Assessing the Rotator Cuff Healing Index (RoHI) Score's Predictive Power for Postoperative Re-Tear and Clinical Outcomes After Arthroscopic Rotator Cuff Repair

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INTRODUCTION: The Rotator Cuff Healing Index (RoHI) is a multifactorial score designed to consider preoperative patient characteristics and imaging findings. While previous studies have shown that RoHI can predict postoperative rotator cuff re-tear, its association with postoperative outcome scores is still unclear. Therefore, this study aims to externally validate the predictivity of the RoHI score for postoperative rotator cuff re-tear and to explore its associations with 1- and 2-year postoperative clinical outcomes following arthroscopic rotator cuff repair.

METHODS: This retrospective study reviewed data from a previously published randomized clinical trial. All participants from the clinical trial were included. The RoHI score was calculated using the original method, substituting the deltoid-tuberosity index as a proxy for bone mineral density (BMD) instead of a DEXA scan. Postoperative imaging was evaluated by two musculoskeletal fellowship-trained radiologists, with rotator cuff re-tear defined as a Sugaya Score of ≥4. Logistic regression and receiver operating characteristic (ROC) analyses were used to determine the predictivity of the RoHI score for re-tear. The optimal threshold for predicting rotator cuff re-tear was identified using Youden's Index. Patients completed ASES, Constant, SANE, SF-12, SST, and VR-12 questionnaires preoperatively and at 1- and 2-years postoperatively. Associations between RoHI score and postoperative Sugaya scores, as well as patient-reported outcome measures (PROMs), were assessed using linear regression analysis. Statistical significance was set at $p < 0.05$, and all analyses were conducted in R.

RESULTS: The study included 100 subjects, with 75 obtaining postoperative MRIs. The average patient age was 56.77 ± 8.71 years, and 37% were female. The mean deltoid tuberosity index and RoHI scores were 1.584 ± 0.185 and 2.673 ± 2.123, respectively. The overall re-tear rate was 37.33%. Postoperative Sugaya scores were significantly associated with RoHI scores ($\beta = 0.153$, $p = 0.019$) and preoperative AP tear size ($\beta = 0.029$, $p = 0.020$). The RoHI score significantly predicted rotator cuff re-tear (OR 1.395, $p = 0.029$), with an ROC analysis demonstrating good predictivity (AUC = 0.791) and identifying a cutoff of 2.55 points for predicting re-tear. However, the RoHI score was not significantly associated with 1-year ($p \geq 0.336$) or 2-year ($p \geq 0.086$) outcomes for any PROM.

DISCUSSION AND CONCLUSION: The RoHI score, using the deltoid-tuberosity index for BMD, shows significant predictivity for re-tear following arthroscopic rotator cuff repair. However, it does not significantly correlate with postoperative outcomes. These results are consistent with previous studies indicating weak associations between postoperative rotator cuff re-tear and PROMs. Further research is needed to identify the most effective preoperative predictors for postoperative clinical outcomes following rotator cuff repair.