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Failure to rescue after emergency general surgery in geriatric patients: does frailty matter?

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ABSTRACT

Background: Failure to rescue (FTR) is considered as an index of quality of care provided by a hospital. However, the role of frailty in FTR remains unclear. We hypothesized that the FTR rate is higher for frail geriatric emergency general surgery (EGS) patients than nonfrail geriatric EGS patients.

Methods: We performed a 3-y (2015-2017) prospective cohort study of all geriatric patients (age $\geq$ 65 y) requiring EGS. Frailty was calculated by using the EGS-specific Frailty Index (EGSFI) within 24 h of admission. Patients were divided into two groups: frail (FI $\geq$ 0.325) and nonfrail (FI $<$ 0.325). We defined FTR as death from a major complication. Regression analysis was performed to control for demographics, type of operative intervention, admission vitals, and admission laboratory values.

Results: Three hundred twenty-six geriatric EGS patients were included, of which 38.9% were frail. Frail patients were more likely to be white ($P < 0.01$) and, on admission, had a higher American Association of Anesthesiologist class ($P = 0.03$) and lower serum albumin ($P < 0.01$). However, there was no difference between the groups regarding age ($P = 0.54$), gender ($P = 0.56$), admission vitals, and WBC count ($P = 0.35$). Overall, 26.7% ($n = 85$) of patients developed in-hospital complications; and mortality occurred in 30% ($n = 26$) of those patients (i.e., the FTR group). Frail patients had higher rates of FTR (14% vs. 4%, $P < 0.001$) than nonfrail patients. On regression analysis, after controlling for confounders, frail status was an independent predictor of FTR (OR: 3.4 [2.3-4.6]) in geriatric EGS patients.

Conclusions: Our study demonstrates that in geriatric EGS patients, a frail status independently contributes to FTR and increases the odds of FTR threefold compared with nonfrail status. Thus, it should be included in quality metrics for geriatric EGS patients.

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Introduction

Every day in the United States, 12,000 Americans reach the age of 65 y, making geriatric people (age ≥ 65 y) the fastest growing population subset. Currently, there are over 46.3 million (14.5%) geriatric Americans, and this figure is expected to grow to 98 million (24%) by 2060.[1] One reason why the rapidly increasing geriatric population is a major public health crisis is because a relatively greater proportion of the elderly requires some form of major operative intervention.[2] It is estimated, for instance, that over 33% of the elderly population undergoes surgery within the last year of life.[3] Increasing age is also associated with higher morbidity and mortality.[4] Moreover, surgical stress in elderly patients is additive and further increases the risk of morbidity and mortality.[5]

Failure to rescue (FTR) refers to mortality after developing a major in-hospital complication. FTR is considered a better indicator of quality of care within a health care organization than the complications rate alone.[6] Various studies have analyzed different factors associated with FTR, including patient volume and hospital resources (e.g., staff and availability of intensive care).[7-10] Recent research has demonstrated that patient-level factors are as important as hospital care delivery in determining his/her recovery and successful rescue after developing complications.[6] Many quality improvement programs focus on reducing the occurrence of postoperative complications and rescuing a patient from dying after developing complications. The first step to reducing the FTR rate is identifying the high-risk, vulnerable elderly surgical patient. Subsequently, different strategies can be devised and implemented to increase the likelihood of "rescue" from complications.

Frailty, defined as a decline in physiological reserve, is an emerging geriatric syndrome. As shown in the surgical literature, it can predict morbidity and mortality. The impact of frailty on outcomes has been studied extensively in acute and elective care settings.[11-21] Hospital-level factors affecting the FTR rate are well established; however, the role of patient-level factors, such as frailty, is not well known. Therefore, the aim of our study was to determine the impact of frailty on FTR among geriatric surgical patients. We hypothesized that frail patients are more likely to die after developing complications following emergency general surgery (EGS) than nonfrail patients.

Methods

Study setting and population

We prospectively enrolled all patients of 65 y of age and older who underwent an emergency surgical evaluation at our level I trauma center (Banner University Medical Center, Tucson) from 2014 to 2016. Banner University Medical Center is a tertiary care hospital with a valid Magnet status, and it is the first hospital in Arizona to earn Magnet recognition in 2003. Our center follows a dedicated acute care surgery (ACS) model and provides 24-h emergency surgery services. To ensure consistency in perioperative management, this study was restricted to patients who underwent surgery by any of the eight attending surgeons in the ACS service. Likewise, the same group of surgeons managed the postoperative care of all the patients. This study was approved by the Institutional Review Board of the University of Arizona.

Inclusion and exclusion criteria

We included all geriatric patients (age ≥ 65 y) who had an emergency surgical evaluation by the ACS service and had surgical intervention. We excluded elective general surgery patients, those transferred from other facilities, and those who died within 24 h after surgery. We also excluded patients for whom we could not calculate a frailty index (e.g., those with an altered mental status, unavailability of family, and who did not consent).

Data points and definitions

After enrolling patients, we obtained data from electronic medical records and personal interviews. We collected the following baseline patient characteristics: demographics (age, gender, race, and ethnicity); admission vitals (heart rate, systolic blood pressure [SBP], temperature, and respiratory rate), admission laboratory values (WBC count, hematocrit, serum creatinine and serum albumin, lactate levels, and base deficit); the American Association of Anesthesiologist (ASA) physical status score; in-hospital complications; hospital length of stay (LOS); intensive care unit (ICU) LOS; in-hospital and 30-d mortality; discharge disposition (home, rehab, or skilled nursing facility); and readmission. We also ascertained preoperative comorbidities (e.g., congestive heart disease, chronic obstructive pulmonary disease, diabetes mellitus, chronic kidney disease, dialysis dependence, coronary artery disease, prior myocardial infarction, prior stroke, the need for anticoagulation, current smoking status, alcohol dependence, malignancy, and immune suppression).

Outcome measures

Our primary outcome measure was FTR. Secondary outcome measures were in-hospital complications, mortality, hospital and ICU LOS, discharge disposition, and 30-d readmissions. Complications included infectious (sepsis and urinary tract infection), respiratory (acute respiratory distress syndrome and pneumonia), cardiovascular (myocardial infarction, cardiac arrest), hematological (deep venous thrombosis, pulmonary embolism, disseminated intravascular coagulation), and renal (acute kidney injury) problems.

Study protocol

Patients eligible for enrollment were identified from morning ACS sign-out rounds. Afterward, investigators approached all eligible patients. The study protocol, along with benefits and harms, was explained to every patient. Following written informed consent, the EGS-specific frailty index (EGSFI) questionnaire (Fig. 1) was administered.[13] It was explained to each patient that all 15 variables in the EGSFI relate to pre-existing conditions. Responses from the patient or closest family member were recorded on the questionnaire.