TREATMENT OF ADVANCED IMPINGEMENT SYNDROME BY ARTHROSCOPIC SUBACROMIAL DECOMPRESSION

D. PETRÉ, O. VERBORGT, F. VANGLABBEEK, J. VERSTREKEN

The authors report a prospective study on 40 patients to investigate shoulder function after arthroscopic subacromial decompression for advanced impingement syndrome (stage II) using a posterolateral and a posteromedial portal. There were no intraoperative or postoperative complications related to the use of these portals. All patients were assessed preoperatively and at 6 months postoperatively using the Constant-Murley Score and the revised ASES Score. Before operation the mean Constant-Murley Score was 49.3. This improved to 78.2 at 6 months postoperatively ($p < 0.0001$). The ASES score improved from 35.6 preoperatively to 80.6 at 6 months postoperatively ($p < 0.0001$). Patient satisfaction, reflected by the affirmation that they would have the same operation again, was 85%. Comparison between the scoring systems using the Spearman rank correlation coefficient revealed a good correlation between the Constant-Murley score and the modified ASES score. The Spearman rank correlation coefficient for the pre- and postoperative scores was 0.995. ($p < 0.0001$).

Keywords : shoulder ; subacromial impingement ; decompression.
Mots-clés : épaule ; conflit sous-acromial ; acromioplastie.

INTRODUCTION

Since the classic work of Neer (11-13) the anterior part of the acromion has been recognized as an important cause of impingement of the rotator cuff. Since then anterior acromioplasty has been the standard surgical procedure for stage II disease refractory to conservative treatment. In the 1980's Ellman (6) popularized arthroscopic subacromial decompression as a method of anterior acromioplasty. Although some authors still favor open subacromial decompression (19), the arthroscopic technique has been proved to yield satisfactory results (10, 15, 25).

Most publications report on the treatment results of a mix of pathological conditions. We aim to prospectively follow shoulder function after arthroscopic subacromial decompression for the treatment of advanced impingement syndrome. Instead of a posterior-viewing portal and a lateral working portal we use a posterolateral-viewing portal and a posteromedial-working portal. Since we use two scoring systems, we will also evaluate the correlation between these scoring systems.

PATIENTS AND METHODS

Patient selection

A prospective study was established to investigate shoulder function after arthroscopic subacromial decompression for advanced impingement syndrome using a posterolateral-viewing portal and a posteromedial-working portal. Between September 1996 and May 1997 we preoperatively examined all patients who were scheduled to have arthroscopic subacromial decompression at our institution. The same author (FVG) operated all patients. All patients were scheduled for surgery after failure of conservative treatment for at

Department of Orthopaedic Surgery, University Hospital of Antwerp, Edegem, Belgium.
Correspondence and reprints : Dirk Petré, Dienst Orthopedie, Universitair Ziekenhuis Antwerpen, Wilrijkstraat 10, 2650 Edegem, Belgium.

least six months. Conservative treatment consists of anti-inflammatory medication, steroid injections and physiotherapy. All patients were examined by the same author (DP) according to the examination protocol of the Research Committee of the American Shoulder and Elbow Surgeons, and all shoulders were scored using the Constant-Murley score (4) and the ASES score (18). Only patients with an arthroscopically-proven impingement without a tear of the cuff were enrolled in this study. Exclusion criteria were previous surgery on the same shoulder, shoulder instability, biceps tendon rupture, cervical spine disease and acromioclavicular degenerative joint disease. Finally 40 patients met the inclusion criteria.

Operative technique

An interscalene nerve block with bupivacaine was given to provide postoperative pain control. After endotracheal anesthesia the patient was placed in the lateral decubitus position and tilted 30° posteriorly. Between 4 and 5 kg of skin traction was applied to the arm, which was placed in 20° of abduction and slight forward flexion (7). The arthroscope was placed through a standard posterolateral portal in the "soft spot" to inspect the glenohumeral joint and the undersurface of the cuff. Through the same skin incision we placed the scope into the subacromial space. After inspection of the subacromial space we made a posteromedial working portal. This portal was 5 cm more medial to the posterolateral portal and 4 cm inferior to the spine of the scapula (5). A motorized soft-tissue resector was placed through this posteromedial portal to remove adhesions and soft tissues on the undersurface of the acromion. First we released the coracoacromial ligament by resecting its bony attachment to the acromion, which reduces bleeding (3). Then we turned to the subacromial decompression. To perform an adequate decompression we used the posterior aspect of the acromion as a cutting block to guide the resection of the anterior acromion bone wedge (23). Acromioplasty was performed using an olive-shaped acromioplasty burr. Spurs on the undersurface of the AC-joint could easily be resected since the posteromedial portal is in line with this joint. After decompression an upbite punch was used to excise remnants of the coracoacromial ligament.

