

Are the frail destined to fail? Frailty index as predictor of surgical morbidity and mortality in the elderly

STUDY QUESTION

Can a modified frailty index predict surgical outcomes in geriatric emergency general surgery patients?

STUDY DESIGN

Design: Retrospective chart review

Setting: Data were obtained from the American College of Surgeons National Quality Improvement (NSQIP) from 2005-2009. The ACS NSQIP monitors and seeks to improve surgical care. It is available to all private sector hospitals which meet minimal requirements and pay an annual fee. The NSQIP goal is to reduce surgical morbidity and mortality.

Patients: Emergency general surgery patients > age 60 years.

Description of Methods: A modified frailty index (MFI) identified 11 variables predictive of frailty from the Canadian Study of Health and Aging Frailty Index (CSHA-FI). The CSHA-FI, an epidemiological study of dementia, consists of 70 variables that determine deficits in physical, cognitive, functional and social abilities. The CSHA-FI has followed over 10,000 geriatric Canadians for a decade and does not focus on the ED setting. The MFI uses 11 variables selected based upon NSQIP data availability, ease of use, and reproducibility. The 11 items include: diabetes, CHF, HTN, TIA, MI, PVD, CVA with a deficit, COPD, previous PCI, impaired sensorium, and functional status. The MFI is calculated by assigning a value of one to each variable when present and then dividing the total by 11 to yield the MFI score, which was computed for each study subject. The MFI score was then assessed as a predictor of outcomes.

Outcomes: Wound infection, any infection, mortality, other adverse events at 30-days.

MAIN RESULTS

There were 35,344 patients reviewed from the NSQIP dataset with a distribution of MFI scores between 0 and >0.73. Some (29.3%) patients had an MFI score of 0.09 representing the presence of just one of the 11 MFI predictor variables. All endpoints, including the primary endpoint of 30 day mortality, increased as the MFI score increased. Mortality increased from 3.6% in those with MFI 0 to 51% with MFI >0.73 ($p < 0.001$). Subsequent multivariate analysis adjusting for wound classification, ASA status, age, and MFI suggested that MFI was the strongest predictor of death (Odds Ratio 11.7, $p < 0.001$).

CONCLUSION

The MFI predicts perioperative mortality and adverse event risk in geriatric patients who undergo emergency general surgery.

ABSTRACTED FROM

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COMMENTARY by Ali Southern, MD, MS (Summa Akron City Hospital)

Mortality and postoperative complications increase with age. [1] This study goes beyond age, evaluating preoperative risk assessment of emergency general surgery using multiple variables contributing to frailty. Frailty indexes which may contain 70 variables are difficult to use and are impractical in the acute setting. Gait speed is one variable considered valuable as a single screening tool.[2] The authors of this study recognize the limitations of using variables such as gait speed and grip strength in the acute care setting. The authors feel the MFI score is a user-friendly, time efficient tool that can guide a physician's decision making and counseling of the patient and family. Although the MFI is more user friendly and practical in the ED setting than other frailty indices, in clinical practice the emergency physician would need to rely upon surgical consultants to fully assess operative risk. The emergency physician can use the MFI as a tool to demonstrate the complexity of decision-making for geriatric patients with multiple co-morbidities, but the threshold above which patients forego emergency surgery is still a multifactorial process requiring more than just the MFI score. This study failed to report sensitivity, specificity, or likelihood ratios amongst their primary outcomes so clinicians cannot translate these prognostic findings to individual patients using Bayesian logic. Further validation is required before implementing the MFI in the ED setting.

1. Keller SM, Markovitz LJ, Wilder JR, Augses AH: **Emergency and elective surgery in patients over age 70.** *Am Surg* 1987, **53**(11):636-640.
2. Abellan van Kan G, Rolland Y, Houles M, Gillette-Guyonnet S, Soto M, Vellas B: **The assessment of frailty in older adults.** *Clin Geriatr Med* 2010, **26**(2):275-286.