Arthrolysis of the shoulder for ruptures of the rotator cuff

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Accepted: 2 October 1996

Summary. *Complete repair of tears of the rotator cuff may be difficult, but with superior arthrolysis by the Apoil-Dautry technique the lesion in the cuff is not treated. We report 17 patients who had this procedure for large cuff defects. The outcome is directly related to the duration of symptoms, and we only had good results in a few patients, although intensive physiotherapy improves function. A wide debridement is needed, followed by intensive physiotherapy for the deltoid and shoulder stabilising muscles. We recommended that this technique should be used in elderly patients who will put less demand on their shoulders.*

Résumé. *La réparation complète d'une rupture de la coiffe des rotateurs peut être difficile mais par l'arthrolyse supérieure avec la technique d'Apoil-Dautry la lésion de la coiffe n'est pas traitée. On rapporte 17 patients qui ont été traités par cette technique avec des grandes ruptures de la coiffe. Le résultat est en relation directe avec la durée des symptômes, et on a obtenu des bons résultats uniquement chez quelques malades, malgré une physiothérapie intense. Il est nécessaire de faire un débridement large, suivi d'une physiothérapie intense pour le deltoïde et les muscles stabilisateurs de l'épaule. On recommande cette technique uniquement pour les gens âgés qui exigent moins de leurs épaules.*

Introduction

Most authors recommend repair of rotator cuff tears in order to regain the full function and strength of the shoulder [3–6, 9–20]. Complete reconstruction of large lesions (Bateman's grades III and IV) [4]), or ruptures of more than one tendon, may be difficult. Several alternatives have been described to use when McLaughlin's technique [14] cannot achieve closure of the ruptured cuff, but these methods are more invasive and their results unpredictable [5, 8, 9, 13–16, 18, 20].

Apoil et al. devised the technique of superior arthrolysis [1, 2]. Little is known about the results, and this paper presents our follow up of patients who have had the procedure with the aim of deciding whether or not the technique is satisfactory.

Patients and methods

Patients with rotator cuff ruptures were treated by operation and in most the MacLaughlin procedure was used provided the defect could be closed without tension. Otherwise, alternative methods were used in young patients who were physically active.

When these techniques were not feasible, and in older patients with less demand on their shoulders, the Apoil procedure of superior arthrolysis with debridement of the subacromial space was carried out, but without routine acromioplasty.

Ninety-three patients were treated for rotator cuff ruptures between January 1989 and December 1992, and in 21 the Apoil operation was used. Their mean age was 64.9 years in women (range 58 to 82 years) and 61.0 years in men (range 49 to 72 years).

We did not immobilise the shoulder after operation, as was done by Apoil et al. [1, 2], but used intensive physiotherapy including continuous passive motion.

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Table 1. Individual retrospective results of arthrolysis at follow-up compared with the preoperative scores

Number	Age in years	Duration of complaints	Preop. ROM	Postop. ROM	Preop. pain	Postop. pain	Preop. weakness	Postop. weakness	Constant-Murley Score	Subjective Hannover Score	Complete Hannover score
			***/**/	***/**/	###/###/	###/###/	###/###/	###/###/			
			*/0	*/0	##/0	##/0	##/0	##/0			
1	72	6	**	***	##	##	##	0	85	72	94
2	58	2	**	***	##	#	##	##	81	90	96
3	62	6	**	**	##	###	#	#	45	59	64
4	57	120	**	**	##	##	##	##	51	50	63
5	59	12	***	***	##	##	##	#	74	84	94
6	61	24	**	**	##	#	##	##	72	69	84
7	69	240	*	**	###	##	###	###	56	53	69
8	69	12	**	***	###	#	##	#	70	74	85
9	65	36	***	*	#	##	##	##	39	48	59
10	62	60	**	**	###	##	###	###	42	70	71
11	60	18	**	*	#	##	##	###	21	35	51
12	64	10	*	***	###	##	##	##	75	64	86
13	62	6	**	***	##	#	#	##	81	88	96
14	62	6	**	***	##	0	##	#	85	79	83
15	49	9	*	***	##	0	##	0	100	97	100
16	55	3	**	***	##	0	###	#	91	90	100
17	69	3	**	***	#	0	##	#	95	95	100

Preoperative movement, especially elevation and abduction, was rated semi-quantitatively: *** = no reduction; ** = reduction from $<180^\circ - >120^\circ$; * = $<120^\circ - >90^\circ$, and 0 = $<90^\circ$.

Pain during movement was graded as: ### = severe pain; ## = moderate pain; # = slight pain, and 0 = occasional, or no, pain.

Weakness of active elevation and abduction was graded as follows: ### = active abduction and elevation less than 90° ; ## = these movements were possible with compensatory movement of the whole shoulder girdle, and/or definite weakness; # = abduction and elevation possible with minimal weakness, and 0 = no weakness.

The preoperative scores were compared with the postoperative scores at follow-up.

Retrospective evaluation was performed with an anamnestic questionnaire and physical examination, using the Constant-Murley [7] and the Hannover shoulder scores [22].

Results

Seventeen of the 21 patients were followed up for a mean duration of 32.7 months after operation (range 14 to 54 months).

The individual results are listed in Table 1. Four of the 17 had definite improvement in pain (difference pre- and postoperatively ≥ 2 points) and 10 scored ≥ 1 , with 3 showing no change.