After the operation, the patient used a sling for comfort. Patients were encouraged to use their arm as soon as possible. All patients began a program of shoulder rehabilitation. (17, 26)

RESULTS

Forty patients met the inclusion criteria. There were 25 women and 15 men, and mean age was 50.5 years (range 32 to 69 years). The mean duration of symptoms was 21.9 months (range 6 to 84 months). The dominant side was affected in 30 patients. Fourteen patients reported overhead activities during their job as a cause for their shoulder problems. Three patients were involved in overhead sports.

There were no intraoperative or postoperative complications related to the use of the posteromedial working portal.

The postoperative Constant score at six months was excellent (91-100) for four patients (10%), good (81-90) for seventeen patients (43%), fair (71-80) for fourteen patients (35%) and poor (-70) for five patients (12%). Thirty-four (85%) of the patients were satisfied with the outcome and would have the same surgery again.

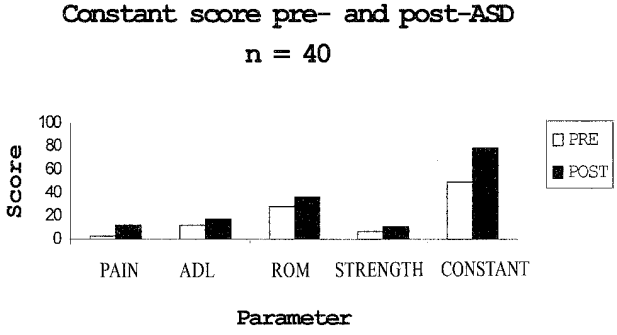


Fig. 1. — Constant score and all of its parameters preoperatively and 6 months postoperatively.

We used the Wilcoxon matched-pairs signed-ranks test to evaluate our scores. The preoperative score was 49.3 points. This improved to 78.2 points at six months ($p < 0.0001$) (Fig. 1). We also looked at the improvement of the different components of the Constant Score (pain, ADL activities, ROM, strength). The score for pain improved from 2.6 points preoperatively to 12.1 points at six months ($p < 0.0001$). The score for ADL activities improved from 11.6 to 17.9 ($p < 0.0001$). The score for range of motion improved from 28.1 to 36.5 ($p < 0.0001$). The score for strength improved from 6.9 to 11.2 ($p < 0.0001$). Most improvement was obtained for

relief of pain and recuperation of movement and ADL activities. Improvement was less impressive for the recovery of strength.

The ASES score was 35.6 preoperatively. This score improved to 80.6 postoperatively ($p < 0.0001$) (Fig. 2). We also looked at the different components of the ASES score (pain, ADL activities). The score for pain improved from 16.6 preoperatively to 39.8 at six months ($p < 0.0001$). The score for ADL activities improved from 19.0 to 40.9 ($p < 0.0001$).

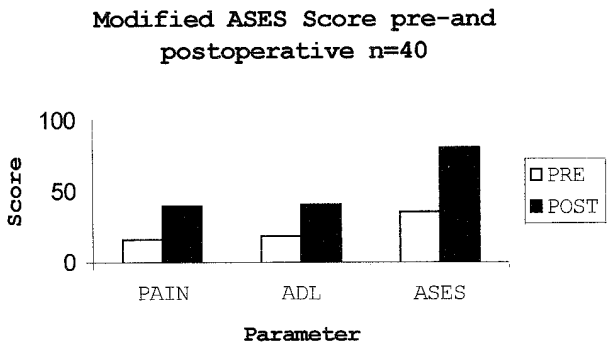
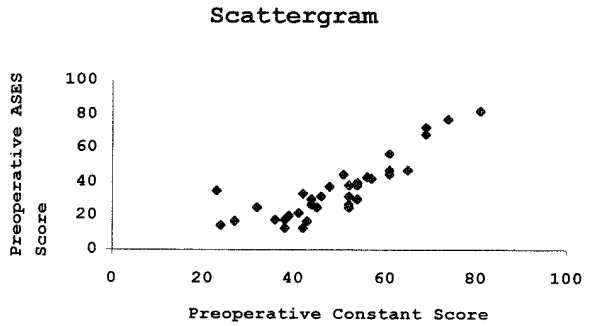


Fig. 2. — Modified ASES score preoperatively and six months postoperatively.

