ARTROSCOPIC SUBACROMIAL DECOMPRESSION

Ivica Medenica, Milan Luković, Srdjan Starčević, and Dragan Madžarac
Clinic for Orthopaedics and Traumatology, Military Medical Academy Belgrade, Serbia

ARTROSKOPSKA SUBAKROMIJALNA DEKOMPRESIJA

Ivica Medenica, Milan Luković, Srdjan Starčević, i Dragan Madžarac
Klinika za ortopediju i traumatologiju, Vojnomedicinska akademija Beograd, Srbija

Received/Primljen: 07. 05. 2007. Accepted/Prihvaćen: 21. 09. 2007.

ABSTRACT

Arthroscopic subacromial decompression (ASD) is frequent operation on shoulder joint. Acromioplasty or subacromial decompression is operative technique for removal of mechanical barrier, which restricts physiological motion of humeral head, during abduction and external rotation movements of shoulder joint. This article explains a technique of arthroscopic subacromial decompression and our results during the three years of study. The research was conducted at Clinic for Orthopaedics and Traumatology Military Medical Academy Belgrade during the period from January, 1st 1999 until December, 31st 2003. Forty six patients were diagnosed clinically and confirmed radiographically and ultrasonographically. These results show valuable effects of arthroscopic subacromial decompression (15).

Key words: arthroscopy, shoulder, decompression, surgery

INTRODUCTION

Acromioplasty or subacromial decompression is operative technique for removal of mechanical barrier, which restricts physiological motion of humeral head, during abduction and external rotation movements of shoulder joint. Arthroscopic subacromial decompression is one of the most frequent procedures in shoulder surgery. Technique was developed as a modification of open acromioplasty, which was first described by Neer (1, 2), Hawkins etc. (3, 4), Rockwood (5) and Bigliani (6). Mechanical barrier is lower and internal part of acromion, precisely the top of the acromion. During motions of abduction and external rotation, major tubercle of humerus colides with acromion and produces impingement. For orthopaedic surgeon involved in dealing with this problem, knowledge of coracoclavicular anatomy is very important.

Bone structures in this region are acromion, acromioclavicular joint, coracoid processus and major tubercle of humerus. Shape and contour of lower surface of acromion can be visualised radiographically at Neer supraspinatus view (Figure 1). Bigliani etc. (6) described tree types of acromion : Type 1-flat like, Type 2-curved and Type 3-hooked. The latter is very often connected with rotator cuff tear. The drugs were used in approved indications and dose regimens. Participation in the study was completely voluntary, according to Helsinki declaration ethical code

SAŽETAK


Ključne reči: arhomijska, rame, dekompresija, hirurška

These are all indication for subacromial decompression (7) and resection of ligament and acromion.

PATIENTS AND METHODS

Study design and patients

The study was prospective, interventional, uncontrolled and open-labeled. It was conducted at Clinic for Orthopedics and Traumatology, Military Medical Academy during the period from January, 1st 1999 until December, 31st 2003. Forty six patients were diagnosed clinically and confirmed radiographically and ultrasonographically to have shoulder injury. We set indications for operative treatment: 1) Subjective discomfort of the patients-pain, inability of carrying out daily routines 2) Objective findings-clinical evaluation-reduction of movements in all directions, especially of external rotation and abduction 3) Changes by at RTG, ultrasound, MRI or MSCT

In this way we set correct indications for treatment, and postoperative results are in the same rank as the results of other authors.

We measured the range of the movements of patients with angle-meter with arms and with gravity angle-meter. The patients’ pain was measured according to the LIKERT scale and according to the Visual Analogy Scale (VAS) (15).

Indications for arthroscopic subacromial decompression are acromion Type 2 and 3, as well as calcification of coracoclavicular ligament and tendo m. supraspinatus

The patients were operated with subacromial decompression, acromioplasty and bursectomy. It means that treatment allocation of studied subjects was only governed by usual clinical practice criteria, not by subject study status. The drugs were used in approved indications and dose regimens. Participation in the study was completely voluntary, according to Helsinki declaration ethical code
and formal IRB/EC approval of study protocol, therefore, was considered unnecessary.

