OUTCOMES OF ARTHROSCOPIC TREATMENT FOR ROTATOR CUFF TEARS

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ABSTRACT

Objective: To evaluate the results of arthroscopic treatment for rotator cuff tears. Methods: A retrospective study was carried out demonstrating the results of this technique in 42 patients operated between 2002 and 2006. The mean follow-up was 31 months and average age was 57 years. The dominant limb was operated in 73.8% of cases. Function and pain were evaluated using criteria of UCLA Score System and Visual Analogic Scale respectively. Results: The results were satisfactory in 85.7% (59.5% excellent and 26.2% good), with 14.3% unsatisfactory. The most frequent associated lesion was the long head of the biceps tendon (57.1%). Nevertheless, the presence of other lesions did not alter the end results. The same occurred in relation to age and follow-up period. When comparing large and massive tears with small and mid-sized ones, the first group had significantly inferior functional results. The function was worse in cases of massive tear. Conclusion: Arthroscopic rotator cuff repair provides lower surgical morbidity and intrarticular diagnosis of associated lesions in comparison to open surgery. The benefit of the procedure was confirmed mainly by pain relief, even in cases of more extensive lesions.

Keywords: Rotator cuff. Shoulder. Arthroscopy.

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INTRODUCTION

The rotator cuff (RC), formed posteriorly by the tendons of the supraspinatus (Ss), infraspinatus (Is) and teres minor (Tm) and, anteriorly by the tendon of the subscapularis (Sc), has an important contribution in the shoulder mobility and stability functions. Lesions of this structure represent one of the main causes of incapacity in the shoulder.[1,2] Satisfactory results of the conservative treatment vary in literature between 40 and 82%, whereas factors such as: age, comorbidities, activity levels and degree of shoulder dysfunction interfere therein. With the increase of functional demand such as practice of sports, work and/or daily activities, etc., in some patients the conservative treatment might not be successful. This situation has occurred more frequently due to the increase in life expectancy and quality.[2-4] In these cases, surgical repair has proven efficient, attaining a high level of satisfaction, with pain relief and function improvement, ranging between 70 and 95%.[5-9]

The arthroscopic technique demonstrates similar results to open surgery, and is associated with advantages such as: preservation of the deltoid, possibility of articular diagnosis and lower surgical morbidity.[9-12]

The aim of this work is to evaluate the outcome of the arthroscopic treatment of the rotator cuff performed in the service.

MATERIAL AND METHOD

A retrospective analysis of the outcome of the arthroscopic repair of the rotator cuff was conducted on patients operated in the service between 2002 and 2006. The diagnosis of the lesions was executed through clinical history, physical examination and radiological supplementation (simple x-ray, ultrasonography and/or magnetic resonance). The criterion for surgical indication in all cases was failure in the conservative treatment for at least 6 months. The postoperative follow-up period was at least 1 year.

All the authors declare that there is no potential conflict of interest referring to this article.

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SURGICAL TECHNIQUE

The patients were operated by the same surgeon, with general anesthesia associated with interscalenic block, lying on their side, with the assistance of longitudinal traction of the operated upper limb. Posterior portal was used for diagnosis and articular instrumentation, and supplementary portals for inspection and subacromial treatment. The extension of the lesions was measured with the use of a arthroscopic ruler with millimeter graduations, and classified as small (partial lesions completed or up to 1 cm), average (between 1 and 3 cm), large (between 3 and 5 cm) or massive (above 5 cm).[13] The measurement considered was correspondent to the tendon retraction (Figure 1). The complete lesions (covering the entire breadth of the tendon) were repaired and the partial lesions with impairment above 50% of the tendon breadth, either by the bursal or articular surface (Figure 2), were completed and repaired, and interpreted as complete lesions of small extension in the study analysis. The repair was accomplished with the assistance of bone-anchored implants (metallic or absorbable) and non-absorbable threads nº 2 (Ethibond® or Orthocord®), according to availability, with the use of tendon-tendon and/or tendon-bone type stitches depending on the lesion appearance.

In the postoperative period (PO), they were all immobilized with a thoraco-brachial splint for six weeks, with immediate passive and active mobilization of the elbow, wrist and hand, besides pendular exercises with the shoulder. Progressive passive and progressive active shoulder mobilization was initiated after the 6th week for gain of articular amplitude, allowing muscular strengthening exercises after the third month. Radiological control was performed on a routine basis on the first PO day, for verification of the correct anchor positioning (Figure 3). Distal clavicle resection (Mumford procedure) was associated in the patients that presented radiological changes and mainly preoperative pain in the acromioclavicular joint (AC). In cases without pain in the AC, but with presence of osteophytes in the distal clavicle, observed during surgery, the surgeon associated their resection, a procedure defined as Mini-Munford.[2] Tenotomy with or without tenodesis was performed in the cases with lesion of the long head of the biceps brachii (compromising more than 50% of the breadth) (Figure 4). The criterion for tenodesis performance was the age and functional demand of the patient, and is therefore indicated in cases below 50 years of age or work requiring effort. When performed, the distal stump of the LHB was fixed with bony anchors. As all the cases were tears of the CR in its posterosuperior portion, changes in the subscapularis tendon were considered associated lesions (Figure 5).