The correlation between the Constant-Murley score and the modified American Shoulder and Elbow Surgeons' score was assessed using the Spearman rank correlation coefficient. The correlation coefficient for the preoperative scores was $rS = 0.871$. ($p < 0.0001$) (Fig. 3). The correlation coefficient for the postoperative scores was $rS = 0.847$ ($p < 0.0001$) (Fig. 4). The correlation between the combined pre-and postoperative scores was $rS = 0.995$ ($p < 0.0001$) (Fig. 5).

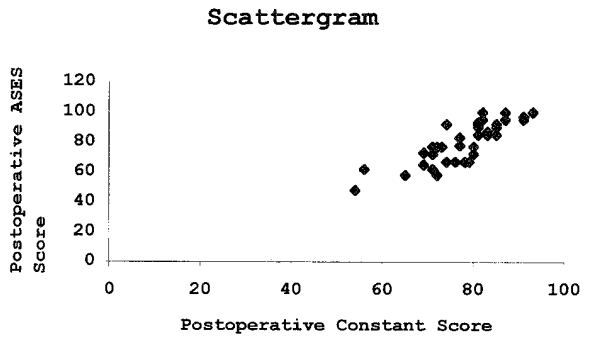
DISCUSSION

Arthroscopic subacromial decompression is the treatment of choice for refractory stage II rotator cuff impingement, as it has become a less invasive technique with a predictable outcome (2). Most surgeons use a posterior viewing and a lateral working portal for subacromial decompression. In 1989 Declercq started using a posteromedial working portal, which had never been described before (Declercq, personal communication). He developed this portal because its use provided easier



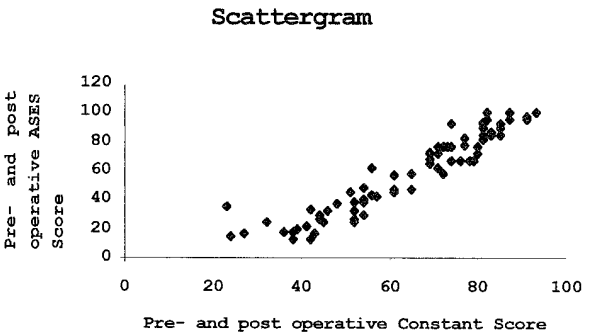
N=40 rS=0.8713 95%CI=0.7683 to 0.9303 t=10.9450
df=38 $p < 0.0001$

Fig. 3. — Spearman rank correlation coefficient for the preoperative scores.



N=40 rS=0.8470 95%CI=0.7274 to 0.9166 t=9.824
df=38 $p < 0.0001$

Fig. 4. — Spearman rank correlation coefficient for the postoperative scores.



N=80 rS=0.995 95%CI=0.7683 to 0.9303 t=10.9450
df=38 $p < 0.0001$

Fig. 5. — Spearman rank correlation coefficient for the combined pre- and postoperative scores.

triangulation, and there were no problems with grooving deeply the undersurface of the acromion as was the case, albeit infrequently, with the lateral portal (Declercq, personal communication). Declercq never reported intra- or postoperative complications related to damage to the axillary nerve or suprascapular nerve. The axillary nerve is located far out of the way, and the suprascapular nerve is protected by the rotator cuff (5). After the subacromial decompression the same portals can be used for arthroscopic excision arthroplasty of the acromio-clavicular joint. Resection of the distal end of the clavicle can be done nicely through the posteromedial portal because it is in line with the AC-joint.

In our study population there were no intraoperative or postoperative complications related to the use of the posteromedial working portal. At six months follow-up we had a significant increase in both the preoperative Constant score and modified ASES score. Patient satisfaction six months postoperatively was as high as 85%.