The research included 46 patients operated with subacromial decompression with acromioplasty and bursectomy. There were 16 male patients, and 30 female patients. Shoulder injury of dominant arm was found at 32 patients (69.6%) and non-dominant at 14 patients (40.4%). Right arm was operated at 34 patients (73.9%), and left arm at 12 patients (26.1). Average age was 56 years (36-65).

All patients started with physical therapy on third postoperative day. Exercises included muscular strengthening and improving full range of movement capability.

Operative technique

Absolute and relative indications, together with preoperative patient care are of importance for procedure of acromioplasty. One of the most frequent problems in approaching the subacromial space, is very narrow subacromial space. Bleeding from arterial vessels can change visual settings, which is very difficult for surgeon. Precise operative technique must be followed to exclude complications and other hazards during procedure. Controlled blood pressure under 100 mm Hg is necessity, provided by experienced anaesthesiologist.

Patients were operated in lateral decubital position, lying at their uninjured side, with injured arm abducted by 30 degrees, with anteflected 10-20 degrees and then applied traction. Patient is leaned back to 25 to 30 degrees, in such a manner that a glenoid surface is parallel with a horizontal parameter (e.g., operating table, floor). Anatomical landmarks are marked to precisely introduce trocar. Posterior portal is usually used for arthroscopic camera, and lateral portal for instruments for decompression. Position for lateral portal were 3.5 cm lateral from acromion in line with arm axis.

Statistics

The study data were analyzed by the methods of descriptive statistics and hypothesis testing (8). The nature of recorded data determined the use of parametric or nonparametric methods. Hypothesis testing was done in two-sided procedure, where the level of statistic significance was established at $p \leq 0.05$.

RESULTS

During the period from January, 1st 1999 until December, 31st 2003, we performed arthroscopic subacromial decompression with arthroplasty and bursectomy at 46 patients. There were no postoperative complications.

These results show valuable effects of arthroscopic subacromial decompression.

Results of our work are shown in the table 1 and figure 1-6.

Table 1. Results of subacromial decompression.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>1 month</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
<th>24 months</th>
<th>36 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without improvement</td>
<td>4 (8.70%)</td>
<td>3 (6.52%)</td>
<td>3 (6.52%)</td>
<td>2 (4.35%)</td>
<td>1 (2.17%)</td>
<td>1 (2.17%)</td>
</tr>
<tr>
<td>Improvement motion with some pain and minimal restrictions of shoulder function</td>
<td>19 (41.30%)</td>
<td>15 (32.60%)</td>
<td>13 (28.26%)</td>
<td>11 (23.91%)</td>
<td>8 (17.39%)</td>
<td>8 (17.39%)</td>
</tr>
<tr>
<td>Improvement of motion without pain and full recovery of function</td>
<td>23 (50%)</td>
<td>28 (60.87%)</td>
<td>30 (65.21%)</td>
<td>33 (71.74%)</td>
<td>37 (80.43%)</td>
<td>37 (80.43%)</td>
</tr>
<tr>
<td>Total</td>
<td>46 (100%)</td>
<td>46 (100%)</td>
<td>46 (100%)</td>
<td>46 (100%)</td>
<td>46 (100%)</td>
<td>46 (100%)</td>
</tr>
</tbody>
</table>

Figure 1. Outcome after 1 month

Figure 2. Outcome after 3 months
Outcomes after 6 months.

| 1. Without Improvement, 3 (6.52%) | 2. Improvement Motion with Some Pain and Minimal Restrictions of Shoulder Function, 13 (28.26%) | 3. Improvement of Motion without Pain and Full Recovery of Function, 30 (65.21%) |

| 1. Without Improvement, 2 (4.35%) | 2. Improvement Motion with Some Pain and Minimal Restrictions of Shoulder Function, 11 (23.91%) | 3. Improvement of Motion without Pain and Full Recovery of Function, 33 (71.74%) |

| 1. Without Improvement, 1 (2.11%) | 2. Improvement Motion with Some Pain and Minimal Restrictions of Shoulder Function, 8 (17.39%) | 3. Improvement of Motion without Pain and Full Recovery of Function, 37 (85.42%) |

| 1. Without Improvement, 1 (2.11%) | 2. Improvement Motion with Some Pain and Minimal Restrictions of Shoulder Function, 8 (17.39%) | 3. Improvement of Motion without Pain and Full Recovery of Function, 37 (85.42%) |

No improvement was noted in 1 (2.17%) patient, motion improvement with some pain and minimal restrictions of shoulder function at 8 (17.39%) and motion improvement without pain and full recovery of function at 37 (80.43%) studied subjects.

