Clinical vignette: Paradoxical low flow, low gradient aortic stenosis despite preserved LV ejection fraction

Sténose aortique à faible débit et faible gradient malgré une fraction d’éjection ventriculaire préservée

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This is the case of a 90-year-old man (body surface area: 1.8 m²) with a history of calcific aortic valve stenosis (AS) and progressive deterioration of his New York Heart Association functional class during the past year. Six months ago, a coronary angiography revealed a 90% stenosis on the circumflex coronary artery, which was corrected by stent implantation but the patient remained in functional class III thereafter. The Doppler-echocardiographic exam showed high degree of LV concentric remodeling with a small cavity size (LV end-diastolic diameter: 39 mm; volume: 66 ml; Fig. 1), a preserved LV systolic function (LV ejection fraction [LVEF]: 60%) but a low stroke volume (40 ml; Fig. 2). Because of the low flow state, the transvalvular gradient was only moderately elevated (peak: 39 mmHg, mean: 25 mmHg; Fig. 3) despite the presence of a severe stenosis as documented by a severely calcified aortic valve with restricted opening (aortic valve area 0.8 cm² by continuity equation and 0.9 cm² by planimetry. This is a typical case of paradoxical low flow, low gradient severe AS, despite the presence of preserved LVEF (Circulation 2007;115:2856–64). This pattern may bring some uncertainty about the actual severity of the stenosis and may lead clinicians to erroneously conclude that the stenosis is not severe and that surgery is not indicated. This case illustrates that normal LVEF is not synonymous with normal LV flow output in AS patients and that it is preferable to rely on indices, such as aortic valve area, that are less flow dependent than gradient to assess AS severity. This patient finally underwent transfemoral valve implantation with a Sapien 26 mm valve and had a favourable postoperative evolution with marked improvement of his symptomatic status.

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Figure 1. Parasternal long-axis view of the left ventricle (LV), left atrium (LA) and aortic valve by bidimensional echocardiography.

Figure 2. Pulse wave Doppler signal of the flow velocity in the LV outflow tract.

Figure 3. Continuous wave Doppler signal of the flow velocity across the aortic valve.