Management of Irreparable Rotator Cuff Tears: Margin Convergence and Superior Capsular Reconstruction have Equal Outcomes in Patients with Preserved Preoperative Forward Flexion

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INTRODUCTION: Margin convergence (MC) and superior capsular reconstruction (SCR) are common treatment options for irreparable rotator cuff tears in younger patients. While both treatment options have demonstrated good outcomes, they have vastly different costs and operative times. Thus, the purpose of this study is to compare range of motion, patient-reported outcomes, and reoperation rates following MC and SCR. We hypothesized that SCR would outperform MC with regard to functional and subjective outcomes as well as reoperation rates.

METHODS: A multicenter retrospective review was conducted on 59 consecutive patients with irreparable rotator cuff tears that underwent either MC (28 patients) or SCR (31 patients) from 2014-2019. Patient inclusion criteria were the following: 1) failed conservative or prior surgical management, 2) no or mild glenohumeral arthritis, 3) Hamada grade 1 or 2 rotator cuff arthropathy, 4) Goutallier grade 3 or 4 fatty infiltration of the involved muscles, and 5) intact or repairable subscapularis tear. All patients had a minimum of 1 year follow up. Visual Analogue Scale (VAS) for pain, Subjective Shoulder Value (SSV), active forward flexion (FF) and external rotation (ER), retear rate, and rate of conversion to reverse total shoulder arthroplasty were evaluated. For statistical analysis, t-tests were used to determine differences in functional outcomes, VAS, and SSV, while Chi-Squared tests were used to determine differences in the rate of retear and conversion to arthroplasty (*$p < 0.05$).

RESULTS:

There were no significant differences in the mean age at the time of surgery, gender, body mass index, preoperative FF and ER, and preoperative VAS between the groups ($p > 0.05$). The average follow up for the MC group was 31.5 months and for the SCR group was 17.8 months. Neither the MC group nor the SCR group had a significant improvement FF or ER postoperatively. Both the MC and SCR group had significant improvements in VAS for pain from an average of 7.3 preoperatively to 2.5 postoperative for the MC group ($p < 0.01$) and from 6.3 preoperatively to 1.6 postoperative for the SCR group ($p < 0.01$). In a subset of the MC group ($n = 22$), the SSV significantly increased from an average of 53.9 preoperatively to 81.5 postoperatively ($p < 0.05$). In the SCR group, the SSV significantly increased from an average of 38.2 preoperatively to 77.1 postoperatively ($p < 0.01$). There were no significant differences in the postoperative FF or ER, change in FF or ER, postoperative VAS, rate of retear, and rate of conversion to arthroplasty between groups (Table 1). In a subset of patients with preoperative pseudoparesis (FF < 90°; $n = 9$), SCR was able to significantly improve FF from 46.6° preoperatively to 141.1° postoperatively ($p < 0.05$).

DISCUSSION AND CONCLUSION: While both MC and SCR were effective in improving VAS for pain and SSV in this cohort with overall preserved preoperative motion, neither treatment consistently resulted in significant improvement in ROM. Thus, MC may be a better option for initial management of irreparable RCTs in patients with preserved preoperative FF since it costs less, requires less operative time, and preserves native tissue. However, further studies with long-term outcomes are needed to determine if there are certain indications for which one treatment results in better outcomes.

Table 1. Comparison of outcomes, re-tear rate, re-operation rate, and rate of conversion to reverse total shoulder arthroplasty between margin convergence and superior capsular reconstruction groups. (FF – forward flexion; ER – external rotation; VAS – visual analogue scale)

	Margin Convergence (n = 28)	Superior Capsular Reconstruction (n = 31)	p-value
Pre-operative FF(°)	144.4	119.3	> 0.05
Post-operative FF (°)	150.5	142.0	> 0.05
Pre-operative ER (°)	47.8	44.2	> 0.05
Post-operative ER (°)	47.8	46.0	> 0.05
Pre-operative VAS for Pain	7.3	6.4	> 0.05
Post-operative VAS for Pain	2.5	1	> 0.05
Re-tear rate (%)	21.4	16.1	> 0.05
Re-operation rate (%)	10.7	6.5	> 0.05
Rate of conversion to reverse shoulder arthroplasty (%)	3.6	6.5	> 0.05