RESEARCH ARTICLE

Functional outcome of arthroscopic subacromial decompression in shoulder impingement syndrome

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Abstract

Objective: To assess the outcomes of arthroscopic subacromial decompression in the treatment of shoulder impingement syndrome cases, and to identify patient factors favouring selection for the intervention.

Method: The retrospective study was conducted in the Department of Orthopaedic Surgery, Liaquat National Hospital, Karachi, and comprised data from January 2018 to December 2023 of male and female patients diagnosed with chronic shoulder impingement syndrome with Neer stage 1-III and Bigliani types I-III. Demographic and clinical history as well as Oxford Shoulder Score and Satisfaction Score were noted using a proforma. The scores at baseline were compared with those taken at the 12-month follow-up. Data was analysed using SPSS 25.

Results: Of the 72 patients with mean age 43.24±12.5 years, 49(68%) were female and 23(%32%) were male. There were 60(83.3%) patients with intact rotator cuff, and 12(16.6%) with rotator cuff fibrillation without tear. There was significant improvement at the follow-up compared to baseline shoulder and satisfactions scores (p<0.05). Patients with Bigliani type II or III acromion at baseline showed significantly more improvement than those with type I (p<0.05).

Conclusion: Arthroscopic subacromial decompression provided substantial benefit to patients with shoulder impingement syndrome. However, patient selection for such an intervention was found to be a critical factor.

Keywords: Shoulder impingement syndrome, Arthroscopic subacromial decompression, Oxford Shoulder Score. (JPMA 76: 696; 2026) **DOI: https://doi.org/10.47391/JPMA.22790**

Introduction

Shoulder impingement syndrome (SIS) is one of the chief causes of shoulder disability. Approximately 65% of all shoulder pathologies has association with SIS, leading to disability, pain and decreased function.[1] The pathophysiology of SIS is based on Charles S. Neer, who postulated that the shoulder pain which occurs during the forward flexion of the arm is secondary to abuttment of the anterior part of the rotator cuff tendons against the tip of the acromion, the coracoclavicular ligament or the under-surface of acromioclavicular joint.[2] This mechanical abuttment[3] can be triggered by os-acromiale, Bigliani type III acromion[4] acromioclavicular degeneration, thickening/ossification of coracoacromial ligament, shoulder instability, post-traumatic deformity, supraspinatus hypertrophy and low-lying acromion. All these contribute to the narrowing in the subacromial space that erodes rotator cuff tendons.

Radiologically, the average space between the acromion and the humeral head is 10-15mm[5] and <8mm produces irritation of free-nerve-endings containing substance-P and calcitonin-gene-related peptides, causing characteristic pain.[6] SIS ranges from a spectrum of subacromial bursitis to supraspinatus sprain, and is the first stage in the development of partial to full-thickness rotator cuff tears and arthropathy. Hence, SIS represents the beginning of a huge clinical burden.[7]

Conservative management is the first-line therapy with non-steroidal anti-inflammatory drugs (NSAIDs), neuromodulators, physiotherapy, suprascapular nerve blockade and steroid injections into the subacromial bursa. Surgical treatment of SIS is reserved for patients not responding to conservative management lasting six consecutive months.[7] Neer et al. advocated open anterior acromioplasty where the coracoclavicular ligament is excised.[8] Nowadays, more surgical options are available, including mini-open or arthroscopic approaches, cuff repair and subacromial decompression, and bursal balloon-spacers.[9] So far, there is no specific gold standard SIS treatment, and the treatment is often based on the surgeon's preference. The arthroscopic technique has gained popularity among the surgeons treating SIS in recent decades. Arthroscopic acromioplasty, more commonly called arthroscopic subacromial decompression (ASAD), has shown to have a good outcome and is comparable to open techniques in treating SIS.[10,11] The functional outcome of ASAD in SIS are usually assessed using the Oxford Shoulder Score (OSS)[12] and the Satisfaction Score[13] in developing countries.

