Arthroscopic Bankart Procedure: Clinical Outcomes with a Minimum Follow-Up of 10 Years

Cirurgia de Bankart artroscópica: Resultados clínicos com seguimento mínimo de 10 anos

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Abstract

Objective To evaluate the functional outcome of patients submitted to arthroscopic Bankart repair in the long-term.

Methods Retrospective evaluation of 41 patients (45 shoulders) operated between 1996 and 2009 followed-up for a mean period of 14.89 years. Functional scores were analyzed by the University of California, Los Angeles (UCLA) and Carter-Rowe scores, physical examination, and analysis of medical records.

Results The Carter-Rowe score showed an average improvement of 46.11 points, with a final average of 85.89 points, and the UCLA score showed an average improvement of 31.33 points. Ten patients (22.22%) relapsed, with the number of preoperative dislocations being the most correlated factor.

Conclusion It was demonstrated that the number of preoperative dislocations negatively influenced the failure rate.

Keywords
- shoulder
- joint instability
- arthroscopy
- recurrence

Resumo

Objetivo Avaliar o desfecho funcional dos pacientes submetidos ao reparo de Bankart artroscópico no longo prazo.

Métodos Avaliação retrospectiva de 41 pacientes (45 ombros) operados entre 1996 e 2009 acompanhados por um período médio de 14,89 anos. Foram feitas análises das pontuações funcionais de University of California, Los Angeles (UCLA) e Carter-Rowe, exame físico e análises de prontuários.

Resultados O escore Carter-Rowe apresentou melhora média de 46,11 pontos, com média final de 85,89 pontos, e o UCLA apresentou melhora de 31,33 pontos. Um total de 10 pacientes (22,22%) apresentou recidiva, sendo o número de luxações pré-operatórias o fator mais correlacionado.

Conclusão Foi demonstrado que o número de luxações pré-operatórias influenciou negativamente na taxa de falha.

Palavras-chave
- ombro
- instabilidade articular
- artroscopia
- recidiva

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Introduction

Arthroscopic Bankart surgery has shown fewer complications, reduced surgical time, lower morbidity, and less postoperative pain when compared with open surgery.[1–3] However, its results deteriorate over time. If, in the short follow-up, the recurrence ranges between 8 and 11%, in the long follow-up, they are between 12.5 and 35%.[4–15]

The purpose of the present study is to evaluate the recurrence rate and the factors predisposing to its occurrence in patients submitted to arthroscopic repair of Bankart lesions with a minimum follow-up of 10 years. Secondly, the study seeks to identify whether there was an improvement in functional scores with surgery. We believe that relapse rates are close to 30% and that there are predisposing factors to surgical failure.

Materials and Methods

The present study was approved by the Research Ethics Committee and did not receive funding for its realization. The patients registered their consent through the free and informed consent form.

The present study retrospectively analyzed patients submitted to arthroscopic Bankart surgery as a primary form of treatment of recurrent anterior shoulder instability from January 1996 to November 2009. The evaluations at the end of the follow-up period were made through a new summoning of the patients. Patients with a minimum follow-up of 10 years who presented a complete record of their information were included. Patients with complete associated rotator cuff rupture were excluded, along with those who had a glenoid bone loss $> 25\%$ measured by radiography in the incidence of Bernageau profile,[16] in addition to those diagnosed with multidirectional instability and those unable to complete all evaluations.

The measurement of glenoidal bone loss was performed using the Bernageau profile method, as described in his work, evaluating the affected side through the image of the "strict profile" of the glenoid. For this, the lower two thirds of the glenoid were divided into 4 equal parts and, thus, the percentage of bone loss was measured as $< 25\%$, between 25 and 50%, between 50 and 75%, or $> 75\%$.[16]

To evaluate osteoarthrosis, the patients underwent shoulder x-rays at true anteroposterior incidence with the arm in neutral rotation. The results were classified into 3 types, according to Samilson et al.:[17] mild – osteophyte < 3 mm; moderate – osteophyte from 3 to 7 mm and mild irregularity of the joint surface; severe – osteophyte > 7 mm, loss of joint space, and bone sclerosis.

All procedures were performed in lateral decubitus under general anesthesia and brachial plexus block. Three arthroscopic portals (posterior, anterosuperior and anteroinferior) and 30° optics were used. The repair of the lesions was performed with 3.5 mm metal anchors loaded with high-strength wires.

