

VIEWPOINT

Frailty in Patients With Valve Disease: How to Assess?

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Introduction

Valvular heart disease contributes to an important portion of hospital admissions. It can progress to heart failure and death, and it ranks eighth among the causes of mortality due to cardiovascular diseases in Brazil.¹ From the moment that a valve disease becomes anatomically important and has clinical repercussions, only interventional treatment (conventional surgery or transcatheter technique) is able to alter the natural course of the disease.^{2,3} The choice of intervention leads to the need for individualized evaluation of the patient, exposing associated clinical conditions that may impact the final result, such as frailty.^{4,5}

Frailty, as a clinical syndrome, is characterized by decreased physiological reserve and reduced capacity after a stressor event, causing vulnerability to diseases.⁶ It is related to decreased muscle strength, resistance, and functionality, resulting in greater dependence for daily activities and increased mortality.⁷ Some commonly associated conditions include sarcopenia, malnutrition, and hormonal disorders.⁸

The demographic transition, with the growth of the elderly population, has changed the global age pyramid, making frailty more common and prevalent. According to a meta-analysis of 21 studies, involving countries in the Americas, Europe, and Asia, frailty affects approximately 10.7% of the population over 65 years old.⁹

It is known that there are different profiles of patients with frailty, for example: patients who are frail due to their age and other associated comorbidities,

patients who become frail due to heart failure generated by valve disease, and young patients with frailty who were previously submitted to multiple surgical procedures.³ This latter profile is frequent in Brazil, where rheumatic fever remains a prevalent and significant disease.¹⁰ The first intervention often occurs in early adulthood, and biological prostheses is a common choice, due to unfavorable socioeconomic conditions and poor adherence to anticoagulant treatment. It is not unusual to come across patients around 50 years of age, with prosthetic dysfunctions and a history of various procedures. With each new surgery, surgical risk and technical difficulty increase.

The development of new interventional techniques, especially transcatheter aortic valve implantation (TAVI), has introduced a new possibility of treating elderly patients previously classified as “untreatable”.^{3,11} Studies have demonstrated the superiority of transcatheter treatment compared to drug treatment in patients with aortic stenosis who could not undergo valve surgery.^{12,13} In addition to TAVI, other techniques are available, such as “valve-in-valve”, “valve-in-mitral annular calcification”, and percutaneous clipping of the mitral valve, emerging as alternatives to surgical treatment.

Discussion

To measure frailty, we have several scores; however, there are limitations in listing which tools are more useful, faster, and easier. Furthermore, the vast majority were developed based on studies in which the population did not have valve disease as a fundamental requirement. This lack of consensus complicates clinical practice, causing divergences in medical assessment and patient characterization. The traditional preoperative risk assessment scores,

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EuroSCORE II and Society of Thoracic Surgeons (STS), are not able to adequately assess frailty; sometimes, they make erroneous estimates regarding cardiovascular outcomes in frail patients, such as in-hospital mortality, acute myocardial infarction, stroke, renal failure, and major bleeding.^{2,14} Routinely used isolated measurements, such as “gait speed” and “eyeball test”, also do not guarantee successful evaluation.¹⁵ Diagnosis of frailty requires a global analysis of the individual, where diverse variables regarding the physical, organic, and mental state are interpreted and correlated. For this task, there are frailty scores, especially the Katz Scale,¹⁶ Fried Scale,¹⁷ Rockwood Clinical Frailty Scale (CFS),¹⁸ Short Physical Performance Battery (SPPB),¹⁹ Bern Scale,²⁰ and Columbia Scale,¹⁷ which are subsequently described.