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In Pakistan, there persists the ultraconservative approach of non-surgical therapy for SIS, with majority of patients being kept in arm slings with prolonged painkillers and multiple intra-bursal steroid injections.[14] Most of these patients are female, middle-aged housewives with modest financial incomes and low literacy.[14] However, as awareness spreads about arthroscopic interventions, there is a rise of in the number of patients opting for arthroscopy for SIS.[14]

The current study was planned to assess the outcomes of ASAD in SIS treatment, and to identify patient factors favouring selection for such an intervention.

Materials and Methods

The retrospective study was conducted in the Department of Orthopaedic Surgery, Liaquat National Hospital, Karachi, and comprised data from January 2018 to December 2023 of male and female patients aged at last 18 years diagnosed with chronic SIS having Neer stage 1-III and Bigliani type I-III, complaining of persistent symptoms for >6 months despite conservative management. Data was retrieved from the archives after approval from the institutional ethics review committee.

SIS diagnosis had been done clinically and radiologically[15,16] with recording of clinical points, like shoulder pain >3 months, pain provoked by shoulder abduction, positive painful arc sign, positive Neer's test, positive Hawkins Kennedy test, temporary relief with steroid injection, Bigliani acromion morphology on shoulder Y-view X-ray, and radiological evidence of SIS on magnetic resonance imaging (MRI) scan of shoulder. Patients with glenohumeral or acromioclavicular joint arthritis, partial or full thickness rotator cuff tears, biceps tendinopathy, other shoulder pathology (non-impingement related) identified on MRI scan or ultrasound, past surgeries on the affected shoulder, patients having rheumatoid arthritis or any other inflammatory disorder of the joints, symptomatic cervical spine pathology, and septic arthritis were excluded. All inclusive sampling with patients meeting the selection criteria was done. OSS and satisfaction scores[12,13] were recorded preoperatively and at 12-month follow-up.

After taking informed consent in all cases, general anaesthesia was administered with the patient in a beach-chair position. All surgeries were done by three senior surgeons having trained in arthroscopy fellowship. A standard three-portal method (posterior, anterior-superior, and lateral) was used. A diagnostic arthroscopy was performed to assess the subacromial space (loss of subacromial fat-empty fat pad sign), rotator cuff integrity, biceps tendon, labrum, cartilage and glenohumeral ligaments. Neer`s staging of impingement[17] and rotator cuff status (intact or partial tear) were determined intraoperatively. If diagnostic arthroscopic examination revealed any pathology requiring intervention other than ASAD, the patient was excluded, and the required intervention was carried out.

The ASAD procedure consisted of debridement of the entire subacromial bursa (bursectomy), resection of the bony spurs, and projecting antero-lateral under-surface of the acromion, carried out with a shaver, burr and/or electro-coagulation ablator. At the end of the ASAD procedure, a cocktail of bupivacaine, epinephrine and triamcinolone was injected intra-bursal, and the patient was discharged as per routine protocol. Rehabilitation focused on supervised home exercises for joint range of motion (ROM), rotator cuff exercises, deltoid training, and the patient had a consultation with a pain management specialist.

Data was analysed using SPSS 25. Frequencies and percentages were calculated for qualitative variables, while mean and standard deviations were calculated for quantitative variables. Paired T-test and the Friedman test were applied to determine the significance of variation of the score, with post-hoc analysis for pair-wise comparison using Wilcoxon signed rank test. $P<0.05$ was considered statistically significant.

Results

Of the 72 patients with mean age 43.24±7.65 years, 49(68%) were female and 23(%32%) were male. The mean duration of SIS symptoms was 13.4±5.6 months. The right shoulder was affected in 46(63.9%) patients, while the left was affected in 26(36.1%). The acromion was graded as Bigliani type I in 8(11.1%) patients, type II in 41(56.9%) and type III 23(32.0%).

