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Article 1: Patient Safety

Cognitive impairment and overall survival in frail surgical patients. Makhani SS, Kim FY, Liu Y, et al. *J Am Coll Surg* 2017;225:590–600

Article 2: Colon/Rectal; General Surgery

American College of Surgeons NSQIP Risk Calculator accuracy for emergent and elective colorectal operations. Lubitz AL, Chan E, Zarif D, et al. *J Am Coll Surg* 2017;225:601–611

Article 3: General Surgery

Effect of surgeon and hospital volume on emergency general surgery outcomes. Mehta A, Efron DT, Canner JK, et al. *J Am Coll Surg* 2017;225:666–675

Objectives: After reading the featured articles published in this issue of the *Journal of the American College of Surgeons* (JACS), participants in this journal-based CME activity should be able to demonstrate increased understanding of the material specific to the article featured and be able to apply relevant information to clinical practice.

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ARTICLE 1

(Please consider how the content of this article may be applied to your practice.)

Cognitive impairment and overall survival in frail surgical patients

Makhani SS, Kim FY, Liu Y, et al
J Am Coll Surg 2017;225:590–600

Learning Objectives: After study of this article, surgeons should be able to create a composite frailty score using the clock-drawing test and Fried frailty criteria, and use this score to predict mortality risk for surgical patients.

Question 1

Preoperative frailty:

- Is calculated by using the Fried frailty score in all surgical clinics nationally
- Has evaluated frailty in both the physical and cognitive domains of surgical patients in previous cohort studies
- Is a reliable and objective method of quantifying a patient's fitness for surgery
- Is associated with postoperative complications, but has no association with hospital stays or discharge institutionalization
- Is a poor predictor of mortality

Critique: Preoperative frailty has no standard definition across surgical clinics nationally, but the Fried frailty score has been used in the literature primarily to calculate preoperative frailty. However, the Fried

frailty score accounts only for a patient's physical capabilities. Other studies have demonstrated that cognitive impairment also influences patients' postoperative outcomes. Previous surgical frailty studies are therefore limited to either the physical domain only or the cognitive domain only, but not a combined assessment of both domains. Nonetheless, previous research highlights the importance of preoperative frailty as a more reliable and objective method of quantifying a patient's fitness for surgery when compared with traditional surgical risk assessments, such as the American Society of Anesthesiologists' scale. Preoperative frailty is found to be associated with poor postoperative outcomes, including increased postoperative complications, longer hospital stays, higher rates of discharge institutionalization, and higher mortality risk.

Question 2

The Fried frailty criteria:

- Consist of 3 components (slow walking speed, weakness, and exhaustion)
- Are measured out of a total score of 5, with a higher score signifying more frail patients
- Involve a global genotype of physiologic reserve that leaves those affected less able to respond to external stressors
- May be applied only to patients 65 years of age or older
- Were originally designed to be used as a surgical risk assessment tool

Critique: The Fried frailty criteria consist of 5 components: slow walking speed, weakness, exhaustion, weight loss, and low activity. Each of these components is graded on a dichotomous scale of 0 or 1, to sum up for a total score out of 5. A higher score indicates a more frail patient. By combining these components for an overall score, Fried conceptualized a "global phenotype" of physiologic reserve to assess the adverse effects of aging. Those with greater frailty were less able to respond appropriately to external stressors. Traditionally, the Fried scale has been applied only to geriatric patients, but it has recently gained popularity as an objective risk assessment tool for surgeons to evaluate any adult patient 18 years of age or older.

Question 3

The clock-drawing test:

- Is a sensitive and specific tool for detecting moderate to severe cognitive impairment

- Is more influenced by educational status and requires more language ability when compared with other cognitive assessments
- Primarily assesses memory and attention
- May only be administered by a physician or a nurse practitioner
- Is considered normal when 2 of 3 criteria are filled: all numbers present, all numbers drawn in the appropriate location, and stated time drawn accurately

Critique: The clock-drawing test (CDT) is a sensitive and specific tool for detecting moderate to severe cognitive impairment. Compared with other cognitive assessments, such as the Mini-Mental State Exam or the Montreal Cognitive Assessment, it is less likely to be influenced by educational status and requires less language ability. The CDT primarily assesses visuospatial cognition and executive function, and it may be administered by any member of the medical ancillary staff. To be considered a normal test, a patient's CDT must fulfill all 3 requirements: 1) all numbers present without omissions, duplications, or superfluous markings; 2) the numbers 12, 3, 6, and 9 drawn in the appropriate quadrant; and 3) clock hands indicating the correct time.

Question 4

When combining both physical frailty (as defined by the Fried frailty score) and cognitive impairment (as defined by the clock-drawing test) in surgical patients:

- Physical frailty (PF) was found to be associated with cognitive impairment (CI).
- Patients who were both physically frail and cognitively impaired (PFCI) had the same mortality risk as those patients who were only physically frail.
- PFCI patients had the same mortality risk as the CI patients.
- PFCI patients had a higher mortality risk than both the PF and CI cohorts within 2 to 3 years postoperatively.
- There was no significant association in mortality difference between the PFCI patients and the robust patients after multivariable analysis.

Critique: In this study, univariate analysis found no significant association between the Fried frailty score and the clock-drawing test (CDT) score. We divided patients into 4 cohorts based on their Fried and CDT results: robust patients (RP), physically frail-only (PF) patients, cognitively impaired-only (CI) patients, and physically frail and cognitively impaired

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