Dobutamine stress echocardiography for low gradient aortic stenosis: current practice in Poland

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see p. 517

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The differentiation of severe and less severe aortic stenosis (AS) can be challenging as there are often discrepancies between mean gradient and effective orifice area. Current guidelines [1] divide severe AS with calculated aortic valve area (AVA) <1.0 cm^2 into 4 flow-gradient subtypes (Figure 1).

Dobutamine stress echocardiography (DSE) is indicated for the subtype in which there is a mean pressure gradient (MPG) <40 mm Hg associated with left ventricular ejection fraction (LVEF) <50% [2]. The aim is to differentiate true severe from pseudosevere AS. The former is expected to benefit from aortic valve intervention but the latter should be treated medically.

In the current issue of *Polish Heart Journal* (*Kardiol Pol*), Płońska-Gościniak et al. presented results from a Polish multicenter registry (Pol-LAS-SE registry) evaluating how stress echocardiography was used to make management decisions in low gradient AS [3]. A total of 163 patients (52% males) with low gradient AS underwent stress echocardiography at 16 cardiology centers using dobutamine in 157 and exercise in 6 patients.

The registry study provides interesting information on the current practice of using low dose DSE as part of diagnostic workup in low gradient AS. There are, however, some methodological constraints that limit the gen-

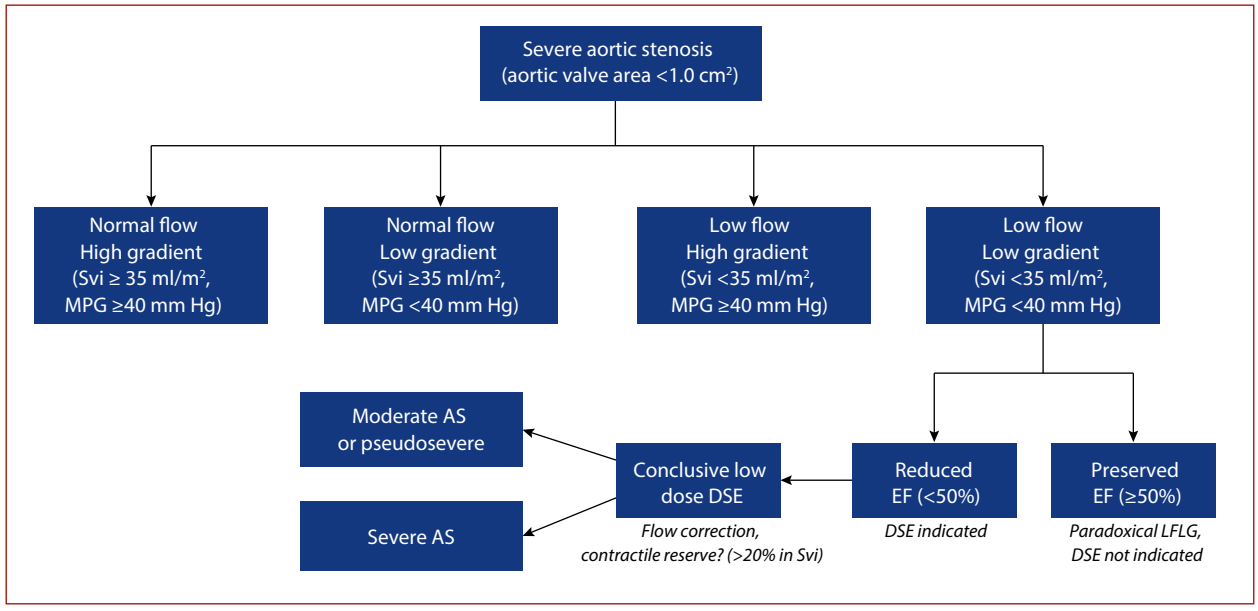

Figure 1. Flow-gradient subtypes of AS and indications for DSE.

Abbreviations: AS, aortic stenosis; DSE, dobutamine stress echocardiography; EF, ejection fraction; LFLG, low flow low gradient; MPG, mean pressure gradient; Svi, stroke volume index

eralizability of the study. First, the indications for stress echocardiography somehow diverged from international guidelines. DSE is indicated for low gradient AS with reduced LVEF while it is better to obtain a calcium score on computed tomography when the LVEF is normal. This is because when the left ventricular (LV) cavity is normal or small, dobutamine often causes severe subaortic flow acceleration which is potentially dangerous and also makes it impossible to interpret the study. Calcium scoring could also have been performed for the 14 patients with non-diagnostic stress results as a result of the absent contractile reserve.

A second problem is that an AVA <1.0 cm^2 was an inclusion criterion, however, there were patients included with a baseline AVA >1.0 cm^2. The discussion refers also to patients with 'trivial stenosis'. In some of them, there was a thickened valve but uncertainty about the grade of AS because of low flow. In others, there was mild aortic valve thickening and the indication for the study was to check whether the valve should be replaced at the same time as coronary artery bypass grafting. There is no randomized controlled trial or other published evidence for using DSE to decide this question. If the decision is made on gradients obtained on mean dobutamine doses of 20 µg/kg/min, it is possible that the gradients through a replacement aortic valve were higher than before surgery.

The purpose of DSE is to assess LV contractile reserve and to differentiate true severe from 'pseudosevere' or moderate AS. Usually, it is easy to differentiate moderate from severe AS provided there is an adequate contractile reserve or overall flow normalization is achieved (stroke volume index ≥35 ml/m^2). The authors considered AS severe if there was >20% increase in LV stroke volume, and any increase in LVEF during stress echocardiography and if the MPG was ≥40 mm Hg and AVA remained ≤1.0 cm^2, which is straightforward. Moderate AS was defined as an AVA between 1.0 cm^2 and 1.5 cm^2 and MPG <40 mm Hg during DSE, however, with no reflection on the LVEF, the presence of contractile reserve or overall flow normalization. Pseudosevere AS was defined as an increase in LV stroke volume of >20% with an increase in ejection fraction associated with an MPG <40 mm Hg and AVA >1.0 cm^2. This definition of pseudosevere AS is consistent with moderate AS so the reason for the separate categories is not clear. Of note, current American and European guidance for the echocardiographic assessment of AS also stresses the fundamental division of AS severity by DSE (true severe vs pseudosevere/moderate) and does not describe pseudosevere as a third separate group in addition to moderate and severe [4].

A further problem is that there is no independent standard or follow-up outcome measures to determine whether stress echocardiography resulted in the best management decision. There is also no information comparing outcomes of patients having stress echocardiography with those who did not.

Overall, the study shows that DSE in AS is safe and feasible. The authors are to be congratulated on their careful recording of data. It is important to examine clinical practice. Their retrospective and descriptive results suggest the need to collect prospective data including outcome measures to prove the benefit of stress testing in AS.

Article information

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