- The Katz Scale was one of the first scores developed that included analysis of elderly patients’ level of independence in basic day-to-day activities, such as bathing, dressing, locomotion, continence, and eating.¹⁶
- The Fried Scale evaluates 5 abnormalities: involuntary weight loss greater than 10 pounds in the past 6 months, reduced grip strength, difficulty initiating movements, reduced walking speed, and fatigue. A score greater than or equal to 3 is considered frail.¹⁷
- The CFS score is based on the patient’s clinical judgment, applying a scale from 1 (“very fit”) to 9 (“terminally ill”). Those classified as greater than or equal to 5 are considered frail.¹⁸
- The SPPB assesses lower limb strength, balance, and gait speed, classifying patients as good physical performance, moderate physical performance, poor physical performance, or disability. Scores less than or equal to 8 indicate frailty.¹⁹
- The Columbia Scale consists of the analysis of 4 items with scores from 1 to 3 for each item: handgrip strength, gait speed, serum albumin, and activities of daily living. Scores greater than or equal to 6 indicate frailty.¹⁷

These widespread scores are commonly used by specialists who deal with elderly patients. Sometimes, they require the help of specific calculators or the use of digital applications, due to the extent of their

components. However, when evaluating patients with valve disease, it is necessary to use a score that is easily and rapidly applicable and that promotes a true interpretation of the presence of frailty.

We highlight the Essential Frailty Toolset (EFT),¹⁷ because it was developed from a prospective, multicenter cohort study (14 centers in the USA, Canada, and France), with patients over the age of 70 years who underwent aortic valve intervention by surgery or TAVI. This score consists of the evaluation of 4 domains for scoring (Figure 1): rising 5 times from a sitting position without the aid of the upper limbs, cognitive status (the Mini-Mental State Examination is used), hemoglobin, and serum albumin. The score ranges from 0 to 5, and the closer to 5, the greater the degree of impact due to frailty. It is a score that is simple to use and quick to perform, and it does not require specialized equipment. It has been validated to predict the risk of 1-year mortality and ventricular dysfunction after aortic valve intervention. In addition, the score also has the power to predict the futility of procedures, as patients with 5 points are at greater risk of fatal outcomes and irreversible dysfunctions.

Another point to be observed is that the EFT does not determine medical conduct, and it does not have the power to contraindicate a procedure. A patient with an EFT score close to 5 presumably has a greater risk of developing cardiovascular events after valve intervention, but this does not necessarily mean that deciding on the intervention would be mistaken or deleterious for the patient. In certain situations, the intervention can guarantee improvement in symptoms, quality of life, and prognosis.

The EFT, compared to the other scores, was the most robust. It presented better performance and greater ability to identify patients at greater risk of poor outcomes after valve intervention.¹⁷ We emphasize that a perfect score does not exist to predict frailty, and we cannot, using only one tool, reject valve intervention. Each case should be discussed in an individualized manner, preferably in a Heart Team model.²¹ Once a patient with frailty has been identified, clinical measures focusing on improving nutritional status and reducing the effects of associated comorbidities should be employed.




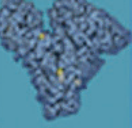
	Get up from the chair five times < 15 seconds	0 points
	Get up from the chair five times > 15 seconds	1 point
	Unable to perform	2 points
	Absent cognitive deficit	0 points
	Present cognitive deficit	1 point
	Serum hemoglobin ≥ 13.0 g/dl = men ≥ 12.0 g/dl = women	0 points
	Serum hemoglobin < 13.0 g/dl = men < 12.0 g/dl = women	1 point
	Serum albumin ≥ 3.5 g/dl	0 points
	Serum albumin < 3.5 g/dl	1 point

Figure 1 – Adapted from Afilalo et al. J Am Coll Cardiol. 2017;70(6):689-700.

Conclusion

We still need further studies to understand the impact of frailty in patients with valve disease, as well as its interactions with the development of heart failure or worsening of the clinical condition. Currently, the EFT has been the most used score in the context of valve diseases, due to its practicality, performance, and validation in patients with aortic valve stenosis. It should not be used as a tool to contraindicate any intervention; however, it provides additional information that assists the decision on conduct and guides medical care.

Author Contributions

Conception and design of the research: Titinger DP, Rosa VEE, Ochiai ME, Fernandes JRC, Tarasoutchi F; acquisition of data: Titinger DP, Ochiai ME, Accorsi TAD, Sampaio RO; analysis and interpretation of the data: Titinger DP, Accorsi TAD, Fernandes JRC, Sampaio RO; writing of the manuscript: Titinger DP;

critical revision of the manuscript for intellectual content: Titinger DP, Rosa VEE, Tarasoutchi F.

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This article does not contain any studies with human participants or animals performed by any of the authors.

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