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Breaking the Frailty Code: Emergency General Surgery in the Elderly

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Abstract

Acute-care surgeons are frequently faced with the care of older patients presenting often with unique diagnostic and therapeutic challenges. In this sense, geriatric emergency general surgery includes a diverse range of disorders with distinct disease processes, presentations and management issues. The most important factor that must be considered when caring for geriatric emergency general surgery patients is frailty. It is defined as a state of reduced physiologic reserve that is independent of age.

This paper defines and measures frailty, contextualizes and optimizes it within the geriatric EGS patient population.

Keywords: frailty, defining and measuring frailty, optimization of frail EGS patients

The older population has been rapidly growing due to an increasing life expectancy. By the year 2030, elderly Americans are expected to constitute 19% of the population.[1] Approximately, 41 percent of all annual in-patient surgeries in the US are already being performed on the older population.[2,3] As a result, acute care surgeons will frequently be faced with the care of older patients who often present with unique diagnostic and therapeutic challenges. Geriatric emergency general surgery includes a diverse range of disorders with distinct disease processes, presentations, and management issues. The most common conditions include acute diverticulitis, mesenteric ischemia, acute cholecystitis, and acute appendicitis. Elderly adults also have distinct physical and social vulnerabilities, as well as unique demands for their care that warrant a more thorough and individualized approach to surgery. The most important factor that must be considered when caring for geriatric emergency general surgery patients is frailty. It is defined as a state of reduced physiologic reserve that is independent of age.

Aging is associated with anatomical and physiological changes that further complicate the management of emergency general surgery in the elderly population. As the global population continues to age, acute care surgeons are likely to see an increased number of elderly patients. In addition, it has been shown that surgeons who perform lower volumes of geriatric-specific EGS procedures annually are associated with higher odds of patient death and failure-to-rescue, underscoring the need for focused care of elderly surgical patients by specialized surgeons and centers.[4]

Primary evaluation of the elderly patient with a suspected surgical emergency is challenging. Presentation of the elderly patients is often atypical, delayed, and vague. Preexisting cognitive impairment or neurologic deficits

(i.e., dementia, delirium, prior stroke, and neuropathy) are contributing factors for the atypical or delayed presentation of the patient, or the ability to be detected by primary care providers.[5] Moreover, the history of present illness may be difficult to obtain as it is often complex, deficient, and imprecise. Among patients hospitalized to an intensive care unit, altered mental status, absence of peritoneal signs, analgesics, antibiotics, and mechanical ventilation contribute to delays and difficulties in surgical evaluation and treatment. All of these factors contribute to increased rates of morbidity and mortality among the elderly, presenting with surgical conditions.[6,7]

Defining and Measuring Frailty

During the past few decades, the quality of health care has become an important focus for outcomes research. The objective of such research is to bring to light the best evidence-based practices that help to improve patient outcomes. Countless studies have examined outcomes following general surgery in older adults. Predominantly, these studies have looked at mortality and complications as outcomes. The association of age and adverse outcomes is well-established and validated. However, more recently, the focus has shifted from age to functional status as a predictor of postoperative outcomes in patients undergoing general surgery. The use of objective measures of preoperative assessment helps in informed decision-making, which is crucial for geriatric patients, undergoing emergency general surgery and for their families. The American College of Surgeons (ACS) has developed a surgical risk calculator based on multi-institutional NSQIP data that allows one to accurately estimate the risk of the most common surgical procedures, and aids in informed decision making.[8] This risk calculator is based on 21 preoperative risk variables. It allows to adjust for surgeon's estimation of an increased risk using the Surgeon Adjustment Score (SAS). Several studies have shown that the NSQIP calculator reliably predicts the postoperative complication risk of surgical patients and aids clinicians and patients to make decisions using empirically derived patient-specific postoperative risks.[9] While accurate, the ACS NSQIP calculator does not incorporate several components of frailty that contribute significantly to the final postoperative outcomes of surgical patients. Studies have also shown that for patients undergoing emergency general surgery, frailty index better predicts complications. Also, the addition of these additional variables to the NSQIP calculator may significantly improve the predictability of the NSQIP calculator.[10]

Several models exist for the calculation of frailty index. The most comprehensive frailty questionnaire is the Rockwood frailty model based on 70 variables that assess the cognitive, physiological, physical, and social wellbeing of the individual. The Rockwood frailty index has been validated for patients undergoing an elective surgery. More recently, a modified 50-variable Rockwood frailty index has been shown to reliably predict morbidity in patients undergoing emergency general surgery.[11] Interestingly, by using the 15 strongest predictors out of the 50 variables, a similar predictability can be achieved. The use of this 15-variable EGS-specific frailty index allows for a more rapid, yet accurate, assessment of frailty status for patients undergoing emergency general surgery (see Table). For each question in the frailty index, a patient receives a score varying from 0 to 1. The sum of final score is then divided by 15 to calculate the frailty index of the patients. Patients with a frailty index of >0.325 are considered frail and are at high risk for morbidity, following emergency general surgery. This new EGSFI was found to be a strong and reliable predictor of postoperative complications and mortality among frail patients, proving it to be a simple and reliable bedside tool to determine the frailty status of patients undergoing EGS.[12,13] Another study has compared the predictive validity of the EGSFI to other frailty indices and found it to have increased practicality, while having superior predictive validity for adverse discharge disposition.[14]

