Preoperative Frailty Assessment: An Opportunity to Add Value to Perioperative Care

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Anesthesiologists routinely assess and provide perioperative care for patients who are older and vulnerable to adverse postoperative outcomes.[1] For many older patients, this vulnerability can be traced back to the presence of frailty, a multidimensional syndrome related to the accumulation of age- and disease-related deficits.[2,3] Accordingly, multiple guidelines recommend that frailty be assessed in all older people presenting for surgery.[4,5] In this issue of Anesthesiology, Canales *et al.* investigate whether point-of-care ultrasound imaging can help to identify older patients with frailty.[6] While well-studied clinical tools exist to assess frailty, assessment is not routinely performed.[7] In some circumstances, especially where patients are acutely unwell, clinical assessment may not be feasible. Therefore, the authors hypothesize that ultrasound assessment could be a useful tool to address the gap between guidelines and practice.[7,8]

"[Can] point-of-care ultrasound imaging help to identify older patients with frailty?"

Fundamental to the hypothesis tested by Canales *et al.* is a tension present in many parts of anesthesiology practice: As new techniques and technologies emerge, is new and more always better? Or could anesthesiologists and our patients benefit from a less-is-more approach? Point-of-care ultrasound has quickly emerged as an area of interest for many anesthesiologists, used for volume assessment, cardiopulmonary evaluation, airway assessment, and other indications.[9] Could ultrasound also emerge as a quick and easy approach to assessing a multidimensional geriatric syndrome with substantial implications on prognostication, optimization, and care planning? Or could the training, equipment and attention required to perform and interpret point-of-care ultrasound studies potentially detract from providing efficient and patient-centered care? Perhaps the right answer lies somewhere in between.

In addressing this tension, let's consider what we know about frailty assessment. First, although no agreement exists on a single definition of frailty, widespread agreement exists that frailty is a multidimensional syndrome that exists on a continuum.[10] While no instrument is considered the accepted standard for frailty assessment, a handful of well-studied instruments exist for perioperative clinicians to choose from. These include the Fried Phenotype (as used by Canales *et al.*), the Clinical Frailty Scale, the Frailty Index, the Edmonton Frail Scale, and the Risk Analysis Index, which all allow frailty to be assessed across multiple domains (*e.g.*, physical, cognitive, physiologic, nutrition, and others), assigning scores that can vary across a meaningful range.[11] Furthermore, among these tools, the Clinical Frailty Scale and Risk Analysis Index can be applied in less than 2 min without the need for additional space, equipment, or subassessment scoring. This means that anesthesiologists already have access to tools that directly assess the presence of frailty, that can be used to assign an information-rich continuous score, and that can be feasibly and efficiently performed in a preoperative clinic or at the bedside with a stable, cognitively intact individual.

When considering an ultrasound-based approach to frailty assessment, one must acknowledge the multiple steps required to move conceptually and practically from imaging to frailty diagnosis. Conceptually, chronic disorders of muscle quality and quantity, which ultrasound imaging capture, are specific to assessment of sarcopenia,[12] a condition long understood to be related to, but distinct from, frailty.[13] Practically, the techniques used to determine the diagnostic accuracy of these muscle measurements in identifying

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frailty require identifying cutoffs for each measurement, which then reflect frailty as a binary diagnosis that is present or absent. This can lead to loss of prognostic information available when the dose–response relationship between frailty and outcome risk is considered. However, as stated by Canales *et al.*, despite these limitations, anesthesiologists routinely encounter patients in the setting of trauma, critical illness, and cognitive dysfunction where an objective bedside imaging assessment may be the only option available. Furthermore, although distinct from frailty, sarcopenia is also a strong risk factor for adverse postoperative outcomes.[14]

Ultimately, however, practitioners will most likely be interested in whether ultrasound accurately identifies those who will truly have frailty based on the Fried Phenotype. At this point, the data provided by Canales *et al.* represent an important step toward answering this question definitively. Their findings suggest that ultrasound measurements may provide moderate discrimination between those with and without frailty, although due to wide CIs, the authors rightly suggest these data require verification in a larger and more-detailed study. Using their estimated likelihood ratios, which were also bounded by wide confidence limits, a positive ultrasound screen results in a positive likelihood ratio of approximately 2, which is considered somewhat useful when one is interested in ruling in a diagnosis.[15] When looking to rule out frailty, muscle depth and circumference both had negative likelihood ratios of approximately 0.4, again considered to be somewhat useful diagnostic measures. For anesthesiologists, this means that if the pretest probability is high (in other words, if frailty in your practice population is prevalent), a positive ultrasound screen would meaningfully increase the likelihood that your patient truly has frailty. For example, in hip fracture patients, frailty is present in 50%,[16] meaning that a positive ultrasound result would increase the probability that your patient has frailty to greater than 66%. In contrast, for low frailty prevalence populations, such as elective hip replacement (approximately 10%),[17] ultrasound measures may be better for ruling frailty out, as a negative result would decrease the likelihood of frailty in a given patient to 4%.

So, for the practicing anesthesiologist, how do we harness the tools developed, and in development, to routinely identify vulnerable older people with frailty and attempt to improve their outcomes? For the majority of our older patients, we should work to incorporate one of the well-studied multidimensional assessment tools into our perioperative processes and systems of care. Knowing that a patient has frailty, and communicating this with the perioperative team, provides unique information that can potentially improve outcomes intrinsically,[18] or provide an extrinsic roadmap to optimization.[19] For patients where such assessments are not feasible, we should build on the work of Canales *et al.* to understand with greater certainty the value of ultrasound assessment, especially for some of our highest-risk patients who cannot engage in clinical frailty assessment. Ultimately, anesthesiologists' unique perioperative knowledge and skill set position us to increase the value of perioperative care for older people. Frailty assessment is a key aspect of this value proposition, and one that will be best addressed through complimentary approaches applied to the unique circumstances of each of our patients.

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