

Response to Letter Regarding Article, “Low-Flow, Low-Gradient Severe Aortic Stenosis Despite Normal Ejection Fraction Is Associated With Severe Left Ventricular Dysfunction as Assessed by Speckle-Tracking Echocardiography: A Multicenter Study”

Response:

We read the comments of Dr Ozkan and would like to answer his questions and remarks.

Concerning left ventricular midwall fractional shortening, it is known for a long time that it is impaired in severe aortic stenosis (AS). Midwall fractional shortening has been shown to be particularly reduced in low-flow, low-gradient AS, as shown by Hachicha et al¹ and confirmed in our study.² In both studies, midwall fractional shortening was particularly low in the group of low-flow AS, although the difference was not significant in our study ($P=0.07$), probably related to the small sample size in each subgroup.

Dr Ozkan underlines that values of basal strain as low as -13.9% have been reported in normal individuals,^{3,4} meaning that the low basal strain observed in patients with AS in our study does not systematically represent left ventricular dysfunction. However, a careful reading of those series allows us to reach opposite conclusions. Although lower deformations of basal left ventricular segments, in particular in the inferoseptum (-14.6%) and the antero-septum (-13.9%), were observed in normal subjects,³ the average basal longitudinal strain in the same patients was higher, reaching $-16.2\pm 4.3\%$ in 1 study³ and $-17\pm 5.2\%$ in the other,⁴ respectively. The values observed in our study in patients with AS were clearly lower in all groups, particularly in patients with reduced flow, with an average basal longitudinal strain of $-10.9\pm 2.8\%$ in Group 2 and $-11.6\pm 3.4\%$ in Group 4, respectively, thus representing severe left ventricular basal longitudinal dysfunction in both situations.

We agree with Dr Ozkan that symptoms are very important prognostic markers in AS. In our study,² 70 (20.6%) of 340 patients were asymptomatic. However, the purpose of our study was not to assess the prognostic value of strain, but rather to study the relationship between the type of AS (particularly low-flow, low-gradient AS) and the severity of left ventricular longitudinal dysfunction, irrespective of the clinical status of the patient. We hope that strain measurements will help clinicians to obtain risk stratification in asymptomatic patients with severe AS. However, the prognostic value of left ventricular longitudinal dysfunction in low-flow, low-gradient AS needs further investigation.

Finally, Dr Ozkan focused on the fact that highest values of valvulo-arterial impedance and lowest global longitudinal strain were found in Group 2 (low flow high gradient) rather than in Group 4 (low flow, low gradient). In our opinion, however, it is not surprising, but rather reassuring, that patients from Group 2, which present with the most severe forms of AS, also present with the lowest global longitudinal strain, because subtle left ventricular dysfunction has been extensively evidenced in this setting of high-gradient AS.^{5,6} The fact that similar findings were observed in patients with low-flow, low-gradient AS (Group 4) in our series is much more interesting and clearly demonstrated by our data, although its prognostic significance remains unknown.

Although we can regret that Dr Ozkan was not able to report his own experience on the topic, we hope that he will keep in mind the main and objective results of our study: (1) subtle left ventricular dysfunction can be evidenced by 2-dimensional strain in the majority of patients with severe AS and normal left ventricular ejection fraction; (2) longitudinal left ventricular dysfunction is particularly

severe in AS with low cardiac output, including low-flow, high-gradient and low-flow, low-gradient AS; and (3) the prognostic significance of these findings needs further investigation.⁷

Disclosures

None.

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