+}	0-7 1±1.7^{+}	0-6 1±1.7^{+}	0-6 0±1.6^{+}
ADL (30) Range Median ±SD	10-17 13±2.0	15-26 22.5±2.7^{+}	15-27 26±2.2^{+}	17-29 27.5±2.2^{+}	18-30 28±3.0^{+}	18-30 29±2.8^{+}
Range (50) Range Median ±SD	12-28 19±5.0	22-40 35.5±4.6^{+}	20-46 42±5.9^{+}	28-48 44±4.0^{+}	28-50 46±5.4^{+}	30-50 48±5.1^{+}
Strength (20) Range Median ±SD	16-18 16±1.0	16-18 18±0.8^{+}	16-20 18±1.1^{+}	16-20 20±1.1^{+}	16-20 18±1.5^{+}	16-20 18±1.5^{+}
Total score Range Mean ±SD	21.7-48.3 31.8±7.2	36.7-81.7 68.5±11.1^{+}	40-93.3 79.8±12.8^{+}	43.3-96.7 86.2±13.4^{+}	50-100 87.8±12.9^{+}	50-100 92.8±12.4^{+}

Table 3: Comparison between preoperative and post operative in group B

	Preoperative	**Post operative**				
		2 weeks	1 month	3 month	6 month	1 year
Pain (VAS) Range Median ±SD	7-9 8 ±0.8	5-8 6±1.0^{+}	4-8 5±1.1^{+}	2-7 4±1.5^{+}	1-7 2±2.0^{+}	0-6 1±1.9^{+}
ADL (30) Range Median ±SD	10-17 13±2.2	14-26 20±2.9^{+}	17-28 24.5±3.1^{+}	19-29 26±2.6^{+}	21-30 28±2.5^{+}	23-30 29±2.2^{+}
Range (50) Range Median ±SD	12-28 18±4.7	16-44 32±7.0^{+}	26-46 36±5.2^{+}	22-48 43±7.7^{+}	26-50 46±7.7^{+}	30-50 48±6.1^{+}
Strength (20) Range Median ±SD	16-18 17±1.0	16-18 16±1.0^{+}	16-18 16±0.9^{+}	18-18 18±0.0^{+}	18-20 18±0.9^{+}	18-20 18±1.0^{+}
Total score Range Mean ±SD	21.7-41.7 31.3±4.7	35-85.3 54.1±10.7^{+}	40-73.3 62.2±9.5^{+}	48.3-85 72.0±11.0^{+}	50-93.3 82.6±13.4^{+}	58.3-98.3 88.3±12.9^{+}

Table 3: Comparison between group A and group B as regarding total score.

	Time	**Group A (n=30)**	**Group B (n=30)**	**P value**
Total score	**2 weeks** Range Mean±SD	36.7-81.7 68.5±11.1	35-85.3 54.1±10.7	**0.001****
	1 month Range Mean±SD	40-93.3 79.8±12.8	40-73.3 62.2±9.5	**0.001****
	3 months Range Mean±SD	43.3-96.7 86.2±13.4	48.3-85 72.0±11.0	**0.001****
	6 months Range Mean±SD	50-100 87.8±12.9	50-93.3 82.6±13.4	0.130
	1 year Range Mean±SD	50-100 92.8±12.4	58.3-98.3 88.3±12.9	0.167

Conclusion

Our results revealed that arthroscopic acomioplasty for subacromial impingement syndrome were effective and safe than bursectomy alone during the first year after operation then both have equall ressults..

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