Massive Rotator Cuff Tears Augmented with a Subacromial Balloon Spacer: Does it Reduce the Retear Rate? A Prospective Study

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INTRODUCTION:

Recurrent rotator cuff tears are a common occurrence noted following rotator cuff repair, reported to be 20%-40% in the first 12 months after surgery. This incidence is even higher in massive rotator cuff tears (MRCT).

Since the introduction of biodegradable subacromial balloon spacer, different authors have proposed that it helps negate the proximal migration of the humeral head, minimizes subacromial friction, and provides a uniformly dispersed force compressing the rotator cuff against its footprint on the humeral head. To date, no one has reported on their experience with the balloon spacer in relation to the retear rate following rotator cuff repair.

Our hypothesis is that the balloon may protect the repair during the healing phase and thus decrease the overall retear rate in the first year after surgery. The aim of this study was to determine if the use of the subacromial spacer in an arthroscopically complete repair of a massive rotator cuff tear decreases the retear rate at one year follow up.

METHODS:

Patients who met the following inclusion criteria were prospectively collected: 1) A Massive Rotator Cuff Tear (MRCT) as defined by Collin (excluding type A), 2) Goutallier stage equal or less than 2, 3) Complete arthroscopic repair of the MRCT achieved. During the first stage of the study, a balloon was added to all the repairs. After enough patients were included in the balloon group, the same repairs were performed but no balloon was added.

Different demographic data and variables considered to potentially influence the final results were collected: sex, age, laterality, history of smoking, diabetes mellitus, and body mass index. The cuff tear retraction was noted according the Lafosse classification for the subscapularis and the Patté classification for the supraspinatus and infraspinatus.

At one-year follow up all patients were reevaluated with an MRI, where the main variable of the study, the existence of a rotator cuff recurrent tear, was determined according to the classification by Sugaya et al. A tear was noted for Sugaya types 4 and 5. The clinical assessment was performed using the Visual Analog Scale (VAS), the Subjective Shoulder Value score (SSV), and the Constant-Murley score (CM). Final scores were compared between both groups and also compared to preoperative values.

RESULTS:

Finally, 31 patients were allocated to group A (no balloon) and 33 patients were allocated to group B (balloon). Main demographic data of each group is shown in **Table 1**.

Preoperative tear characteristics of both groups are shown in **Table 2**. The only difference found between groups was a greater degree of supraspinatus retraction in group B. After review of postoperative MRIs, no statistically significant difference was noted in the overall retear rate between groups. **Table 2**.

As is shown in **Table 3** no significant differences were found between groups regarding preoperative VAS and SSV. A statistically significative difference was found in relation to the CM, which was higher in the group A. However, this difference (7.31) does not reach the minimum threshold of 10.4 points determined as minimal clinically important difference for the CM in patients undergoing rotator cuff surgery. All functional scores improved in both groups at one year postoperatively, finding no differences between patients with or without the balloon spacer.

DISCUSSION AND CONCLUSION: In reparable massive rotator cuff tears (excluding Collin type A) the subacromial spacer does not significantly reduce the number of patients with a recurrent rotator cuff tear identified by MRI imaging. It was also not effective in reducing the number of reruptured tendons in these patients. No clinically significant findings were noted at one year postoperative in Constant, SSV, and VAS scores.

Table 1. Demographic data

Variable	Group A No balloon (n=31)	Group B Balloon (n=33)	p value
Gender, female/male	14/17	11/22	0.332
Age mean ± SD	61,29 ± 8,25	62,48 ± 8,73	0.576
Injured side, right/left	14/17	22/11	0.083
Diabetes Mellitus yes/no	3/28	1/32	0.272
Smoking yes/no	5/26	3/30	0.394
BMI mean + SD	24,12 ± 9,21	24,68 ± 8,27	0.785

Table 2. Rotator Cuff characteristics

Variable	Group A No balloon (n=31)	Group B Balloon (n=33)	p value
Tendons injured and repaired	78	90	0.140
Subscapularis (mean ± SD)	24 (1,77 ± 1,28)	25 (1,85 ± 1,37)	0.824
Supraspinatus (mean ± SD)	31 (2,13 ± 0,85)	33 (2,67 ± 0,48)	**0.0025**
Infraspinatus (mean ± SD)	23 (1,13 ± 0,81)	32 (1,48 ± 0,71)	0.065
Retears at 1 year follow up in MRI			
Total number of patients	6 (19,35%)	5 (15,15%)	0.746
Total number of tendons	10	5	0.112
Subscapularis	2	0	
Supraspinatus	5	4	
Infraspinatus	3	1	

Table 3. Functional outcomes between both groups

Variable mean	BEFORE SURGERY			AFTER SURGERY		
	Group A No balloon (n=31)	Group B Balloon (n=33)	p value	Group A No balloon (n=31)	Group B Balloon (n=33)	p value
VAS ± SD	5,45 ± 1,46	4,97 ± 2,14	0.330	1,89 ± 2,1	2,39 ± 2,47	0.397
SSV ± SD	52,42 ± 11,02	52,18 ± 21,74	0.956	82,52 ± 15,74	78,61 ± 14,81	0.309
Constant ± SD	47,61 ± 11,22	40,3 ± 15,35	**0.034**	76,48 ± 14,19	70,42 ± 15,21	0.105