

EDITORIAL COMMENT

Frailty

An Important Measure in Patients Considered for Transcatheter Aortic Valve Replacement*



Lars Søndergaard, MD, DMSc, Bettina Højberg Kirk, RN, MSN, Troels Højsgaard Jørgensen, MD

The risks of death and morbidity associated with the natural history of severe aortic valve stenosis need to be weighed against the risk related to aortic valve replacement as a basis for recommendation of treatment (1,2). The STS (Society of Thoracic Surgeons) score and EuroSCORE are often used to risk stratify patients undergoing surgical or transcatheter aortic valve replacement (TAVR) in connection with research (3–9). However, it is not uncommon for the risk score and actual mortality rate to differ significantly in cohorts of TAVR patients (Figure 1) (3–10). Further, guidelines for the management of valvular heart disease include the STS score and EuroSCORE II as tools to guide the recommendation of treatment in patients with aortic valve stenosis (1,2). However, it is stressed that risk scores have major limitations because important risk factors are not considered (1,2).

Predicting outcome after intervention needs to take more than clinical comorbidities into account. In an elderly patient population as that of TAVR candidates, there is a vast heterogeneity related to (sub) clinical vulnerability, including nutritional status, physical and cognitive impairments, and psychosocial risk factors (11,12). The vulnerability to stressors due to impairment in multiple, inter-related systems has been termed *frailty* (13) and has been conceptualized in many different scoring instruments for clinical use as to predict the outcome in different interventions (11). However, obtaining consensus on

frailty as a clinical measurable tool has proven difficult (12). Further, it has been hypothesized that different frailty scoring instruments might predict outcome better in specific clinical scenarios (11).

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In this issue of *JACC: Cardiovascular interventions*, Schoenenberger et al. (14) evaluate whether combining a Frailty index with the conventional STS score or logistic EuroSCORE improves prediction of mortality rate 1 year after TAVR. The applied Frailty index was developed by Schoenenberger et al. (15) on the basis of multidimensional geriatric assessment as a summary of scores ranging from 0 to 7. The frailty scores are derived from categorized values of Mini-Mental State Examination (cognitive assessment), Timed Get Up and Go test (mobility assessment), Mini Nutritional Assessment (nutritional status), basic and instrumental activities of daily living (functional status), and preclinical mobility disability. In total, 330 consecutive patients undergoing TAVR between September 2009 and June 2013 were included in the analysis. The median age was 83.6 years, transfemoral TAVR was performed in 93.6% of patients, and the median STS score and logistic EuroSCORE was 6.0% (interquartile range: 4.3%) and 19.2% (interquartile range: 16.6%), respectively.

The 1-year mortality and VARC (Valve Academic Research Consortium) defined complication rate increased with increasing Frailty index. Further, the 1-year mortality rate was extremely high in patients with the highest score on the Frailty index, albeit the number of patients with a high score was very low. Most importantly, Schoenenberger et al. (14) found that combining the Frailty index with the STS score or logistic EuroSCORE improved the prediction of 1-year mortality after TAVR. Further, the Frailty index accounted for most of the predictive information in

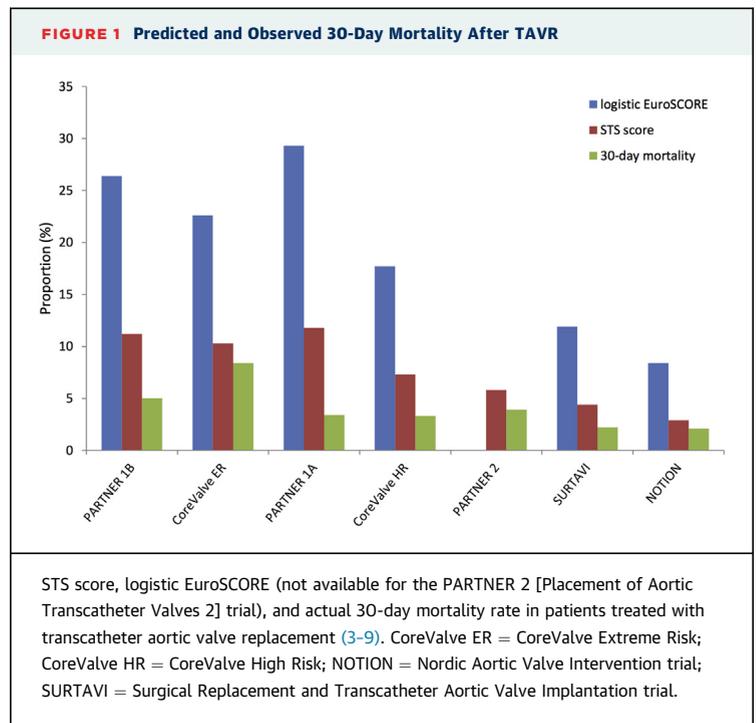
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From the Department of Cardiology, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

both models of Frailty index combined with the STS score or logistic EuroSCORE.

It is uncertain whether these results will increase the interest in the logistic EuroSCORE because its current use is limited and no longer recommended in a clinical setting (2). Obviously, the prospective nature of the present study including patients from 2009 until 2013 excluded the use of the recommended EuroSCORE II presented in 2011. Analysis of the individual components of the Frailty index in the present study found that the performance-based Timed Get Up and Go test for mobility impairment was best at predicting 1-year mortality. Interestingly, instrumental activities of daily living, but also preclinical mobility disability, which is somewhat similar to the poor mobility criteria included in the EuroSCORE II, did not show association with prediction of 1-year mortality in the TAVR cohort of the present study. By contrast, another study reported that poor mobility as defined in the EuroSCORE II was the best predictor of mortality over the long term after TAVR (16). Finding the optimal frailty scores and their TAVR-specific scale warrants investigation in larger trials. Further, designing or modifying a risk model does not necessarily benefit from numerous additional variables that might increase the risk of user error, collinearity, and overfitting (17), and could be cumbersome to complete.

The results of the present study are important and should increase the interest of combining frailty with conventional algorithms. However, the study results were derived from a single center including patients treated from 2009 until 2013. In the following years, operator experience and knowledge of how to treat complications have increased, and newer device generations have emerged, resulting in a low procedural mortality rate, even in high- and extreme-risk patients. As pointed out by the authors (14), the objective should be confirmed in independent and also more present-day TAVR populations. Further, the majority of included patients underwent transfemoral TAVR; it will be reasonable to consider whether the same performance of risk prediction will be found in patients undergoing TAVR with other access routes.



Frailty should be considered by every heart team when assessing the risk for the individual TAVR candidate. Guidelines recommend not relying on an “eyeball test,” but rather assessing frailty in an objective matter; however, no “gold standard” is recommended (1,2). Successful incorporating frailty into an algorithm for risk stratification of patients undergoing TAVR would be a much needed tool that could aid clinical recommendations and also provide information of potential reversible risk factors that could guide in-hospital stay and post-procedural management to a better outcome for the patient.

ADDRESS FOR CORRESPONDENCE: Dr. Lars Søndergaard, The Heart Center, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen, Denmark. E-mail: lars.soendergaard.01@regionh.dk.

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