

Does a Modified Frailty Index Predict 30-Day Complications Following Nonunion or Malunion Surgery? Part I: Upper Extremity

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Purpose: The purpose is to assess the use of the 5-item modified frailty index (mFI-5) score to identify patients with elevated risk of 30-day complications after surgical treatment of nonunions and malunions of upper extremity long bones.

Methods: All patients undergoing surgical repair of nonunions and malunions of upper extremity long bones from the 2005-2018 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) were identified. mFI-5 was calculated for each patient, then stratified as mFI-5 score of 0, 1, or ≥ 2 . Univariate analysis was performed to determine the association between each of the demographic factors (age, sex, and race), comorbidities (smoking, dialysis, bleeding disorder, obesity, and steroid use), and complications (wound, medical, cumulative morbidity, extended length of stay, adverse discharge, and unplanned readmission) with the mFI-5 score categories. All significantly associated demographic and comorbidity variables were then used as covariates in a binomial logistic regression model to determine the independent association of mFI-5 score and the postoperative outcomes that were significantly associated with mFI-5 on univariate analysis. The main outcome measure was postoperative 30-day complications following upper extremity nonunion/malunion surgery.

Results: 2964 patients were included. Of this cohort, 1786 (60.3%) had an mFI-5 of 0 (and thus considered not frail), 792 (26.7%) had an mFI-5 score of 1, and 386 (13.0%) had mFI-5 score ≥ 2 . Univariate analysis showed that increasing mFI-5 score was associated with older age and female gender. With respect to comorbidities, increasing mFI-5 score was associated with American Society of Anesthesiologists (ASA) class, smoking, dialysis, bleeding disorders, obesity, and steroid use. Additionally, increasing mFI-5 score was associated with complications such as medical complications, extended length of stay, adverse discharge, and readmission. Binomial logistic regression showed that patients with mFI-5 ≥ 2 had an increased risk of wound complications (odds ratio [OR] 2.660, 95% confidence interval [CI]: 1.139-6.211, $P = 0.021$), medical complications (OR 2.433, 95% CI: 1.320-4.486, $P < 0.001$), cumulative morbidity (OR 2.265, 95% CI: 1.368-3.750, $P = 0.001$), adverse discharge (OR 1.694, 95% CI: 1.190-2.410, $P < 0.001$), and unplanned readmission (OR 2.007, 95% CI: 1.030-3.909, $P < 0.001$).

Conclusion: An mFI-5 score greater than or equal to 2 is associated with major 30-day complications following operative management of upper extremity long bone nonunions and malunions.