

Risk stratification in moderate aortic stenosis: looking beyond the valve

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This editorial refers to ‘SPARK score: comprehensive risk stratification in patients with moderate aortic stenosis,’ by C. Godino et al., <https://doi.org/10.1093/ehjvshd/xwag006>.

Moderate aortic stenosis (AS) has long been considered a transitional and largely conservative domain in valvular heart disease, managed with watchful waiting, periodic echocardiography, with intervention deferred until conventional criteria for severe stenosis are met. Over the past decade, however, this paradigm has been progressively challenged. Large observational cohorts and meta-analyses suggested that patients with moderate AS experience substantial rates of heart failure hospitalization and death, often approaching those observed in severe disease, particularly in the presence of left ventricular dysfunction or systemic comorbidity.^{1–4} However, the incidence of these complications in patients not undergoing AVR is still unclear, and their prediction remains difficult.

In the current issue of *Eur Heart J Valvular Heart Dis.*, Godino and co-authors assessed the risk of composite endpoint of cardiovascular death or heart failure hospitalization in 520 patients with moderate AS, all treated conservatively, over a 2-years follow-up period. The incidence of the composite endpoint was of 5.7 per 100 person-year, highlighting an elevated risk in this population. They also identified five outcome predictors (reduced left ventricular ejection fraction (LVEF), elevated filling pressures, pulmonary hypertension, anaemia, and chronic kidney disease), that they used to create a new score—the SPARK score—allowing to stratify the risk among patients with moderate AS. The cumulative incidence of the composite endpoint was 5.6% in the low-risk group (<4) and 32.7% in the high-risk group (≥4), with a hazard ratio of 7.3.

A major strength of the present study lies in its deliberate focus on events occurring during the moderate stage of the disease. By censoring patients at the time of progression to severe AS, the investigators avoided a key limitation of much of the existing literature, in which outcomes are confounded by disease progression and subsequent intervention. This design choice allowed a more faithful assessment of prognosis attributable to moderate AS itself, and confirmed that this stage is far from benign: more than 11% of patients experienced cardiovascular death or heart failure hospitalization within 2 years.

The outcome predictors identified in this study are in line with those evidenced in previous studies assessing outcomes in patients with moderate AS. Indeed, two trials identified pulmonary hypertension, reduced LVEF, and elevated filling pressure as assessed by the E/e' ratio as mortality predictors in this setting.^{2,3} As for anaemia and kidney disease, they both indicate presence of comorbidities and declined overall health status. Incorporating those parameters in one simple score could help the clinicians assess the actual risk of the patient and schedule the follow-up and management accordingly. Of note, classical valve haemodynamic parameters such as transvalvular gradient and velocity, did not independently predict prognosis. This observation reinforces a central concept that has progressively reshaped the field: prognosis in AS is driven less by the valve lesion in isolation than by the extent of myocardial and extracardiac damage that has already occurred. The staging system proposed by G  n  reux et al.⁵ formalized this paradigm in severe AS, demonstrating a stepwise increase in mortality with progressive involvement of the left ventricle, left atrium, pulmonary circulation, and right heart.⁵ The SPARK score extends this concept to moderate AS and confirms that markers of myocardial vulnerability dominate risk stratification even before the stenosis becomes hemodynamically severe.

Beyond the risk assessment among patients with moderate AS, the SPARK score might help in guiding intervention timing and designing future trials assessing the yield of early intervention in patients with moderate AS. Indeed, the advantage of early intervention at the moderate stage of AS has been a topic of debate in the recent years, as attention has focused on the risk of cardiac damage and its reversibility. Interestingly, among the parameters included in the SPARK score, both reduced LVEF and elevated filling pressure predicted worse prognosis even if AVR was performed in patients with moderate AS.² In another observational study including patients with reduced LVEF and moderate AS, AVR, and especially transcatheter AVR during follow-up, was still associated with improved survival, suggesting an advantage of early intervention in moderate AS. More recently, the

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TAVR UNLOAD randomized trial assessed the yield of transcatheter AVR in patients with moderate AS and reduced LVEF.⁶ It did not evidence a significant reduction in the composite of death, heart failure hospitalization, or disabling stroke compared with optimal medical therapy. This neutral result has tempered enthusiasm for routine early intervention. Yet the trial must be interpreted with caution. The sample size was modest, follow-up relatively short and patient selection based almost exclusively on left ventricular systolic dysfunction.

As the SPARK score clearly illustrates, reduced LVEF is only one dimension of myocardial damage, and outcomes in moderate AS are likely driven by a broader constellation of pathophysiological processes. The PROGRESS trial (NCT04889872) is enrolling patients with moderate AS and evidence of cardiac damage defined not only by systolic dysfunction but also by impaired global longitudinal strain, elevated filling pressures, or biomarker abnormalities. The central hypothesis is that unloading the left ventricle before irreversible remodelling occurs may modify the natural history of the disease. Similarly, the Evolut EXPAND TAVR II trial (NCT05149755) is evaluating transcatheter AVR in a broader population of symptomatic patients with moderate AS and early cardiac damage. These trials reflect a conceptual shift from valve-centered to myocardium-centred patient selection. If a benefit of AVR is confirmed in those trials, the SPARK score could help selecting patients that should be considered for early intervention.

In conclusion, Godino and colleagues provide a thoughtful and pragmatic contribution to a rapidly evolving field. By shifting the focus from valve gradients to myocardial damage, the SPARK score aligns risk stratification with pathophysiology and sets the stage for a more individualized approach to moderate AS. The therapeutic applications of the score remain to be assessed, together with the yield of early AVR in moderate AS.

Author contributions

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Declarations

Disclosure of Interest

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