Report of a Simplified Frailty Score Predictive of Short-Term Postoperative Morbidity and Mortality

Louis M Revenig, MD, Daniel J Canter, MD, FACS, Sungjin Kim, MS, Yuan Liu, PhD, John F Sweeney, MD, FACS, Juan M Sarmiento, MD, FACS, David A Kooby, MD, FACS, Shishir K Maithel, MD, FACS, Laureen L Hill, MD, MBA, Viraj A Master, MD, PhD, FACS, Kenneth Ogan, MD

BACKGROUND: Frailty is an objective method of quantifying a patient's fitness for surgery. Its clinical use is limited by the time needed to complete, as well as a lack of evidence-based interventions to improve outcomes in identified frail patients. The purpose of this study was to critically analyze the components of the Fried Frailty Criteria, among other preoperative variables, to create a simplified risk assessment amenable to a busy clinical setting, while maintaining prognostic ability for surgical outcomes.

STUDY DESIGN: We performed a prospective evaluation of patients that included the 5-component Fried Frailty Criteria, traditional surgical risk assessments, biochemical laboratory values, and clinical and demographic data. Thirty-day postoperative outcomes were the outcomes of interest.

RESULTS: There were 351 consecutive patients undergoing major intra-abdominal operations enrolled. Analysis demonstrated that shrinking and grip strength alone hold the same prognostic information as the full 5-component Fried Frailty Criteria for 30-day morbidity and mortality. The addition of American Society of Anesthesia (ASA) score and serum hemoglobin creates a composite risk score, which facilitates easy classification of patients into discrete low (ref), intermediate (odds ratio [OR] 1.974, 95% CI 1.006 to 3.877, $p = 0.048$), and high (OR 4.889, 95% CI 2.220 to 10.769, $p < 0.001$) risk categories, with a corresponding stepwise increase in risk for 30-day postoperative complications. Internal validation by bootstrapping confirmed the results.

CONCLUSIONS: This study demonstrated that 2 components of the Fried Frailty Criteria, shrinking and grip strength, hold the same predictive value as the full frailty assessment. When combined with American Society of Anesthesiologists score and serum hemoglobin, they form a straightforward, simple risk classification system with robust prognostic information. (J Am Coll Surg 2015;220:904–911. © 2015 by the American College of Surgeons)

Adults aged 65 or older are the fastest growing segment of the American population, and correspondingly, there will continue to be an increase in the number of surgical procedures performed in the elderly.[1] The traditional surgical risk assessments are subjective,[2,3] account only for a single organ system,[4,5] or are limited to overt diagnosed comorbidities.[6] The subjectivity of these assessment tools are demonstrated in studies showing high inter-observer variability between anesthesia personnel assigning American Society of Anesthesiologists (ASA) scores and poor concordance among physicians estimating 10-year life expectancy.[7,8]

The inability of traditional risk assessments to capture decrements in physiologic reserve stimulated interest in adapting patient frailty as a preoperative assessment to better capture the functional heterogeneity and operative risk of the elderly and infirm. Frailty is an entity well described in the geriatrics literature as a syndrome of decreased

Disclosure Information: Nothing to disclose.

Received December 16, 2014; Revised January 31, 2015; Accepted January 31, 2015.

From the Departments of Urology (Revenig, Master, Ogan), General Surgery (Sweeney, Sarmiento), Surgical Oncology (Kooby, Maithel), and Anesthesiology (Hill), Emory University School of Medicine and Winship Cancer Institute (Kim, Liu, Sarmiento, Kooby, Maithel, Master, Ogan), Atlanta, GA; and the Department of Urology, Einstein Health Network and the Urologic Institute of Southeastern Pennsylvania, Philadelphia, PA (Canter).