Speer *et al.* reported on 25 shoulders in 24 patients with advanced impingement syndrome and no rotator cuff tear. They noted a 90% patient-satisfaction rate after 20.3 months (24). Esch *et al.* reported on 11 patients with stage II disease and no cuff tear. Of the 11 patients, 9 were satisfied with the subacromial decompression. Those 9 patients had a UCLA score of at least 28 points (8). Gartsman performed arthroscopic subacromial decompression in 89 shoulders. At a minimal follow-up of 2 years the preoperative ratings for pain, activities of daily living, work and sports improved markedly in 81 patients (9). Ryu reported on arthroscopic subacromial decompression of seven patients with impingement syndrome with no cuff tear. Six patients improved significantly after 12 months' follow-up (22). Olsewski *et al.* reported on arthroscopic subacromial decompression of 27 patients with impingement without a cuff tear. After a two-year follow-up the postoperative ratings improved in 22 patients to an 81% satisfactory result rate (16). Roye *et al.* reported on arthroscopic subacromial decompression of 47 shoulders with impingement without a cuff tear. After an average follow-up of 41 months, 37 results were satisfactory (21).

Since our results are not as good as those reported by other authors some points derived from our data deserve emphasis. The mean age of our study population was 50.5 years, so our study population is older and patients might have more chronic impingement lesions. Therefore the results of this study may not be comparable to those in patients at a younger age with a more acute onset of symptoms. Secondly, our postoperative follow-up was six months. Nutton *et al.* showed a postoperative improvement up to twelve months (15). Therefore with longer follow-up our results may still improve. In addition this study was designed to minimize variability in operative technique and postoperative rehabilitation. Last, we used the Constant-Murley score for postoperative evaluation. Most other authors use the UCLA score, which gives far better results for a certain patient group than other scoring systems (20). Furthermore we did not used age specific values for the Constant score.

To prove the reliability of the Constant score we calculated the correlation with the modified ASES score. The latter represents an attempt by the American Shoulder and Elbow Surgeons to propose a standard scoring system on expert consensus. It has been proven to be a reliable scoring system (2). The correlation between the two scoring systems was very good as the combined pre- and postoperative scores had a correlation coefficient of 0.995. This is very good, as a correlation coefficient of 1.0 means perfect correlation.

In conclusion, arthroscopic subacromial decompression is a safe and reliable technique for the treatment of advanced impingement syndrome even if one uses a posterolateral viewing portal and posteromedial working portal. Most patients have a significant improvement after six months. The Constant score seems to be as reliable as the modified ASES score in assessing patients with impingement syndromes.

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SAMENVATTING

D. PETRÉ, O. VERBORGT, F. VANGLABBEEK, J. VERSTREKEN. Behandeling van subacromiale impingement door arthroscopische decompressie.

De auteurs melden een prospectieve studie van 40 patiënten met stadium II impingement behandeld met arthroscopische subacromiale decompressie via posterolaterale en posteromediale toegansweg. Er waren geen complicaties door deze toegangswegen. Alle patiënten werden preoperatief en na 6 maanden geëvalueerd met de Constant-Murley score en de ASES score. De Constant score verbeterde van 49,3 preoperatief tot 78,2 postoperatief ($p < 0,0001$). De ASES score evolueerde van 35,6 naar 80,6 ($p < 0,0001$). De patiënt gebonden bevrediging was 85%. De correlatie tussen de Constant en de ASES score was hoog (Spearman rank correlation = 0,995 ; $p < 0,0001$).

RÉSUMÉ

D. PETRÉ, O. VERBORGT, F. VANGLABBEEK, J. VERSTREKEN. Traitement du conflit sous-acromial évolué par décompression arthroscopique.

Les auteurs présentent les résultats d'une étude prospective réalisée chez 40 patients pour évaluer la fonction de l'épaule après décompression arthroscopique de l'espace sous-acromial pour conflit évolué (stade II), en utilisant des points d'entrée postéro-latéral et postéro-médial. Ils n'ont observé aucune complication per- ou postopératoire en rapport avec l'utilisation de ces voies d'entrée. Tous les patients ont été évalués avant et six mois après l'opération au moyen du score de Constant-Murley et du score ASES modifié. En préopératoire, le score de Constant-Murley était en moyenne de 49,3 ; cette valeur est passée à 78,2 six mois après l'intervention ($p < 0,0001$). Le score ASES est passé de 35,6 en préopératoire à 80,6 six mois après l'intervention ($p < 0,0001$). Quatre-vingt cinq pour-cent des patients étaient satisfaits et seraient disposés à subir à nouveau la même opération. La comparaison des systèmes d'évaluation au moyen du coefficient de corrélation de Spearman a montré une bonne corrélation entre le score de Constant-Murley et le score ASES modifié. Le coefficient de corrélation de Spearman, pour les scores pré- et post-opératoires, était de 0,995 ($p < 0,0001$).