

Cuff Integrity and Clinical Results after Arthroscopic Rotator Cuff Repair with Muscle Advancement Procedure for Large and Massive Posterior-Superior Rotator Cuff Tears: A Multicenter Study

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INTRODUCTION:

Muscle advancement procedure for posterior-superior rotator cuff tears was first described by Debeyre and Patte *et al.* as an open surgery in 1965 (Fig 1). We modified this procedure and combined with arthroscopic rotator cuff repair (ARCR). In this study, we retrospectively evaluated the clinical outcomes of ARCR with muscle advancement procedure for posterior-superior large and massive rotator cuff tears. We also assessed the risk factors of postoperative retear.

METHODS:

This retrospective multicenter study recruited 165 patients (92 men, 73 women; mean age, 69.9 years) who had undergone ARCR with muscle advancement procedure for large and massive rotator cuff tears (Boileau stage III or IV) and followed up longer than 12 months. Surgical steps of our ARCR with muscle advancement procedure consists of 3 steps. Step 1; standard arthroscopic cuff mobilization, step 2; mini open (3-4cm incision on medial scapula spine) supraspinatus (SSP) and infraspinatus (ISP) muscle release and advancement, step 3; arthroscopic suture bridge cuff repair (Fig 2). Subscapularis (SSC) tendon was repaired when tears exist. Postoperative cuff integrity was classified according to Sugaya's classification with magnetic resonance imaging (MRI) one year after surgery. We statistically compared age, gender, surgical side, pre and one year postoperative American Shoulder and Elbow Surgeons (ASES) score, pre and one year postoperative range of motion (ROM), and Goutallier classification for fatty degeneration using preoperative MRI, between non-tear group (Sugaya type I-III) and retear group (Sugaya type IV, V). $P < 0.05$ were considered to be statistically significant.

RESULTS:

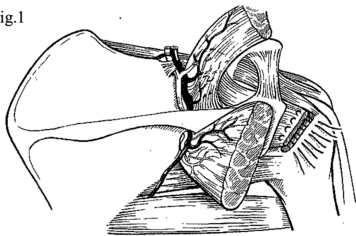
All patients had large and massive rotator (Boileau stage III or IV) cuff tears on preoperative MRI. Cuff integrity (Sugaya's classification) were type I (n=69, 41.8%), type II (n=31, 18.8%), type III (n=28, 17.0%), IV (n=10, 6.1%), and type V (n=27, 16.4%), thus retear rate was 22.4%. ASES score significantly improved from 43.1 points to 85.1 points after ARCR with muscle advancement procedure ($P < 0.001$). There was no difference in age and surgical side between groups, but the percentage of male was higher in retear group (78.4%) compared to non-tear group (49.2%) ($P < 0.002$). The rate of Goutallier 4 cuff by preoperative MRI was higher in retear group (54.1%) than in non-tear group (24.2%) ($P = 0.001$). Postoperative ASES score was superior in non-tear group (88.3 points) than retear group (77.2 points) ($P = 0.005$). There was no difference in preoperative ROM, while postoperative ROM was significantly better in non-tear group than retear group (Table 1).

DISCUSSION AND CONCLUSION:

Our results suggest that ARCR with muscle advancement procedure is a reliable and useful techniques for large or massive rotator cuff tears. However, male patients and significant fatty degeneration in preoperative MRI were risk factors for

retear.

Fig.1



Debeyre J, Patte D, *et al.* J Bone Joint Surg. 1965.

Fig.2



Table 1. Difference between non-tear group and re-tear group.

	NON-TEAR GROUP	RE-TEAR GROUP	P-VALUE
Age	69.4±7.6 y.o.	71.5±7.7 y.o.	0.14
Gender (Male)	49.2%	78.4%	0.002*
Surgical side (Right)	78.1%	73.0%	0.51
Goutallier 4 in pre op MRI	24.2%	54.1%	0.001*
Pre op ASES score	44.2	38.1	0.24
Post op ASES score	88.3	77.2	0.005*
Pre op forward flexion	114±49	105±37	0.32
Post op forward flexion	151±21	132±40	<0.001*
Pre op external rotation	46±26	45±23	0.96
Post op external rotation	46±22	35±19	0.006*
Pre op internal rotation [†]	6.4±2.1	5.9±2.3	0.22
Post op internal rotation [†]	6.7±1.5	5.7±2.1	0.003*

* Significant difference between groups ($P < .05$)

[†] Vertebral levels are converted to points for analysis purposes (Buttock-Gnate trochanter; 2points, Sacrum-L4; 4 points, L3-L1; 6 points, T12-T8; 8 points, T7-T1; 10 points).