Correspondence address: Kenneth Ogan, MD, Department of Urology, Emory University School of Medicine, 1365 Clifton Rd NE, Building B, Suite 1400, Atlanta, GA 30322. email: kogan@emory.edu

© 2015 by the American College of Surgeons
Published by Elsevier Inc.

http://dx.doi.org/10.1016/j.jamcollsurg.2015.01.053
ISSN 1072-7515/15

Abbreviations and Acronyms

ASA = American Society of Anesthesiologists
AUC = area under the ROC curve
CCI = Charlson Comorbidity Index
ECOG = Eastern Cooperative Oncology Group
ROC = receiver operator characteristic

physiologic reserve. When recognized, it identifies community-dwelling older adults at increased risk for falls, hospitalization, disability, institutionalization, and mortality.[9] Numerous groups have investigated various definitions of frailty and found them to be reliable predictors of morbidity, mortality, extended length of stay, discharge to a nursing facility, and increased costs.[10-13]

Widespread clinical adoption of frailty is limited by a number of factors. Primarily, the time taken to perform a frailty assessment is not negligible to a busy surgical clinic, especially in settings without ancillary research staff. Furthermore, without a currently available evidence-based intervention to improve outcomes for the identified frail patients, practitioners may question the added time and expense. As such, in this study, we built on our previously published results[14] by expanding enrollment to allow for a critical analysis of the individual components of the frailty criteria, among other preoperative variables. The purpose of this study was to isolate the most critical components of the frailty assessment while supplementing them with variables that are already part of the standard preoperative workup, with the aim of creating an accurate, simplified frailty score more applicable to the setting of a busy surgical clinic.

METHODS

Study design and participants

The Emory University Institutional Review Board approved this prospective study of patients undergoing major surgical intervention for a urologic, general surgical, or surgical oncology illness, not including endoscopic procedures such as transurethral resection of the bladder/prostate and ureteral stone retrieval. We included patients aged 18 years or older who were in the process of being evaluated for a surgical procedure requiring hospital admission. We excluded patients who were unable to ambulate, those who had poor manual dexterity or inability to grip, and those unable to read or verbally understand the questionnaires. We enrolled 393 patients consecutively after surgical consultation and consent to proceed with surgery.

Preoperative assessment of frailty included the 5 components of the Fried Criteria[9] (shrinking, weakness, exhaustion, low activity, and slowed walking speed [Appendix 1]), traditional risk indices assigned by surgeons and/or anesthesiologists, such as American Society of Anesthesiologists (ASA) scale,[2] Eastern Cooperative Oncology Group (ECOG) Performance Status,[3] and Charlson Comorbidity Index (CCI),[6] and serum biochemical measurements commonly obtained preoperatively (albumin, C-reactive protein, serum creatinine, platelets, and hemoglobin). For grip strength measurements, we used the Jamar Hydraulic Dynamometer. For each patient, we also collected the following clinical/demographic variables: age, race, sex, height, weight, BMI, medical comorbidities, and surgical procedure.

Outcomes measures and statistical analysis

The primary outcomes measures were any postoperative complications of any grade using the Clavien-Dindo Classification within 30 days of surgery,[15] any major complication, mortality, and discharge to a nursing care facility. Meticulous review of the medical record, with particular attention to the patient's hospital course and postoperative follow-up visits, was conducted to obtain data on postoperative surgical complications and discharge disposition.

All analyses were conducted using SAS 9.3 software. Results were considered significant, with a $p < 0.05$ or marginally significant, with $p < 0.1$. Descriptive analysis was carried out for the entire study population as well as for subpopulations separated by frailty status (not frail vs intermediate frail and frail). In the univariate analysis assessing study outcomes, the chi-square test or Fisher's exact test, where appropriate, were used for categorical variables and Wilcoxon rank-sum tests for continuous variables. The predictive ability of the overall frailty score, defined as the sum of 5 frailty components (range 0 to 5) as well as their combinations, were estimated and compared by the area under the curve (AUC) through receiver operating characteristic (ROC) analysis.

Once a simpler combination frailty score with a similar predictive power as the overall frailty score was identified, we were able to construct a predictive model for 30-day complications using a new, integrated risk assessment score incorporating other preoperative variables, such as ASA, Charlson Comorbidity Index, age, serum hemoglobin, and serum albumin. A logistic regression model for a backward elimination method was used, with an alpha level of removal of 0.1. With the final prediction model, a weight for each level of the variables in the model was decided such that each 2-point increase in the final score

Download English Version:

https://daneshyari.com/en/article/4291269

Download Persian Version:

https://daneshyari.com/article/4291269

Daneshyari.com