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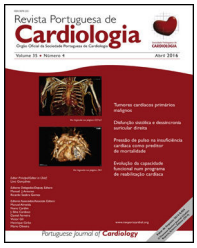

EDITORIAL COMMENT

The heart team approach to transcatheter aortic valve implantation: What has been done and what is to be expected

Abordagem da *Heart Team* à TAVI: o que tem sido feito e o que se espera

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Aortic stenosis is the most common acquired valvular heart disease in Europe. Its importance is growing not only because of its prevalence, but also because percutaneous treatment options have emerged in the last fifteen years that provide validated and effective treatment for previously untreatable patients.[1,2] Although a variety of devices are now available for treating patients of advanced age and with complex disease, not all patients are suitable candidates for transcatheter aortic valve implantation (TAVI), and patient selection remains a challenge.

The world's first TAVI procedure was performed by Alan Cribier in 2002.[3] The technique was first used in Portugal five years later in August 2007,[4] and since then many other centers have developed a TAVI program.[5] There are now as many as eleven functioning TAVI centers in Portugal, which annually perform over 56 procedures per million population, a figure that is growing.

Comorbidity, disability, and frailty are three entities that are particularly associated with elderly candidates.[6] The STS/ACC TVT Registry reports that TAVI patients are elderly, highly symptomatic and frail, with multiple comorbidities and advanced functional class, a high Society of Thoracic Surgeons-predicted risk of mortality, and poor self-reported health status.[7] Considering all these factors, it is not surprising that a significant percentage of patients die or fail to show improved quality of life in follow-up. The need to optimize the decision-making process in these complex patients has led to increased interaction between different specialties. Thus the concept of the heart team was born and has been widely applied ever since.

The value of a dedicated heart team assessment prior to TAVI is best shown by the team's ability to bring multidisciplinary clinical expertise to bear on two aspects of patient eligibility: risk stratification and analysis of futility. Integrating these two aspects should allow for better performance in assessing how the patient's quality of life and survival may be influenced by the valve disease and associated conditions, and in determining the treatment option that best balances risk and benefit. The importance of a heart team assessment is acknowledged in current practice guidelines, but is not reflected in a substantial quantity of publications on real-life applications.

In this issue of the *Journal*, Costa et al.[8] address the advantages of a systematic multidisciplinary approach to TAVI patients and provide insight into the heart team's assessment of TAVI candidates in a single large-volume national center.

The authors describe three steps for patient assessment: clinical assessment, non-invasive and invasive tests, and finally a multidisciplinary discussion. For the latter, a

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multidisciplinary team composed of clinical and interventional cardiologists, experts in cardiac imaging, heart failure specialists and cardiac surgeons meet regularly to define treatment strategies. Notably, the article is co-authored by a multidisciplinary team from different medical centers composed of the above-mentioned areas of expertise, as well as a researcher at the Chronic Diseases Research Center (CEDOC) of Nova Medical School.

The sample included 473 patients from 2008 to 2015, in 383 of whom a heart team assessment was completed. A significant number of patients were selected for surgical aortic valve replacement (SAVR) (20.9%) or for medical therapy alone (23.2%) (overall 169 of 383, 44.1%), reflecting the wide range of patient complexity. Those undergoing SAVR or TAVI were followed at 30 days, six months and one year after the procedure, and then annually; the authors do not mention a systematic follow-up of patients under medical therapy alone, which was presumably performed by the clinical cardiologist. The criteria for TAVI included inoperability or high surgical risk, and a subjective assessment of lack of futility.

A simple dedicated TAVI risk score remains an unmet clinical need. Most risk scores were designed for surgical risk, and patients under analysis for TAVI are beyond that stage. Integration with variables such as frailty (including muscle strength, gait speed, weight loss, exhaustion, and level of activity), the patient's capacity for self-care, and home oxygen use appear to contribute to more precise stratification. The $TAVI_2$-SCORe by Debonnaire et al. stratifies patients into five risk groups for one-year mortality based on a retrospective analysis of 511 individuals who underwent TAVI, with better results than the logistic EuroSCORE.[9] Hermiller et al. published a novel score for early and late mortality in extreme-risk and high-risk patients that accurately stratified patients into low, moderate and high risk,[10] while Capodanno et al. proposed a simple seven-factor risk tool (the OBSERVANT score) for prediction of 30-day mortality after TAVI.[11]

In parallel with risk stratification is the development of new tools for predicting clinical futility, and this entails looking at the patient from a different angle. Futility can be defined by the combination of death and/or absence of improvement in functional class during short-term follow-up post-procedure (six months to one year). Other definitions are possible and this is still a hotly debated topic. Factors influencing futility of treatment include non-cardiovascular conditions such as chronic lung disease (CLD), advanced chronic kidney disease and frailty, and various cardiovascular conditions, including reduced left ventricular ejection fraction, pulmonary hypertension, low trans-aortic gradient, low-flow state or severe organic mitral regurgitation.[12] An analysis of futility has been performed for a Portuguese TAVI population of 340 patients with a mean STS score of $5.67\pm4.17\%$. The authors found that age, CLD, New York Heart Association functional class $\geq$III prior to the procedure and a non-transfemoral approach were predictors of futility for this population.[13] Apart from its clinical impact, analysis of futility is also closely related to the healthcare costs of TAVI.

Although the TAVI and SAVR groups appear to have performed well in the population analyzed by Costa et al., there is still room for improvement, as the authors recognize. The fact that many patients died (12% of the study population) while awaiting heart team assessment or TAVI itself is a reminder of the severity of these patients and that appropriate strategies need to provide a more timely response from the healthcare system.

Heart team assessment should not only help clarify which patients are unlikely to benefit from TAVI, but should also translate into a positive effect on healthcare costs. Perhaps one of the most important statements by Costa et al. is that results are continuously monitored and all clinical and procedural data are collected in a dedicated database (Cardiobase) and included in an ongoing registry, the Valve Catheter Restorative Operation on Santa Cruz Hospital (VCROSS). It is reassuring to know that monitoring of results is taking place. This is critical for self-evaluation and improvement in any system and should be highlighted as a reference for currently implemented systems at other intervention centers.

To conclude, the accurate measurement of procedural outcomes for TAVI patients should include procedure-related clinical events, and also an assessment of quality of life and functional capacity. In the population analyzed by Costa et al., an analysis of quality of life and characterization of patients for whom the procedure was deemed futile could expand the analysis of the quality of treatment. Performing this analysis for the population of the national TAVI registry and determining predictors of futility could result in a valuable tool for heart teams in the future.

Conflicts of interest

The authors have no conflicts of interest to declare.

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