Low Flow, Low Gradient Aortic Stenosis Despite Preserved LV ejection Fraction: New Insights from Weights of Operatively Excised Valves

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Abstract

The objective of this study was to compare the valve weight of patients with classical Paradoxical Low Flow versus those with Normal Flow Aortic Stenosis.

Methods

Aortic valves were explanted from 250 consecutive patients undergoing aortic valve replacement for Aortic Stenosis (AS).

Exclusion criteria:
- History of rheumatic disease, endocarditis, and inflammatory diseases were excluded.
- Paradoxical Low Flow configuration grade ≥ 2.
- All patients underwent a preparative Doppler echocardiographic examination including:
  - LV stock volume (SVi)
  - AVA using the continuity equation
  - Transvalvular gradients using the modified Bernoulli equation
- Given that a large proportion (30%) of the patients included in this series were obese, we elected to index valve weight.

Results

Patients were classified into 3 AS patterns:
- Normal Flow pattern (NF) defined as LVEF ≥ 50% and SVi ≥ 22 ml/m²
- Paradoxical Low Flow pattern (PLF) defined as LVEF ≥ 50% and SVi ≤ 22 ml/m²
- Classical Low Flow pattern (CLF) defined as LVEF < 50% and SVi ≥ 22 ml/m²

Background

Disparate findings between aortic valve area (AVA ≤ 1.0 cm²) and mean gradient (i.e. MG ≤ 40 mmHg) may raise uncertainty regarding the actual severity of the stenosis as well as the potential indication of aortic valve replacement (AVR).

We recently reported this clinical presentation often reflects the presence of a severe AS with concomitant “paradoxical” low flow (PLF), i.e. reduced stroke volume despite preserved LV ejection fraction (LVEF). Other investigators suggested that this discordance is related to an inconsistency in the cut-off values of AVA and gradient proposed in the guidelines for grading stenosis severity.

Conclusion

Patients with PLF AS are generally at a more advanced stage of the disease compared to patients with NF AS.

The clinician should pay attention not to systematically deny surgery to a patient with small AVA and a low gradient.

In this PLF population, an important step prior to aortic valve replacement would be to rule out pseudo-severe AS by stress echocardiography (dobutamine or effort) or valve calcium scoring by computed tomography.