Overreduction of Type V Acromioclavicular Joint Dislocations During Acute Fixation is Associated with Improved Postoperative Rockwood Classification

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INTRODUCTION: Loss of reduction (LOR) is the most common postoperative complication following fixation for acromioclavicular joint (ACJ) dislocations with previously identified surgical risk factors. However, those studies did not include isolated suspensory fixation or examine the effect of intraoperative overreduction for which a LOR definition of an increase in coracoclavicular (CC) distance of 6 mm may be inappropriate. Therefore, the purpose of this study was to evaluate loss of reduction after acute fixation and risk factors associated with loss of reduction for Rockwood Type V ACJ dislocations in a young, active population with different fixation methods.

METHODS: We retrospectively analyzed CC ligament repairs and reconstructions performed in the Military Health System from 2013-2020. Type V ACJ dislocations treated within 6 weeks were included. We excluded patients for inadequate imaging, less than 1 year follow-up if they had maintained reduction, for hookplate use, fracture, or reoperation for infection or hardware removal. Radiographs were analyzed for two measures of LOR, known risk factors for LOR, and overreduction of the ACJ during surgery. We defined radiographic loss of reduction as an increase in CC distance of 6 mm. Clinical loss of reduction was defined as a Rockwood Type III or greater on final imaging. We defined overreduction as the inferior border of the clavicle being inferior to the inferior aspect of the acromion and measured this difference. The primary outcome was LOR. Secondary outcomes included return to duty and reoperation for revision or distal clavicle excision. We statistically analyzed risk factors for LOR using student t-tests, ANOVA, and logistic regression. Univariate analysis was performed with Fisher's exact tests and logistic regression.

RESULTS: 183 patients were included with a mean age of 28.6 ± 8.1 years and were 94.5% male and 92.3% active duty. Repair occurred in 99 (54.1%). Mean time to surgery was 11.8 ± 9.0 days from injury. Isolated suspensory fixation occurred in 91 (49.7%), suspensory fixation with graft reconstruction in 47 (25.7%), and graft reconstruction without suspensory fixation in 37 (20.2%). The radiographic LOR rate was 37.2%. Fixation type was not a statistically significant risk factor for radiographic LOR. The clinical LOR rate was 24.6%. At the time of surgery, 55 (30.0%) were overreduced by a mean 5.2 ± 2.4 mm (range 2.1-12.1) beyond a Rockwood Type I. Overreduction was protective against clinical LOR with an odds ratio of 0.14 (95% CI 0.02-0.60, p=0.002), but not for radiographic LOR with an odds ratio of 1.32 (95% CI 0.65-2.65, p=0.409).

DISCUSSION AND CONCLUSION: In Type V ACJ dislocations treated acutely, loss of reduction remained high regardless of fixation type. However, clavicles that were overreduced at time of fixation were seven times less likely to lose ACJ reduction clinically, defined as a Rockwood Type III or greater postoperatively. Surgeons should consider overreduction at the time of fixation to decrease the rate of clinically important loss of reduction.

Figure 1: (A) Preoperative radiograph demonstrating a Rockwood Type V ACJ dislocation with >100% elevation of the clavicle relative to the acromion. (B) Initial postoperative radiograph following CC ligament repair with suspensory fixation and ACJ reduction classified as a Rockwood Type "0" with overreduction of the ACJ by 6.1 mm. Yellow lines parallel the inferior and superior borders of the lateral clavicle. The red line is drawn perpendicular to the inferior border of the lateral clavicle superiorly to the inferior aspect of the acromion to measure the amount of overreduction. (C) Postoperative radiograph at 4 months demonstrating a Rockwood Type I and no clinical LOR, but a >6 mm increase in the CC distance that would classify as a radiographic LOR by the traditional definition.