A record was completed with particulars of each patient including: name, gender, address, age, dominant side, operated side,

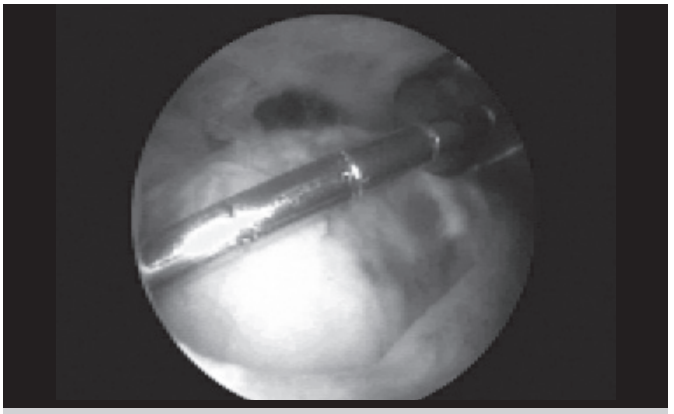

Figure 1 – *Arthroscopic view of the measurement of the lesion with ruler.*

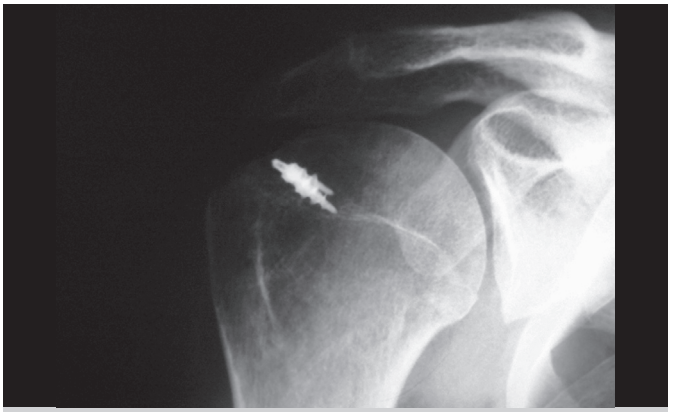

Figure 3 – *Simple X-ray of the shoulder in anteroposterior position demonstrating postoperative condition with adequate positioning of the anchors.*

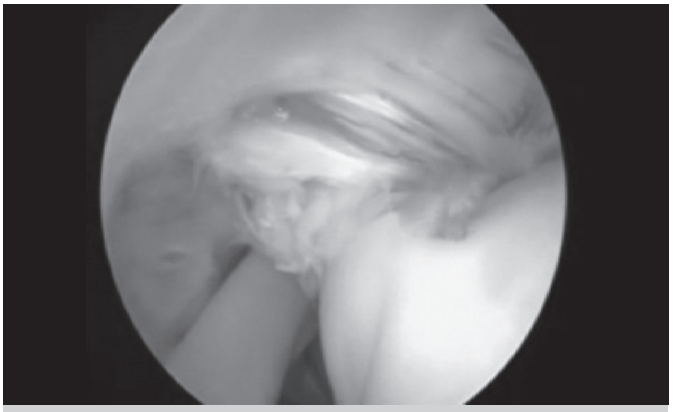

Figure 2 – *Arthroscopic view of partial lesion of the articular surface of the supraspinatus tendon.*

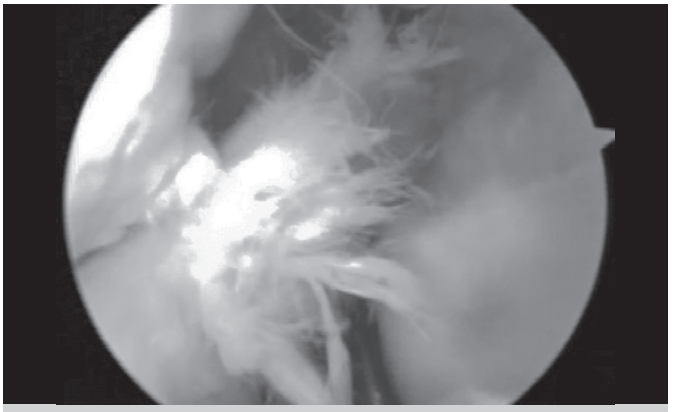

Figure 4 – *Arthroscopic view demonstrating degenerative lesion in the tendon of the long head of the biceps brachii.*