Information such as gender, laterality, dominance, sports practice (pre- and postoperative), type of sport (contact or contactless), level of participation (amateur or professional), mechanism of trauma, and age at the first episode of instability were collected from medical records. The time elapsed between the first episode of instability and surgical treatment was also recorded, as well as the age at which the procedure was performed, the number of recurrences until its performance, and the return to sports practice.

For functional evaluation, the Carter-Rowe and the University of California, Los Angeles (UCLA) scores were used.[18,19] The first was comparatively evaluated before and after the surgical procedure. The second was evaluated only postoperatively. The results of the UCLA score were grouped, being considered excellent scores 34 and 35, good 28 to 33, regular 21 to 27, and bad < 20. Regarding the Carter-Rowe score, it was considered an excellent result when the score was between 90 and 100, good between 75 and 89, reasonable between 51 and 74, and bad when < 50 points.

The physical examination of the patients at the end of the follow-up included the comparative measurement of the lateral rotation of the right and left shoulders with the limb abducted close to the body and the use of a goniometer. They were also submitted to the previous apprehension test, and impending joint instability was considered as positivity. The presence of pain was not considered as a positive result of the test. Capsule-ligamental hyperlaxity analysis was performed according to the criteria of Beighton et al.[20] This condition was defined by a score ≥ 4.

The occurrence of a new episode of dislocation or of subluxation was considered a criterion for postoperative recurrence. The persistence of positivity in the apprehension test was recorded without the presence of recurrence, emphasizing that positivity alone in this test was not considered a failure in our study.

The statistical evaluation was divided into descriptive, association, and logistic regression analyses. Data analyses were performed using IBM SPSS Statistics for Windows, version 23 (IBM Corp., Armonk, NY, USA). The tests used to analyze the associations of qualitative variables were the Pearson chi-squared test and the Monte Carlo test, when necessary. The Kruskall-Wallis test and the Mann-Whitney U test were used to analyze the associations of quantitative variables. Multiple logistic regression was used to identify the main risk factors associated with recurrence. The significance level used in the entire study was of 5%.

Results

After applying the inclusion and exclusion criteria, 41 patients (45 shoulders) were included in the sample. The mean follow-up time was 14.89 years (minimum of 10 years and maximum of 23 years). The qualitative and quantitative variables can be observed in ►**Tables 1** and **2**. Recurrences totaled 22.20% (9 dislocations and 1 subluxation), and in 2 of these cases there, were bone Bankart lesions $< 25\%$ of the glenoid, and both evolved with dislocation. At the end of the follow-up, four patients had a positive apprehension test.

The results of the Carter-Rowe score are shown in ►**Table 3.** There was an improvement of 46.11 points on average

Table 1 Clinical characterization (qualitative variables) of the sample

Variable		*n*	%
Gender	Male Female	34 7	82.92 17.07
Laterality	Right Left	23 22	51.11 48.89
Dominance	Right-handed Left-handed	35 6	85.36 14.63
Hyperlaxity	Yes No	2 39	4.87 95.12
Sports practice	Yes No	33 8	80.48 19.51
Type of sport	Contact Non-Contact	17 16	51.51 48.48
Level of sports practice	Amateur Professional	23 10	69.69 30.30
Trauma mechanism in the first episode	Trauma Seizure Other	42 1 2	93.33 2.22 4.44

(39.79 to 85.89 points). At the end of the follow-up, the UCLA score totaled 31.33 points on average. Considering this score, 19 patients presented excellent results, 17 were classified as good, 7 had regular results, and only 2 had poor results (►**Table 4**).

Arthrosis was absent in 41 shoulders (91.11%) in the preoperative period. At the end of the follow-up, 19 shoulders (42.23%) of operated patients had arthrosis, with 16 cases (35.56%) being type 1, 3 cases (6.67%) type 2, and no type 3 cases (►**Table 3**).

At the end of the follow-up, 75.56% of the patients returned to sports practice, being predominantly contactless sports (61.76%) and amateur level (52.94%).

A statistically significant association was observed between the number of episodes of instability before surgery and failure of the Bankart procedure ($p = 0.019$).

Multiple binary logistic regression analysis showed that each recurrence of instability preoperatively is associated with an increase in the chance of surgical failure by 1.118 times (95% confidence interval [CI]: 1.0–1.2; $p = 0.012$).

