Arthroscopic subacromial decompression for stage-II impingement

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ABSTRACT

Purpose. To evaluate outcomes of arthroscopic subacromial decompression for stage-II impingement.

Methods. Records of 42 consecutive patients with stage-II impingement treated by arthroscopic subacromial decompression from January 2000 to February 2002 were reviewed. Clinical outcomes were measured using the UCLA shoulder rating scale, and radiological outcomes using anteroposterior and supraspinatus outlet shoulder radiographs.

Results. The mean follow-up period was 14.6 (range, 12–30) months. Using the UCLA scale, 14 (33%) patients had an excellent result, 21 (50%) had a good result, 4 (10%) had a fair result, and 3 (7%) had a poor result. Mean component scores for the UCLA scale were: 8.0 for pain, 8.8 for function, 4.5 for forward flexion, and 4.5 for strength. The mean extent of resection was 2.9 mm in the anteroposterior and 2.0 mm in the supraspinatus outlet radiographs. There was no correlation between the extent of acromial resection and the UCLA shoulder rating scores.

Conclusion. Short-term results of arthroscopic subacromial decompression for stage-II impingement are favourable.

Key words: acromion; arthroscopy; Asian continental ancestry group; rotator cuff; shoulder impingement syndrome

INTRODUCTION

Subacromial impingement is a common cause of recurrent shoulder pain and disability. Neer described subacromial impingement as a distinct clinical entity, in which the rotator cuff was impinged upon by the anterior one-third of the acromion, coracoacromial ligament, and acromioclavicular joint. The portion of the rotator cuff being impinged upon was the insertion of the supraspinatus tendon on the greater tuberosity. The ensuing formation of spurs in the substance of the coracoacromial ligament leads to chronic wear and tear of the rotator cuff.
Neer divided subacromial impingement into 3 stages. Stage I consisted of oedema and haemorrhage, usually encountered in patients aged <25 years. Stage II consisted of fibrosis and tendonitis from repeated mechanical irritation, noted in persons aged 25 to 40 years. Stage III consisted of complete rotator cuff tear.

Anterior acromioplasty was widely accepted as the treatment. It involved debridement of the inflamed subacromial bursa, resection of the coracoacromial ligament (and any spurs), anteroinferior acromion, and overhanging osteophytes from the acromioclavicular joint. Complications and unsatisfactory results could occur when acromial resection was excessive. Arthroscopic subacromial decompression was an alternative, which produced results comparable to the open procedure. No correlation was found between the extent of acromial resection and improvement of Constant’s score.

We aimed to describe our results following arthroscopic subacromial decompression for stage-II impingement, and to determine whether the extent of acromial resection was associated with specific outcomes.

MATERIALS AND METHODS

Records of 46 patients who underwent arthroscopic subacromial decompression for stage-II impingement between January 2000 and February 2002 were evaluated. Indications for surgery were: (1) positive impingement signs, and (2) unimproved pain after a course of conservative treatment comprising rest, physiotherapy, non-steroidal anti-inflammatory medications, and steroid injections into the subacromial space. Four patients with a completely torn rotator cuff (found intra-operatively) were excluded because they had poorer results and formed a separate group, unlike patients with either an intact or partially torn cuff.

The remaining 42 patients (27 men, 15 women) aged 38 to 76 (mean, 50) years had a mean duration of pain for 12.4 (range, 3–96) months, a mean duration of conservative treatment for 4.6 (range, 2–16) months, and a mean number of triamcinolone injections of 1.2 (range, 0–3). 33 (79%) of the patients had intact rotator cuffs, while in 9 (21%) there was a partial tear. Such tears were detected by preoperative ultrasound scans and confirmed intra-operatively by direct arthroscopic visualisation.

Clinical tests were performed to exclude other concomitant shoulder pathologies, such as glenohumeral instability, superior labral anteroposterior lesions (O’Brien test), and acromioclavicular joint disorders (cross-arm adduction test). Radiological assessments were made using anteroposterior and supraspinatus outlet radiographs, taken by a single radiographer and measured by a single observer. Care was taken to minimise variations in the distance between the X-ray tube and shoulders, so as to achieve similar magnification and to allow comparisons of acromiohumeral distances (Fig.). Patients were classified by acromial morphology.

Surgery was performed with the patient under general anaesthesia and in the lateral position with the arm suspended in 45° of abduction and 15° of forward flexion with ≤10 pounds of continuous traction. The bony landmarks were marked with a skin marker and anterior and anterolateral portals created. The glenohumeral joint was inspected through the posterior portal and the anterolateral portal was used for working tools. Surgery consisted of debridement of partial cuff tears, resection of the subacromial bursa, anterior acromioplasty with a high-speed Burr (removal of the anterior 1 cm of the acromion, and thinning of the inferior acromion an additional 2 cm posteriorly). Removal of the anterior acromial hook was also carried out, if present, to convert a type 3 acromion into a type 1. Regional anaesthesia was not routinely used for postoperative pain management. Patients were given parenteral opioids and oral non-steroidal analgesics for pain control. Most patients were discharged one day after surgery. Rehabilitation consisted of active range-of-movement exercises as tolerated.

