Six-Item Modified Frailty Index as a Predictor for Postoperative Complications Following Open Reduction Internal Fixation of Distal Radius Fracture

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INTRODUCTION: Distal radius fracture (DRF) is one of the most common fractures across all age groups and is second only to hip fractures in the elderly. With increasing life expectancy and a more active elderly patient population, it becomes increasingly relevant to understand patient risk factors in those who undergo surgical fixation of DRF. In elderly patients undergoing orthopedic surgery, patient frailty has been associated with higher rates of postoperative complications following total hip and knee arthroplasties. The goal of this study was to investigate the six-item modified frailty index (MF-6) as a predictor for postoperative complications following open reduction internal fixation of distal radius fracture in elderly patients.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for all patients of age 65 and older who underwent open reduction internal fixation (ORIF) of distal radius fracture between 2015 and 2020. The NSQIP database is fully deidentified, therefore rendering this study exempt from approval by our University's Institutional Review Board. MF-6 was calculated using a 6-point system with one point given for each of the following conditions: chronic obstructive pulmonary disease, congestive heart failure, insulin or non-insulin dependent diabetes, hypertension, dependent functional status, and hypoalbuminemia. Patient comorbidities and complications were compared between cohorts of normal MF-6 (< 3) and high MF-6 (≥ 3) using bivariate analysis. Multivariate logistic regression was used to identify independent associations between MF-6 score and postoperative complications.

RESULTS SECTION: A total of 2,472 patients remained after exclusion criteria, of which 2,299 (93.0%) had MF-6 < 3 and 173 (7.0%) had MF-6 ≥ 3. After adjusting for all significantly associated patient variables, multivariate logistic regression identified the 30-day postoperative complications associated with MF-6 ≥ 3 (Table 3). Multivariate analysis found MF-6 ≥ 3 to be independently associated with higher rates of reintubation (OR 16.47, 95% CI 1.74-155.52; $p = 0.014$), readmission (OR 3.36, 95% 1.83-6.18; $p < 0.001$), non-home discharge (OR 1.89, 95% CI 1.31-2.74; $p < 0.001$), and mortality (OR 6.45, 95% CI 1.61-25.95; $p = 0.009$).

DISCUSSION: The MF-6 is an emerging tool for predicting postoperative orthopedic outcomes. Our findings align with previous studies that show the five-item modified frailty index (MF-5) effectively predicts poor outcomes after orthopedic surgery. Overall, this study showed that the MF-6 score predicts higher rates of reintubation, readmission, non-home discharge, and mortality in patients undergoing ORIF of distal radius fractures. Limitations of this study include limitations of the data available on NSQIP, such as postoperative data only within the 30 day postoperative period.

SIGNIFICANCE/CLINICAL RELEVANCE: The MF-6 has the potential to be a strong tool for clinical use, allowing clinicians to evaluate patients more effectively preoperatively and ultimately make clinical decisions more efficiently.

IMAGES AND TABLES:

Table 1. Multivariate analysis of 30-day postoperative complications, adjusted for significant patient demographics/comorbidities, based on MF-6 scores. Bold p-values indicate statistical significance.

Complication	Odds Ratio	95% CI	p-value
Pneumonia	2.74	0.66-11.26	0.162
Reintubation	16.47	1.74-155.52	**0.014**
Urinary tract infection	1.59	0.58-4.38	0.369
Cardiac arrest	5.99	0.52-69.40	0.152
Blood transfusion	1.62	0.48-5.46	0.436
Readmission	3.36	1.83-6.18	**<0.001**
Non-home discharge	1.89	1.31-2.74	**<0.001**
Mortality	6.45	1.61-25.95	**0.009**

CI, confidence interval