Letters to the Editor

Cardiopulmonary exercise testing in patients with severe aortic stenosis: lights and shadows

Prueba de esfuerzo con consumo de oxígeno en pacientes con estenosis aórtica grave: luces y sombras

To the Editor,

We have read the editorial by Baez-Ferrer et al.[1] in *Revista Española de Cardiología* on cardiopulmonary exercise testing (CPET) in asymptomatic severe aortic stenosis (AS). The authors highlight the value of unmasking symptoms in patients with apparently asymptomatic severe AS during CPET by using parameters such as peak oxygen consumption (pVO_2)[2] and the slope comprising minute ventilation to CO_2 production ratio (VE/VCO_2 slope)[3] abnormalities. This approach would lead to aortic valve replacement (AVR) and a better prognosis for patients with severe asymptomatic AS.[2–4] However, our experience differs in this respect.[5]

We studied a cohort of 113 patients with AS undergoing CPET.[5] The classic established criteria were applied to determine whether the test was positive.[6] Parameters related to gas analysis were determined, but were not criteria for stopping the test. During CPET, the presence of symptoms differed by group, which had been established according to the severity of AS ($P < .05$); however, no differences were found in pVO_2 or in the VE/VCO_2 slope. According to pVO_2, all patients were in Weber et al.[7] class I or II. There were no differences in pVO_2 regarding the presence or absence of symptoms during CPET or according to the type of AS, with values well above the $pVO_2 \leq 14$ mL/kg/min[4] cutoff used to indicate disease. According to the VE/VCO_2 slope, all patients were in ventilatory class I. The foregoing aspects led us to think that the worst functional class would not only depend on the severity of the valvular heart disease, but—as the authors themselves recognize—on comorbidities such as aging, frailty, obesity, or others.[2,4]

Studies supporting the prognostic value of pVO_2 and VE/VCO_2 slope have been based on small population samples with few events, which makes it difficult to adequately control the covariables in the survival analysis and to ignore other prognostic variables. In previous series, it is striking that a predicted VO_2 value of $< 80\%$ in patients with asymptomatic severe AS had a stronger relationship with the presence of coronary artery disease or atrial fibrillation than with aortic valve area.[2] Other authors have suggested that blood BNP level is a stronger predictor of revealed symptoms than pVO_2 during CPET.[8] The widespread adoption of a therapeutic strategy of AVR in patients with severe asymptomatic AS based on the results of CPET could increase the number of patients treated with this strategy. Such an approach, in the setting of an increasing prevalence of degenerative AS, would lead to an increase in both the burden of care and that of health care costs. On the other hand, the latter aspect would not necessarily lead to better health, as other authors have already suggested.[9] We believe that studies with a larger population of patients with severe asymptomatic AS are needed to guarantee the robustness of the prognostic variables described in the setting of CPET.[2–4]

SEE RELATED CONTENT:
https://doi.org/10.1016/j.rec.2022.07.013
https://doi.org/10.1016/j.rec.2022.10.013

FUNDING

None declared.

AUTHORS' CONTRIBUTIONS

All the authors equally shared in the design conception and preparation of this article.

CONFLICTS OF INTEREST

None declared.

Juan Lacalzada-Almeida,* Belén Marí-López, and Rebeca Muñoz-Rodríguez

Servicio de Cardiología, Hospital Universitario de Canarias, Tenerife, Spain

* Corresponding author:
E-mail address: jlacalzada@gmail.com (J. Lacalzada-Almeida).

Available online 9 December 2022

REFERENCES

1. Báez-Ferrer N, Avanzas P, Domínguez-Rodríguez A. Papel de la prueba de esfuerzo con consumo de oxígeno en pacientes con estenosis aórtica grave. *Rev Esp Cardiol.* 2022. http://dx.doi.org/10.1016/j.recesp.2022.07.005.
2. Dhoble A, Enriquez-Sarano M, Kopecky SL, et al. Cardiopulmonary responses to exercise and its utility in patients with aortic stenosis. *Am J Cardiol.* 2014;113:1711–1716.
3. Dominguez-Rodriguez A, Abreu-Gonzalez P, Mendez-Vargas C, et al. Ventilatory efficiency predicts adverse cardiovascular events in asymptomatic patients with severe aortic stenosis and preserved ejection fraction. *Int J Cardiol.* 2014;177:1116–1118.
4. Levy F, Fayad N, Jeu A, et al. The value of cardiopulmonary exercise testing in individuals with apparently asymptomatic severe aortic stenosis: A pilot study. *Arch Cardiovasc Dis.* 2014;107:519–528.
5. Lacalzada-Almeida J, Izquierdo-Gómez MM, Laynez-Cerdeña I, et al. Role of Exercise Testing and Speckle Tracking Echocardiography in Paradoxical Severe Aortic Stenosis. *Cureus.* 2021;13:e18266.
6. Vahanian A, Beyersdorf F, Praz F, et al. 2021 ESC/EACTS Guidelines for the management of valvular heart disease: Developed by the Task Force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery. *Eur Heart J.* 2022;43:561–632.
7. Weber KT, Janicki JS, McElroy PA. Determination of aerobic capacity and the severity of chronic cardiac and circulatory failure. *Circulation.* 1987;76:VI40–VI45.
8. Rajani R, Rimington H, Chambers JB. Treadmill exercise in apparently asymptomatic patients with moderate or severe aortic stenosis: relationship between cardiac index and revealed symptoms. *Heart.* 2010;96:689–695.
9. Ennezat PV, Malergue MC, Le Jemtel TH, et al. Watchful waiting care or early intervention in asymptomatic severe aortic stenosis: Where we are. *Arch Cardiovasc Dis.* 2021;114:59–72.

https://doi.org/10.1016/j.rec.2022.10.011
1885-5857/