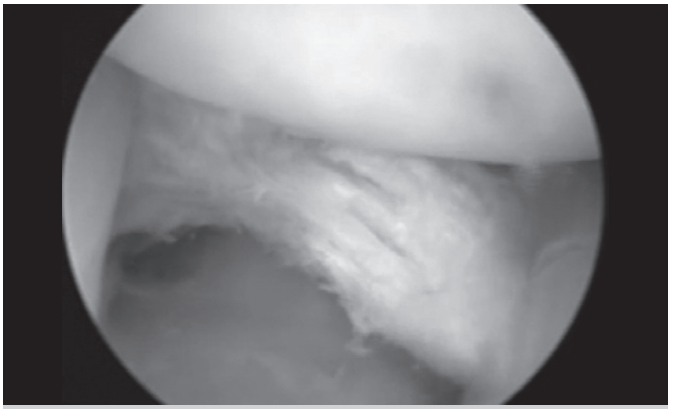

Figure 5 – *Arthroscopic view demonstrating partial lesion of the subscapularis.*

date of surgery and follow-up time, lesion size, associated lesions, associated procedures, type of repair, number of portals, number and type of anchors, postoperative mobility, complications and return to activities. Criteria from UCLA (University of California-Los Angeles)[14] and the Visual Analogue Scale (0 to 10) for pain were used for evaluation of the outcome. The amplitude of joint mobility was evaluated according to the AAOS Convention.[15]

The results obtained were compared with: age, lesion size, associated lesions, associated procedures, pain level and postoperative follow-up time, analyzing them statistically by the Student's t-Test and Fischer's Exact Test.[16,17]

RESULTS

Forty-two patients were evaluated, of whom 14 (33.3%) were male and 28 (66.7%) female, with ages ranging between 39 and 79 years (mean age 57.3 years). The dominant side was operated in 73.8% (31 cases). The average follow-up time was 31 months, with minimum of 12 and maximum of 66 months. The result was satisfactory in 36 patients (85.7%) (Table 1). The most common associated lesion was in the tendon of the long head of the biceps brachii (LHB), found in 22 cases. Of these, an additional procedure (tenotomy with or without tenodesis) was necessary in 68.1% (15 cases). Other lesions and associated procedures are demonstrated in Tables 2 and 3. Analyzed separately, between the patients above and below 50 years of age, there was no significant difference in the results. This also occurred in relation to the presence or not of associated lesions and when other procedures were performed. There was no difference considering groups with PO follow-up above and below 2 years either. Lesion size statistically influenced the outcome, with predominance of satisfactory results in the cases of small and medium lesions compared with large and massive lesions (Table 4).

This situation was reflected in the PO function, with cases of massive lesion impairing mainly elevation (Table 5). In evaluating pain, it was concluded that the average pain before surgery was significantly higher than in the PO period, even in the unsatisfactory cases. Therefore, even with decreased function, the majority obtained pain improvement. This is confirmed in the

Table 1 – *Relationship of Cases and Results.*

Patient	AGE	DOMAIN	OPERATED	GENDER	SIZE	SHOULDER ELEVATION (Degrees)	UCLA
1	64	D	E	M	Medium	160	35
2	71	D	D	F	Medium	160	35
3	75	D	D	M	Large	170	34
4	40	D	D	M	Medium	170	35
5	62	D	D	F	Small	160	35
6	45	D	D	M	Medium	180	35
7	45	D	D	M	Small	150	31
8	61	D	E	F	Large	180	35
9	51	D	D	F	Medium	180	34
10	58	D	E	F	Small	160	31
11	43	D	E	F	Small	180	27
12	57	D	D	F	Medium	170	35
13	50	D	D	F	Small	180	35
14	57	D	D	M	Small	170	35
15	44	D	D	M	Small	160	31
16	52	D	E	M	Small	160	35
17	73	D	D	F	Massive	90	27
18	64	D	D	M	Large	170	33
19	82	D	E	F	Medium	170	35
20	56	D	D	F	Medium	150	33
21	67	D	E	F	Large	140	26
22	58	D	D	F	Medium	155	33
23	59	D	D	M	Small	170	35
24	59	D	D	M	Large	170	35
25	57	D	D	M	Massive	150	35
26	62	D	D	F	Medium	180	35
27	72	D	D	F	Large	170	35
28	79	D	D	F	Large	125	26
29	63	D	D	F	Medium	180	35
30	40	D	E	F	Massive	70	15
31	60	D	D	F	Medium	175	33
32	51	D	D	F	Medium	160	35
33	49	D	D	F	Small	170	35
34	44	D	E	F	Small	150	33
35	71	D	E	F	Small	140	29
36	39	D	D	F	Small	150	32
37	64	D	D	F	Medium	170	33
38	47	D	D	F	Medium	170	35
39	45	E	D	F	Large	170	15
40	55	D	D	F	Small	150	35
41	41	D	D	M	Medium	170	35
42	78	D	D	F	Medium	165	35