Association Between Frailty and Outcomes Among Geriatric EGS Patients

Frailty has been extensively studied in the geriatric EGS patient population. The frailty syndrome was found to be significantly associated with higher rates of worse in-hospital outcomes, including postoperative complications, failure-to-rescue (defined as death of a patient after suffering a complication), and in-hospital mortality. Frail patients have also been found to be at a higher risk of non-home discharge disposition, such as discharge to a skilled nursing facility and in-patient rehabilitation.[13,15-18] Interestingly, frailty was also independently associated with the development of postoperative delirium, an alarming finding considering the prevalence, morbidity, and overall health decline associated with delirium.[19]

Finally, frailty has also been associated with worse long-term post-discharge outcomes. Patients with mild frailty experienced a higher risk of 1-year mortality compared with non-frail patients (hazard ratio 1.97). In the year after discharge, patients with mild and moderate to severe frailty had more hospital encounters compared with non-frail patients (7.8 and 11.5 vs 2.0 per person-year: incidence rate ratio [IRR] 4.01 vs IRR 5.89). Patients with mild and moderate to severe frailty also had fewer days at home in the year after discharge compared with non-frail patients. Considering the detrimental pre-, peri-, and post-operative outcomes attributed to frailty syndrome, it is vital that we identify and address frailty at every point of intervention possible.

It is also worth noting that frailty may have implications for operative decision-making as well. Frail geriatric acute uncomplicated appendicitis patients were found to have significantly higher rates of mortality, complications, clostridium difficile infections, and total hospital costs when managed with delayed appendectomy versus those managed operatively on index admission.[20] Similarly, frail geriatric patients with acute calculous cholecystitis, who were managed non-operatively on index admission were found to have poorer 6-months outcomes, if compared to those who were managed with early cholecystectomy on index admission, including longer lengths of stay, increased mortality, a 19% rate of failure for non-operative management, and higher rates of emergency operations and postoperative complications among those managed with a delayed emergent cholecystectomy.[21] These findings highlight the need for further research into the optimal management approaches of common EGS procedures among frail geriatric patients.

Optimization of Frail EGS Patients

When possible, modifiable factors should be optimized if frailty is identified prior to elective surgery for improving the likelihood of favorable outcomes. Preoperative optimization can include attention to pre-habilitation, nutrition, psychosocial factors, and possibly drug therapy.

Pre-habilitation and exercise therapy can improve frailty and may be particularly important for frail patients with cardiac disorders. A reconditioning program for elderly abdominal surgery patients was found to improve both sit-to-stand time and up-and-go time compared to the usual care.[22] Improving nutritional deficiencies, including attention to vitamin replacement, protein supplementation, and iron supplements when indicated, may also be of value, though more research is needed to explore the benefit of these interventions. Screening with a depression instrument such as the PHQ-9, and dealing with other psychosocial factors, including social support and "will-to-improve" should also be addressed. Additionally, although the safety, benefit, and mechanism of "performance-enhancing drugs" (e.g. anabolic steroids) are unclear, it is thought that they are helpful.

Finally, a frailty identification and care pathway implemented at a hospital may be the ideal method for identifying at-risk patients as well as reversing and optimizing their frailty status preoperatively. An example of a frailty identification pathway would be to use a validated frailty index such as the EGSFI as a screening tool for all elderly EGS patients. The frailty care pathway would then employ a combination of hospitalist/geriatrician consultations; nutritional/speech/physical/occupational/language therapist consultations; early family and social support engagement; social worker involvement for identifying social needs and goals of care; a specialized geriatric specific order set; and thorough post-discharge follow-up plans in order to holistically and comprehensively attend to all of the unique challenges faced by a frail geriatric EGS patient. Such a screening and care pathway has already been implemented and was found to lead to reduced length of stay, 30-day emergency readmissions, and loss of functional independence.[23] Similarly, specialized enhanced recovery after surgery (ERAS) pathways for geriatric EGS patients consist of recommendations on perioperative glycemic and fluid management, temperature control, pain, nausea, and vomiting management, and mobilization and diet have all been found to result in shorter hospital lengths of stay as well as fewer postoperative complications.[24]

End-of-life Care in Elderly EGS Patients

Withdrawal of care is a common occurrence in geriatric trauma patients who are admitted to the ICU. Despite its frequency, it remains a complicated and challenging situation for health care providers. Most common causes for withdrawal of care include reduction of patient suffering, anticipated poor quality of life, and brain death.[25] It is important to understand that withdrawal of care should not always be viewed as a symbol of failure or defeat. Understanding the issues associated with end-of-life situations and palliative care is of paramount importance to improve the care of dying patients.

A patient-centered approach should be utilized to establish the goals of the treatment in geriatric patients. This requires an in-depth discussion with the patient and their families about the likely outcomes and subsequent quality of life. There are numerous prognostic models that predict mortality and may help in informed decision making. However, none of these models are 100% accurate. The decision for withdrawal of care should be based on a risk-benefit analysis, patient autonomy, and patient wishes. Concurrent surgical and palliative care have been found to significantly improve quality of life and end of life care for geriatric EGS patients. Palliative care was found to be independently associated with increased rates of hospice discharge instead of inpatient mortality.[26,27]

Conflict of Interest Disclosure Statement

The author has no conflicts of interest to disclose.

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