Table 3 Results of the Carter-Rowe score

	Carter-Rowe	
	Preoperative	Postoperative
Excellent	1	34
Good	1	2
Reasonable	5	0
Bad	38	9
Total operated shoulders	45	45

Discussion

The present study showed a failure rate of 22.22% in arthroscopic Bankart surgery at the end of the ten-year minimum follow-up; on average, the failure occurred 5.4 years after surgery. This finding is consistent with the literature, which presents failure rates of between 12.5 and 35% when evaluated in the long-term.[4–15]

The literature shows that 50% of recurrences occur in the first 2 years after the procedure, with an increase of 25% at the end of 5 years.[6,15,21] This information was confirmed by evaluating the arthroscopic repair of Bankart lesions with a minimum follow-up of 2 years performed by our group, which observed 8.9% of failures and residual apprehension in 2.2%,[5] and another national study with the same follow-up time found rates of 11.7 and 24.46%, respectively.[22] It is noteworthy that the evaluation criteria are divergent and some authors consider a persistently positive apprehension test indicative of recurrence.[23] This factor was not considered in our study.

Several authors have demonstrated a satisfactory functional gain with arthroscopic Bankart surgery when evaluated in long-term follow-up. Considering the Carter-Rowe score postoperatively, our study found at the end of the evaluation period an average of 85.89 points, and this value is consistent with the results of other authors, whose mean ranged from 76.0 to 90.5 points.[7,8,13,24,25] Regarding the UCLA score at the end of the follow-up, our group found an average of 31.33 points, similar to the value found by Castagna et al.,[8] who obtained an average of 32.1 points at the end of the evaluation period.

Aboalata et al.[7] demonstrated a direct relationship between surgical recurrences and the number of episodes of

Table 2 Clinical characterization (quantitative variables) of the sample

Variable	*n*	Average	Standard deviation	Minimum	Maximum
Age at the first episode of dislocation (years)	45	28.60	11.35	12.00	62.00
Time between first episode and surgery (years)	45	3.37	5.32	0.04	25.00
Number of relapses before surgery	45	8.60	8.48	1.00	30.00
Age at surgery (years old)	45	31.76	11.10	18.00	63.00
Time between surgery and relapse (years)	10	5.40	3.47	1.00	10.00
Age at relapse (years)	10	34.20	9.13	24.00	49.00
Number anchors	45	3.13	0.73	2.00	5.00
Lateral rotation limitation (degrees)	45	7.38	8.59	0.00	30.00

Table 4 Results of the UCLA score at the end of follow-up

Variable		*n*	%
UCLA categorized	Bad	2	4.44
	Regular	7	15.56
	Good	17	37.78
	Excellent	19	42.22

Abbreviation: UCLA, University of California, Los Angeles.

Table 5 Evaluation of the presence of osteoarthrosis by the classification of Samilson and Prieto

Variable		*n*	%
Preoperative Samilson	Absence of arthrosis	41	91.11
	Mild arthrosis	4	8.89
Samilson at the end of the follow-up	Absence of arthrosis	26	57.78
	Mild arthrosis	16	35.56
	Moderate arthrosis	3	6.67

preoperative dislocations. Our study confirmed this trend with statistical significance and corroborates the importance of early surgical intervention. This proposal aims to reduce recurrences and consequent bone losses of the glenoid, already observed by several authors as a negative influence factor on the outcome of Bankart surgery.[26–28] Its impact can be observed in our results that found dislocation at the end of the follow-up in the 2 cases of the sample with bone Bankart.

Of the patients in the sample, 42.23% developed osteoarthrosis secondary to Bankart arthroscopic repair, a value similar to that reported in the literature, in which rates range from 39 to 80%.[8,10,23,29,30]

In our opinion, the present study is the first in the national literature to report the results of arthroscopic Bankart with a minimum follow-up of 10 years. The main limitation refers to the retrospective character consisting of a series of cases composing a small sample, treated surgically at a time when the effects of bone losses on recurrences were underestimated and poorly quantified by the methods used.

Conclusions

In a minimum follow-up of 10 years, the recurrence rate of the arthroscopic Bankart procedure was of 22.20%, similar to that described in the literature. The number of preoperative recurrences was the main impacting factor in failures after surgery.

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Conflict of Interests
The authors have no conflict of interests to declare.

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