Table-1: Patient demographics (n=72).

	n (%)
Males	23 (32)
Females	49, (68)
Mean Age (years)	43.2±12.5
Right Shoulder	46 (63.9)
Left Shoulder	26 (36.1)
Mean Duration of Pain (months)	13.4±5.6
Mean Active Shoulder Abduction	68.2±21.3^{o}
Steroid Injection	31 (43.1)
Acromion Bigliani Type I	8 (11.1)
Acromion Bigliani Type II	41 (56.9)
Acromion Bigliani Type III	23 (32.0)
Mean Acromio-Humeral Distance (on X-Ray) (mm)	5.6±2.1
Neer`s Stage I (oedema and haemorrhage)	4 (5.6)
Stage II (fibrosis and tendinitis)	56 (77.8)
Stage III (structural changes at the under surface of acromion with rotator cuff fibrillation without tear)	12 (16.6)

Table-2: Comparison of basline and follow-up scores.

	Pre-operative	12 months
Overall OSS	21.1±3.6	43.3±8.5*
Overall Satisfaction Score	16.5±2.5	86.3±11.5*
Bigliani Type I	29.1±5.4	46.6±5.2
Bigliani Type II	22.3±7.2	44.6±4.7*
Bigliani Type III	17.4±6.4	41.3±9.8*

(*p<0.05 using Friedman test/Wilcoxon post-hoc analysis); OSS: Oxford Shoulder Score

There were 60(83.3%) patients with intact rotator cuff, and 12(16.6%) with rotator cuff fibrillation without tear. Neer stage I was noted in 4(5.6%) patients, stage II in 56(77.8%), and stage III in 12(16.6%) (Table 1).

There was significant improvement at the follow-up compared to baseline shoulder and satisfactions scores (p<0.05). Patients with Bigliani type II or III acromion at baseline showed significantly more improvement than those with type I (p<0.05) (Table 2).

Discussion

SIS is a debilitating pathology of the shoulder, and limits activities of daily living (ADLs). The current study demonstrated that ASAD was an effective and reliable procedure for improving short-term functional outcomes in selected patients with primary SIS who had failed to respond to conservative treatment. The finding was comparable to earlier studies.[18] The simple, minimally invasive, day-care procedure led to positive the outcomes and high patient satisfaction in the current study as well as in previous studies.[19] Signorino et al. stated that surgery should be recommended if conservative treatment does not improve symptoms for six months, and reported better results with ASAD than physiotherapy.[20] Lädermann et al. concluded that ASAD produced significantly better results.[21]

In cases with rotator cuff tears, recent studies have advocated the treatment of rotator cuff repair as a separate entity, with poor results when treated with ASAD solely.[22,23] It can be argued that any tear of the rotator cuff should be treated with cuff repair as needed, and that a subacromial decompression was an adjuvant treatment; not an alternative treatment for rotator cuff tears, as expressed in literature.[22,23] In another study evaluating long-term effects of ASAD and the rotator cuff integrity, 78% patients had an intact cuff 15 years after ASAD, and the study favoured the procedure as it could minimise the prevalence of rotator cuff tears in impingement patients.[23] This finding was beyond the scope of the current study which focussed on short-term outcome measurement, which showed that patients with both Bigliani type III acromion and Neer stage III impingement and lower initial scores as well as those with a longer duration of symptoms showed greater improvement in shoulder scores.

The current study did not consider patients' health-related issues, such as diabetes, which are potential factors influencing the overall recovery of patients with surgically treated SIS. As reported earlier, patients with diabetes have a relatively poor outcome due to shoulder disorders compared to those without diabetes.[24]

The present study has several limitations. First, the 12-month follow-up period was relatively short. Second, the sample size was relatively small, and the sample size was not calculated. Third, the study did not assess the impact of comorbidities and lifestyles on outcomes.

Conclusions

ASAD was found to be a beneficial intervention, and it was effective in treating SIS patients without rotator cuff tears. In terms of clinical and functional outcomes, OSS and satisfaction scores revealed significant improvement in patients' outcomes over the period of one year.

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Conflict of Interest: None.

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Author Contribution:

TKD: Methodology, data compiling, analysis, formatting and abstract writing.
SA: Literature search, introduction, methodology and data compiling.
MS: Data collection and analysis.
MK: Data collection, results and conclusion.
SMS: Data collection, methodology and drafting.
SSN: Result compilation, data analysis, literature search and methodology.