After the first month there was no improvement at 4 (8.70%) patients, motion improvement with some pain and minimal restrictions of shoulder function at 19 (41.30%), and motion improvement without pain and full recovery of function at 23 (50%) patients.

In the third month there was no improvement at 3 (6.52%) patients, motion improvement with some pain and minimal restrictions of shoulder function at 15 (32.60%) patients and motion improvement without pain and full recovery of function at 28 (60.87%) patients.

In the sixth month there was no improvement at 3 (6.52%) patients, motion improvement with some pain and minimal restrictions of shoulder function at 13 (28.26%) patients, and motion improvement without pain and full recovery of function at 30 (65.21%) patients.

One year after the operation there was no improvement at 2 (4.35%) patients, motion improvement with some pain and minimal restrictions of shoulder function at 11 (23.91%) patients, and motion improvement without pain and full recovery of function at 33 (71.74%) patients.

Two years after the operation there was no improvement at 1 (2.17%) patients, motion improvement with some pain and minimal restrictions of shoulder function at 8 (17.39%) patients and motion improvement without pain and full recovery of function at 37 (80.43%) patients.

Three years after the operation there was no difference in results comparing to the second year.

**DISCUSSION**

Shoulder pain with restriction of movement and impaired working capability is common complaint in working population. Treatment is initially nonoperative, with rest, nonsteroid antiinflammatory medications and physical therapy (14). Operative procedures are reserved for cases unresponsive on above mentioned therapy, but with absolute and relative indications. Arthroscopic subacromial decompression is very effective procedure in treating impingement syndrome, and with very good results regarding relief of pain, return of normal activities and decreasing costs of treatment, hospital stay and rehabilitation. This affects working abilities of this specific population of patients and their fast return to work.

The absolute and relative indication for acromioplasty as well as preoperative preparation and selection of patients are of utmost importance for successfull procedure. Pain during motion above head, external rotation and pain during throwing are dominant symptoms. The unexplained night pain is very important as specific symptom of subacromial impingement (13) Indications for arthroscopic subacromial decompression are acromion Type 2 and 3, as well as calcification of coracoacromial ligament and teno m. supraspinatus.

Advantages of arthroscopic procedure in comparion to open procedures are: a) lesser destruction of soft tissue and deltoid muscle, b) faster and more efficient rehabilitation, c) inspection of bursal and articular side of rotator cuff as well as inspection of shoulder joint, d) possibility to continue with other procedures during arthroscopic
decompression if necessary: distal resection of clavicula, rotator cuff reparation, c) estetic improvement, f) lower cost of operation (one-day surgery).

Relative contraindications for this procedure are: a) rotator cuff tear at young patients, associated with instability and secondary impingement, at patients with false impingement, and in patients with isolated acromioclavicular pathology, b) preservation of anterior part of acromion and of deltoid muscle, c) use of coaguration or VAPR for control of bleeding as well as monitoring of arterial blood pressure and suitable arthropump pressure.

The first arthroscopic procedure of arthroscopic subacromial decompression was described in 1986 by Johnson (9). Ellman (10) was first to present mid-term follow up study, and he showed benefits and advantages of arthroscopic acromioplasty in comparison with open procedures. Esch et al. (11) in their study presented results of acromioplasty at patients with conjoined rotator cuff tears. Paulos and Franklin (12) in their article showed results with 80 cases, using midlateral approach. All of the above authors used posterior portal for visualisation.

In our work we used cases without rotator cuff tears. In comparison with the results of other authors who used the arthroscopic method, Johnson (9), Ellman (10), Paulos and Franklin (12) our results are identical concerning the subjective findings-reduction of pain and turning to normal daily functioning.

We used UCLA shoulder rating scale and VAS in order to compare results with the results of the other authors (9,10,12,15).

As for the clinical-objective findings, our results are up to 10 % better concerning the increase of external rotation motion with abduction, and improvements in UCLA shoulder rating scale and VAS scale (9,10,12,15).

These results show valuable effects of arthroscopic subacromial decompression.

REFERENCES


