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A Novel Ultrasonographic Grading System for Postoperative Adhesion Following Arthroscopic Rotator Cuff Repair: Correlation with Postoperative Functional Shoulder Outcomes

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Introduction and Background

Postoperative stiffness remains a frequent and challenging complication after arthroscopic rotator cuff repair. Such stiffness may partly result from postoperative adhesion concomitant to intraoperative bleeding and trauma; however, the possible clinical relevance of adhesion has been underexplored in literature. Postoperative ultrasonography may enable the evaluation of such adhesion, as it provides a dynamic assessment of periarticular tissue. We aimed to introduce and validate a novel ultrasonographic grading system for postoperative adhesion and to analyze its correlation with functional outcomes after ARCR.

Material and Method

A retrospective cohort of 147 patients (mean age, 62.2 ± 9.2 years) who underwent primary ARCR for small- to medium-sized posterolateral tears was evaluated. Ultrasonographic examinations were performed at 3, 6, and 12 months postoperatively, and the subcoracoid view was obtained at each examination. Adhesion severity observed in the subcoracoid view was classified from grade 0 to 4 based on deltoid-subscapularis-coracohumeral ligament interaction during passive external rotation. Range of motion (ROM), pain visual analog scale (VAS), ASES, and Constant scores were recorded at each follow-up. Partial correlations adjusted for age, sex, tear size, and hand dominance were calculated. Inter- and intrarater reliability were assessed using Cohen's κ .

Results

Grade 2 adhesion was most common across alltime points (51.0% at 3 months), while grade 3 incidence decreased from 42.2% at 3 months to 16.3% at 12 months. Higher adhesion grades correlated significantly with reduced ROM, ASES, and Constant scores at all follow-up points ($p < 0.05$). Patients with grade 3 adhesions (in which the coracohumeral ligament elongates along with passive external rotation) demonstrated significantly inferior ROM and clinical scores compared with those with grades 0-2. Intrarater reliability was substantial ($\kappa = 0.662$), and inter-rater reliability was moderate ($\kappa = 0.534$).

Conclusions

The novel ultrasonographic grading system introduced in this study provides a simple, reproducible method for assessing postoperative adhesion after ARCR and shows strong correlations with functional outcomes.

