To our knowledge, this is the first report of follow-up OCT assessments in CTO lesions with BVS including subintimal scaffolding. Although the results herewith demonstrated are promising, we acknowledge that longer-term follow-up imaging evaluations would be able to provide further insights into the assessment of scaffold reabsorption, whereas physiological assessments would be able to test whether vasodilation capabilities are recovered in this setting. Further validation of our findings is warranted.

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Comparison of Echocardiography and CT for the Assessment of Aortic Stenosis Valve Area

We read with great interest the paper of Clavel et al. (1) in this issue of *iJACC*. The authors focused on the elliptic shape of the left ventricular outflow tract (LVOT) that was first shown by Baumgartner on transthoracic echocardiography in 1990 (2).

Clavel et al. compared the functional area obtained by the substitution of the echocardiographically calculated LVOT area by LVOT planimetry on 64-slice computed tomography (CT) in the continuity equation (aortic valve area [AVA] CT) with CT planimetry of the stenotic aortic valve (AVA plani).

Two important messages are provided in their paper: the threshold found for predicting mortality in patients with medically treated aortic stenosis; and the demonstration that some discrepancies between the mean aortic valve gradient and the functional AVA (AVA echo) is not the result of inadequacy in measuring the LVOT area.

However, CT LVOT planimetry should be performed exclusively in systole because, as shown for the aortic annulus (3), the ellipticity index is less in systole compared with that in diastole.

The good correlation of the AVA reached by the continuity equation using the LVOT area calculated by echocardiographic Doppler (AVA echo) with AVA CT is not surprising because the 2 areas share the same ratio (velocity time integral [VTI] outflow tract/VTI aortic valve). This is also true for the mean aortic valve gradient and AVA CT or AVA echo because this gradient is related to $1/AVA^2$ (CT or echo).

The functional AVA (calculated by the continuity equation) is a mean area in systole compared with the anatomic aortic valve area, which is a maximal instantaneous valve area in systole. When the valve is calcified and rigid, as in aortic stenosis, the aperture is delayed and limited, increasing the difference between the anatomic area and the functional area. The flow convergence downstream from the anatomic valve area also explains the lower value of the functional area.

Although this study adds to the reliability of echocardiographic Doppler assessment, CT planimetry of aortic stenosis remains an alternative in cases of poor acoustic window or when the continuity equation is inaccurate (high dynamic gradient of the LVOT). CT adds the incremental prognostic value of valve calcium scoring (4). There is a 0.2 cm^2 upward shift of the threshold to define significant stenosis on AVA CT planimetry compared with the AVA echo functional area (5).

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REPLY: Comparison of Echocardiography and CT for the Assessment of Aortic Stenosis Valve Area

We appreciate the interest of Dr. Habis and colleagues in our study (1) and their contribution to this research area.

In response to their first issue, there is indeed a difference in the elliptic shape of the left ventricular outflow tract (LVOT) between systole and diastole by multidetector computed tomography (MDCT). Although this shape change is statistically significant, the clinical significance of the difference is modest and would rarely change the grading of aortic stenosis (AS) severity by MDCT. Indeed, in our study the timing of LVOT planimetry between systole and diastole would affect LVOT area by 6% (between 2% and 14%), a finding consistent with the literature (1–3) and close to the variation observed by intraobserver and interobserver variability (2). Thus, the issue of systolic versus diastolic LVOT measurement does not affect our results notably, as reported in our paper (1).

Planimetry of aortic valve area, as emphasized by Dr. Habis and colleagues, measures the geometric orifice area (GOA), not the effective orifice area (EOA), so differences between methods are expected. We agree that the theoretical interest of planimetered GOA by MDCT is linked to the hypothesis that MDCT-planimetered GOA may have superior reproducibility and reliability. Although the seminal work on CT planimetry was encouraging from this point of view, clinical practice studies such as ours are less optimistic about the method. We indeed found a significant correlation between all continuity EOA and planimetered GOA ($r = 0.57$, $p < 0.0001$) (1); however, the variability remained too high to be clinically useful. Furthermore, variability between GOA and EOA changes according to AS severity, with “GOA almost equal to EOA in mild AS but significantly greater in severe AS” (4). We therefore believe that the main indication of MDCT in regard to AS severity assessment is in patients with poor acoustic windows, for planimetry of LVOT and calculation of continuity EOA. This approach is valid as long as the cutoff values used to assess severe AS account for the MDCT method’s specific higher thresholds (1). Importantly, we do agree with Habis and colleagues that noncontrast MDCT has a major role in assessing the severity of calcified AS, by measuring aortic valve calcium load, independently of Doppler data and defining excess risk of mortality (5). Thus, we share the confidence of Habis and colleagues that MDCT is promised an essential role in evaluating patients with AS.

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