

Use of a Modified Frailty Index as a Preoperative Assessment Tool for Patients Undergoing Fixation of Long Bone Fractures

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Purpose: Frailty is an important predictor of surgical outcomes that can be used in risk assessment for patients with multiple comorbidities and functional impairments. The modified frailty index (mFI) has recently been adapted to a 5-item score and has promise to be a valuable risk assessment tool in orthopaedic trauma patients. As there is an increased incidence of long bone fractures in frail patients, the mFI may be used as a predictor of complications to better inform preoperative planning.

Methods: The National Surgery Quality Improvement Program (NSQIP) 2006-2016 database was queried for cases of surgically managed long bone fractures by using CPT codes. Cases were excluded if they were missing demographic, frailty, or outcome data. The 5-item frailty index was calculated based on the sum of presence of 5 conditions: COPD (chronic obstructive pulmonary disease)/ pneumonia, congestive heart failure, diabetes, hypertension, and impaired functional status. Non-routine discharge was defined as discharge to a location other than the patient's home. Chi-square was used to determine variables significantly associated with each outcome. Significant variables were included in multivariate logistic regression. The Bonferroni correction was applied, which yielded a significance threshold of $P < 0.003$.

Results: Of the 140,249 fixation procedures performed on long bone fractures in NSQIP, 109,423 cases remained after exclusion criteria were applied. The majority of patients were between the ages of 61 and 80 years (34.0%), female (65.6%), and Caucasian (86.3%). Multivariate analysis revealed that mFI scores >3 were significantly predictive of mortality (odds ratio [OR] = 4.27), wound disruption (OR = 2.83), unplanned reoperation (OR = 1.57), unplanned readmission (OR = 2.12), surgical site infection (OR = 1.90), major and minor complications (OR = 3.04 and 2.79, respectively), and non-routine discharge (OR = 3.06).

Conclusion: We present data on the relationship between frailty and postoperative complications in patients with long bone fractures. Patients with the highest frailty score had the greatest likelihood of morbidity and mortality, independent of other factors. The mFI may have a role as a simple, easy-to-use risk assessment tool that can inform preoperative discussions in cases of orthopaedic trauma and lead to appropriate precautions to minimize the frequency of these complications. Future studies should investigate the prospective predictive value of the mFI and any prophylactic measures taken.