Definite improvement in range of movement with a score of ≥ 2 was found in 2, moderate improvement (≥ 1) in 8, no change in 5 and deterioration in 2.

Comparison of pre- and postoperative weakness of the shoulder showed a definite improvement (≥ 2) in 3, moderate (≥ 1) in 4, no change in 8 and deterioration in 2.

Table 2. Range of movement before and after operation

	Preop. mean	Range	Postop. mean	Range
Abduction	115°	$60^\circ - 180^\circ$	124°	$20^\circ - 180^\circ$
Adduction	18°	$10^\circ - 35^\circ$	24°	$20^\circ - 60^\circ$
Elevation	129°	$80^\circ - 170^\circ$	138°	$80^\circ - 180^\circ$
Retroversion	32°	$0^\circ - 60^\circ$	48°	$10^\circ - 60^\circ$
Extern. Rotat.	39°	$0^\circ - 65^\circ$	54°	$10^\circ - 90^\circ$
Intern. Rotat.	63°	$0^\circ - 90^\circ$	68°	$49^\circ - 90^\circ$

Individual data are correlated with age and duration of symptoms in Fig. 1. The postoperative Hannover and Constant-Murley scores are shown in Fig. 2.

Analysis of these criteria with the individual results showing the best correlation (linear factor of 0.43) for the duration of symptoms with the Hannover and Constant-Murley scores; the longer the preoperative complaints, the worse the postoperative results. The patients' age and the length of follow-up had correlation factors of 0.005 and 0.12 respectively when compared with the scores.

Most patients showed poor results in the subjective part of the Hannover score. The complete Hannover and Constant-Murley scores showed similar results, but some of our patients had good results (Fig. 2).

Fig. 1. Correlation of the Hannover and Constant-Murley scores with age and the duration of complaints

Fig. 2. Classified score results

Discussion

Apoil et al. reported the results of their operation on 70 [1] and 100 [2] patients. Rockwood et al. used a slightly modified technique and followed up 50 patients [21].

Apart from the differences in operative technique, the postoperative management was also different in these two series. Apoil et al. routinely used a deltopectoral approach, and resected the subacromial bursa and the coraco-acromial ligament [2]. The intracapsular part of the long head of biceps was also resected and the remaining end fixed in the bicipital groove. Remnants of the torn parts of the cuff were excised. After operation, the shoulder was immobilised in a thoracobrachial cast with the arm adducted and flexed. Physiotherapy was begun on the fourth day removing the arm from the cast.

Rockwood et al. considered that a modified acromioplasty was the most important of the procedure [20, 21], and divided the anterior part of the acromion beyond the acromioclavicular joint; the anterior part of the deltoid is detached temporarily. The rotator cuff tendons are debrided so that there are no residual components which can be caught, ground or impinged between the head of the humerus and the acromion during flexion and rotation of the arm [21]. Additional resection of reactive exostoses on the greater tuberosity may be necessary. Before closure the resected anterior part of the deltoid is fixed to the newly formed acromial rim and the soft tissues injected with 0.25% bupivacaine. After operation the arm is placed in a sling-immobiliser. Physiotherapy is begun on the first day to maintain movement and in the third week concentrates on strengthening the deltoid, particularly the anterior part, and the rotator cuff muscles together with the scapular stabilisers [21].

Apoil et al. used their own follow-up score and found definite relief of pain with improved mobility in at least half the patients [1, 2]. Nevertheless, strength of abduction and external rotation had significantly decreased in 18% and was moderately decreased in 40% of their patients. Almost all the patients reported early tiring after repeated flexion movements and in maintaining this position. The overall results were rated as excellent in 57% with no pain and free movement, good with slight pain and reduced elevation between 120° and 180° in 24%, and poor with elevation less than 120° and severe pain in 19%. They concluded that the best procedure for large cuff defects was correction of the elements of the impingement syndrome, including resection of the coraco-acromial ligament and debridement of the torn cuff and subacromial space. Surgical repair of the ruptured cuff was rarely indicated except in traumatic lesions in young active patients.

Rockwood et al. used the modified rating system of the University of California and reported the results in 53 shoulders. These were excellent in 32, good in 12, fair in 4 and poor in 5. Most patients (89%) had no pain, or only occasional pain. Patients who had previous acromioplasties and cuff repairs had less good relief of pain and definite deltoid weakness. Rockwood et al. stated that postoperative function, strength and satisfaction depended on the function of the deltoid [21].

Comparison of results is difficult because different scoring systems were used, but 59% of our patients had excellent or good results when the complete Hannover score, including subjective and objective scores, was used.

Although we expected limitation of shoulder function, this was not mentioned by most patients, although when there were serious complaints,

functional weakness was often reported. The poorest results occurred when postoperative weakness had not improved or had deteriorated. The best results (patients 3, 17, 17) were obtained when improvement in movement was accompanied by relief of pain and minimal weakness. Comparison of the range before and after operation did not show any improvement.

We conclude that differences in reported results depend on the operative techniques and the postoperative rehabilitation used. We only recommend superior arthrolysis in elderly patients who put less demand on their shoulders. The most important factors for achieving good results are wide debridement, including acromioplasty, but not necessarily resection of the biceps tendon. Management after operation is critical and our regime of early exercises produces good results with no, or minimal deltoid weakness.

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