A re-tear following arthroscopic rotator cuff repair induces deterioration of functional outcome after mid-term follow-up: A propensity score-matched comparative study.

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INTRODUCTION:

Arthroscopic rotator cuff repair (ARCR) as a treatment for full-thickness rotator cuff tear (FTRCT) has been reported to have retear rates ranging from 3% to 27%. However, despite these findings, ARCR has consistently demonstrated high patient satisfaction and favorable clinical outcomes. Therefore, there remains a debate regarding the relationship between structural integrity and clinical outcomes, as well as predicting patients who will require revision surgery.

Although many studies have demonstrated factors increasing the retear rate following ARCR, factors such as age, sex, tear size, cuff involvement, repair technique, and follow-up period, have also been reported to affect outcomes after ARCR, irrespective of retear. Therefore, the confounding effects of these factors cannot be excluded.

Also, such dissociation between structural and clinical outcomes poses challenges for surgeons in predicting candidates for revision surgery. While it has been reported that patients with retear who experience persistent pain or muscle weakness undergo revision surgery, there is still limited research on significant factors to aid in deciding between conservative treatment and revision surgery.

Therefore, the purposes of this study were (1) to evaluate the impact of retear following ARCR on clinical outcomes in both the short-term and after a minimum 5-year follow-up period, and (2) to identify associated factors among patients with retear requiring revision surgery.

METHODS:

This study was a retrospective analysis of patients who underwent ARCR at a single institution from January 2014 to December 2018. The inclusion criteria consisted of patients who underwent ARCR for FTRCT. The exclusion criteria consisted of the following: (1) patients who had previous surgery on the affected shoulder, (2) patients with an isolated subscapularis tears, (3) patients who underwent partial repair, and (4) patients without postoperative MRI follow-up.

Preoperative evaluation was performed for all patients. Active range of motion (ROM) was assessed. Functional scores, including visual analog scale for pain and function (PVAS, FVAS), the American Shoulder and Elbow Surgeons (ASES) score, and Constant score, were evaluated preoperatively, and final functional outcomes, including PVAS, FVAS, and ASES score, were evaluated with telephone interview by a shoulder-specialized trainer. The minimal clinically important difference (MCID), substantial clinical benefit (SCB), and patient acceptable symptomatic state (PASS) for the PVAS and ASES score were utilized from a previous study, and they were 1.5, 2.5, 1.7 for PVAS and 21.0, 26.0, 78.0 for ASES score, respectively.

Postoperative MRI was obtained for all patients 6 months after surgery to evaluate structural integrity. Based on the Sugaya classification, patients were classified into 2 groups: healed group (Sugaya type I-III) and retear group (Sugaya type IV and V).

Propensity scores were calculated using a logistic regression model with following factors: age at surgery, sex, tear size of supraspinatus tendon, Yoo and Rhee classification of subscapularis tendon, repair type of supraspinatus and infraspinatus tendon, and follow-up period.

Finally, information on whether revision surgery was performed, and the type of revision surgery received was also collected.

RESULTS:

Among 742 patients who underwent ARCR, retears were identified in 106 patients (total retear rate of 14.3%) on the six-month postoperative MRI, of which 86 underwent a follow-up of over five years (follow-up rate of 81.1%). The retear rates by tear size demonstrating 6.3% for small size, 12.9% for medium size, and 20.7% for large-to-massive size tears.

Of the 86 patients in the retear group, 11 who underwent revision and 10 without a one-year postoperative follow-up were excluded for propensity score matching (PSM). Consequently, PSM was performed for the remaining 65 patients, resulting in 65 well-balanced pairs with a SMD of .008. The mean follow-up period was 6.9 ± 1.4 year. All functional outcomes at the postoperative 1 year and the final follow-up improved compared to the preoperative status, regardless of the retear (all $P < .001$). Within the Retear group, PVAS at the final follow-up was observed to deteriorate compared to postoperative 1 year ($P = .044$). While there were no significant differences in all functional outcomes at 1-year postoperatively (all $P > .05$), the Retear group demonstrated significantly worse outcomes than the Healed group in PVAS (2.5 ± 1.5 vs. 1.9 ± 1.5, $P = .011$), FVAS (7.3 ± 1.4 vs. 7.8 ± 1.3, $P = .020$), and ASES score (73.2 ± 12.7 vs. 79.9 ± 15.4, $P = .008$) at the final follow-up. While there were no significant differences between the two groups in the proportion of patients achieving improvements exceeding the MCID, SCB, and PASS thresholds in PVAS at one-year postoperatively (all $P > .05$), at the final follow-up, the Healed group had significantly higher rates than the Retear group in achieving

MCID (0.80 vs. 0.59; *P* = .008), SCB (0.60 vs. 0.32; *P* = .002), and PASS (0.48 vs. 0.26; *P* = .011). Similarly, while there were no significant differences in the ASES score at one-year postoperatively (all *P* > .05), at the final follow-up, the Healed group demonstrated significantly higher rates than the Retear group in achieving MCID (0.68 vs. 0.46; *P* = .013), SCB (0.57 vs. 0.39; *P* = .035), and PASS (0.60 vs. 0.43; *P* = .049).

Revision rate in the Retear group was 12.8%. The multivariate analysis showed that retear of the infraspinatus (P = .037) and larger anteroposterior retear size (P = .022) were associated with revision following a retear.

DISCUSSION AND CONCLUSION: The functional outcomes following ARCR improved regardless of the presence of retear during mid-term follow-up. However, while the impact of retear itself on clinical outcomes was minimal in the short-term, it became more pronounced after the mid-term period. Additionally, retear involving the infraspinatus or with a larger anteroposterior size was associated with a higher likelihood of requiring revision surgery.