Postoperative assessment was performed at a mean of 14.6 (range, 12–30) months using the UCLA shoulder rating scale. Pain and function were each
rated on a scale of one to 10, whereas active range of movement, strength, and patient satisfaction were rated on a scale of one to 5; one was the worst score. The maximum score was 35; results were graded as satisfactory if they were excellent [34–35 points] or good [28–33 points] and unsatisfactory if they were fair [21–27 points] or poor [0–20 points]. Radiological glenohumeral distances and acromial morphology were measured again postoperatively.

The mean preoperative and postoperative acromiohumeral distances in each view were analysed using the paired t-test. The Spearman’s correlation coefficient for nonparametric variables was used to determine correlation between the extent of acromial resection and the UCLA score. p Values below 0.05 were considered statistically significant.

### RESULTS

Preoperatively, 12% of the patients had a type-2 and 88% had a type-3 acromion. Postoperatively, 93% of the patients had a type-1, 2% a type-2, and 5% a type-3 acromion. The mean duration off work was 23 days and the mean time till return to normal activities was 4.2 months. Using the UCLA rating scale, 14 (33%) of the patients had an excellent and 21 (50%) had a good result. Whereas 4 (10%) had a fair and 3 (7%) had a poor result. Thus, the ratio of satisfactory to unsatisfactory results was 83% to 17%. The mean component scores for the UCLA scale were: 8.0 for pain, 8.8 for function, 4.5 for forward flexion, and 4.5 for strength. 85% of patients with no rotator cuff tear and 78% of those with a partial tear had satisfactory outcomes.

Preoperatively, the mean acromiohumeral distance in the anteroposterior view was 7.9 (range, 6–12) mm, and 8.2 (range, 4–11) mm in the supraspinatus outlet view. Postoperatively, corresponding mean distances were 10.8 (range, 7–15) mm and 10.2 (range, 6–14) mm. The corresponding mean extent of resection was 2.9 mm and 2.0 mm. The differences between mean preoperative and postoperative acromiohumeral distances in both views were statistically significant (p<0.05, Table). There was no correlation between the extent of acromial resection and the UCLA shoulder rating score. However, our sample size may have been too small to detect a statistically significant difference.

There were 2 complications. A 68-year-old woman developed a shoulder sinus at the portal site; cultures of the discharge were sterile and the sinus healed after 3 weeks of dressings. A 53-year-old man developed adhesive capsulitis; following intensive physical therapy, almost full active range of shoulder movement was regained within 6 months.

### DISCUSSION

Our results compare favourably with previous reports; 85% of patients with no rotator cuff tear were deemed satisfactory, compared to 81 to 100% in other studies. \(^3\)\(^–\)\(^7\) 78% of our patients with a partial cuff tear had satisfactory results, compared to 66 to 93% reported by others. \(^3\)\(^–\)\(^7\),\(^10\),\(^12\)

The ideal extent of acromial resection is unknown, but dimensions (depth by length) of 0.9x2.0 cm and 1x1 cm have been recommended. \(^3\),\(^4\) Most of our patients had conversion of acromial morphology from types 3 and 2 to type 1.

Three structures determine the pathogenesis of subacromial impingement: the anterior acromion, coracoacromial ligament, and thickened subacromial bursa. As there was no correlation between the extent of bone resection and outcome (based on the UCLA shoulder rating scale), the 2 other structures may be more crucial.

Although our study was retrospective and entailed only level-4 evidence, it provides information on outcomes to expect from surgery and our results compared favourably with those described in previous reports on arthroscopic subacromial decompression. Further studies are planned to more accurately measure the extent of bone resection, using computed tomographic scans.

### Table

Comparison of acromiohumeral distances in the anteroposterior and supraspinatus outlet radiographs

<table>
<thead>
<tr>
<th>Acromiohumeral distance</th>
<th>Anteroposterior view</th>
<th>Supraspinatus outlet view</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean preoperative (range) [mm]</td>
<td>7.9 (6–12)</td>
<td>8.2 (4–11)</td>
</tr>
<tr>
<td>Mean postoperative (range) [mm]</td>
<td>10.8 (7–15)</td>
<td>10.2 (6–14)</td>
</tr>
<tr>
<td>Mean amount of resection (mm)</td>
<td>2.9*</td>
<td>2.0*</td>
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</tbody>
</table>

* p<0.05
REFERENCES