Source: Department of Orthopedics and Traumatology – Santa Casa de Misericórdia de Curitiba (DOT-SCMC)

Table 2 – *Frequency of Associated Lesions.*

Type of Lesion	Frequency (%)
Tear of Long Head of the Biceps Brachii (LHB)	2 (4.7%)
LHB Degeneration < 50%	7 (16.6%)
LHB Degeneration > 50%	15 (35.7%)
Partial Tear of Subscapularis< 50%	11 (26.1%)
Partial Tear of Subscapularis > 50%	2 (4.7%)
Glenohumeral Arthritis	8 (19.0%)
Adhesive Capsulitis	1 (2.3%)
Acromioclavicular Arthrosis	14 (33.3%)
SLAP Lesion	3 (7.1%)

Source: DOT – SCMC

Table 3 – *Frequency of Additional Procedures.*

Procedures	Frequency (%)
Munford	12 (28.5%)
Mini-Munford	2 (4.7%)
Long Head Biceps Brachii (LHB) Tenotomy	7 (16.6%)
LHB Tenotomy and Tenodesis	6 (14.2%)
SLAP Lesion Repair	3 (7.1%)
Adhesive Capsulitis Release	1 (2.3%)
Acromioplasty	42 (100%)

Source: DOT – SCMC

Table 4 – *Relationship between Lesion Size and Results.*

Size of Lesion	SATISFACTORY	UNSATISFACTORY
Massive/Large	6 (55%)	5 (45%)
Medium/Smal	30 (97%)	1 (3%)

Source: DOT – SCMC

Table 5 – *Relationship between lesion size and PO function.*

Size of Lesion	Mean Postoperative Elevation of Shoulder (Degrees)
Small	160.71
Medium	167.81
Large	161.88
Massive	103.3

Source: DOT – SCMC

subjective data regarding satisfaction with surgery, in which all the patients referred to an improvement after surgery. The return to pre-surgical activities occurred in the fifth month on average, ranging from 45 days to 1 year PO. No patient had any complication with the procedure.

DISCUSSION

The results of the surgical treatment of CR lesions have been shown as satisfactory by the majority of authors.[8,9,11,14] With the improvement of quality and technology of materials, as well as an improvement in the learning curve for performance of the totally arthroscopic repair, this technique has been popularized as advantageous due to the reduction of surgical morbidity, besides allowing diagnosis and treatment of associated lesions in the joint. Accordingly, the results presented in recent literature have been better and better (70 to 95%).[1,5-9] We obtained similar results with 85.7% of satisfaction. These results are generally shown as inferior in older patients. Worland et al.[18] demonstrated satisfactory results at 78.2% in patients over 70 years of age. Our results were perhaps superior as we were dealing with patients in a lower age bracket (mean age 57.3 years). Nonetheless, our results were not worse in older patients. The possibility of articular diagnosis proved an advantage, after we found associated lesions in 52.3% of the cases. The most frequent was observed in the LHB tendon in 57.1% of the cases. This corresponds to the report of Murthi et al.[19] who found a greater association with biceps lesions. In spite of this, our results were not influenced when there were associated lesions. In fact, Gartsman et al.[20] found other articular lesions in 68% of the cases, considering them "lesser lesions" as they do not interfere in the results, requiring additional treatment in just 12.5% of them. The factor that statistically influenced our results was lesion size, which was higher in small and medium lesions compared to large and massive ones (97% and 55%, respectively). This relationship continued in relation to PO function with massive lesions demonstrating inferior mean elevation (103.3°) compared with smaller lesions (166.8°). Although they impair function, even larger lesions were related to pain improvement. The difference of this factor observed in the PO period was significant, confirming the benefit of the procedure when the goal is mainly pain treatment. Therefore, even in the cases of massive lesions, which are often irreparable, we recommend the procedure after failure in the conservative treatment.

CONCLUSION

The arthroscopic repair of the rotator cuff demonstrated satisfactory results in 85.7% of the cases;
Factors such as: gender, age, association with other lesions and PO time did not interfere in the final result;
Larger lesions evolve with worse results;
Pain improvement was the main benefit obtained with the procedure, and was observed even in the cases with worse functional results.

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