The frailty volume–outcome proposed relationship by Goel and colleagues is of great interest. However, further study is needed to determine the institutional mechanisms that underlie effective care. In the meantime, efforts must be taken at all cardiac surgery centers, irrespective of frailty volume, to assume comprehensive strategies to ensure better care and enhanced recovery for frail patients. Simply stated, it is not enough that frail patients survive; rather, they must thrive no matter where they undergo their cardiac operation.

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Commentary: Frailty, surgical volume and outcomes: Implication for percutaneous treatment

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When I accepted to write this editorial commentary, my first thought was to ask my colleagues to help me in defining the relationship between frailty and cardiac surgery. As expected, we independently concluded that frailty is an under-used concept and its assessment is complex, because “the eye ball test” at the end of the bed does not reflex the real patient’s conditions. A multidisciplinary team (“heart team”) is the key to success in identifying the best treatment option for that given condition and minimizing the potential risks. Frailty is a syndrome characterized by increased vulnerability to stressors owing to a loss of physiologic reserve. It is age-dependent, and its prevalence in patients

CENTRAL MESSAGE

A multidisciplinary approach is required for decision making between percutaneous and surgical treatment, especially for low-risk frailty patients.

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aged >65 years ranges from 8% to 20%.¹ Several frailty risk scores have been developed, comprising a combination of functional tests, descriptive scales, nutrition and cognitive assessments, and questionnaires.² However, these scores are often underused because they are complex and time consuming. In addition, no consensus has been reached regarding how frailty should be assessed. Afilalo and colleagues³ proposed the incorporation of some frailty markers in most common risk stratification tools. Nevertheless, the outcomes could depend on the volume outcomes as well.⁴ In this issue of the *Journal*, Goel and colleagues⁵ report a relationship between the outcomes and the

hospital's annual volume of frail patients, rather than the overall cardiac surgical volume. Using The Johns Hopkins Adjusted Clinical Groups frailty-defining diagnoses indicator, the authors identified 72,818 frailty patients of 1,507,899 patients (4.8%) undergoing coronary artery bypass graft or valve surgery at 1693 different hospitals during a 4-year study period.⁵ The most common single diagnostic cluster for frailty was malnutrition (67%), followed by decubitus ulcers (15%), difficulty in walking (11%), and weight loss (7%).⁵ The authors found that the frailty volume was associated with a 20% risk reduction in mortality and failure to rescue. In addition, the frailty volume also determined a shorter length of stay (3 days less) and lower costs (\$7500 USD less). Interestingly, the overall patient volume for mortality was not independently associated with improved mortality or failure to rescue.⁵

The large study by Goel and colleagues⁵ adds evidence that frailty is an important component for risk stratification because it increases mortality, morbidities, and costs. Specifically, overall, in-hospital mortality and failure to rescue were fourfold higher than in the nonfrailty patient group. Moreover, a median difference of 11 days and \$35,000 USD in hospital stay and health costs were found.⁵ These numbers have important implications for cardiac surgery, because percutaneous treatment is a less-invasive option for treating high-risk patients. Studies have shown the non-inferiority of the transcatheter approach compared with surgery for patients undergoing aortic valve replacement, irrespective of the baseline characteristics.⁶ Although longer follow-up is required, the early outcomes of frailty patients might benefit from percutaneous treatment, which avoids the invasiveness of the cardiopulmonary bypass machine and the surgical approach. A similar consideration exists for myocardial revascularization.^{7,8}

The strength of their study is the large sample size; however, the study has several limitations.⁵ First, it lacks specificity. Information on the patients' surgical operative risk (STS score or EuroSCORE II) is not reported. Thus, the authors were not able to evaluate the outcomes of low-risk frailty patients, who, at present, are at the center of discussion of the heart team. Second, the outcomes could also depend on quality improvement projects. Recently, Worrall and colleagues⁹ reported a significant 50% reduction in the observed/expected mortality (and morbidity) ratio for patients undergoing isolated coronary artery bypass grafting after adoption of a multifaceted quality improvement initiative. In addition, Kurlansky and colleagues¹⁰ demonstrated

that the surgical outcomes are not associated with the program or surgeon volume but are directly correlated with the focus on quality, as manifested by compliance with evidence-based quality standards. Finally, the postoperative results will also depend on the learning curve of young surgeons, who might have an impact on the outcomes of low-risk frailty patients.

In conclusion, the authors have demonstrated that the hospital's annual volume of frail patients undergoing cardiac surgery better predicts the outcomes for frail patients than does the overall cardiac surgical volume.⁵ However, the mortality and morbidity and costs have remained high compared with those for patients without frailty. A multidisciplinary approach, which includes the patient's operative risk and frailty assessment, is more and more required for decision-making between percutaneous and surgical treatment, especially for low-risk frailty patients.

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