



## Editorial

## Aorta dimensions: It is not a single player game

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The assessment of aortic anatomy and function remains an essential step on the diagnostic-therapeutic pathway of patients with aortic diseases. Despite its importance, there is a lack of consistency in the methodology used to perform aortic measurements [1–3].

In this regard the work by Bons LR et al. represents a “challenging exercise” comparing ascending aortic diameter measurements among different imaging modalities and techniques in patients with bicuspid aortic valve or Turner syndrome. Not surprisingly, the authors found a substantial inter-modality variation of aortic dimensions. Consistently, transthoracic two-dimensional echocardiography (2DE) diameters measured smaller than computed tomography angiography (CTA) and magnetic resonance angiography (MRA). The best agreement was registered between leading edge-to-leading edge by 2DE and the inner edge-to-inner edge method by CTA or MRA during mid-systole. There was also a good agreement between CTA and MRA [4].

In this regard, there are few considerations to be discussed and clarified. As the most widely available, non-invasive and risk-free modality, multi-view 2DE remains the first line imaging technique [1,3,5–7]. However, 2DE has a “dimensional” disadvantage over CT and MRA, as linear measurements are ignoring the three-dimensional nature of the aortic anatomy. In current clinical practice, however, 3DE (3D volume rendering or X-plane imaging) is a tool that is available in most clinical centers and can significantly overcome this disadvantage. It is important to acknowledge, however, the critical role of CTA and MRA in the care of patients with aortic disease. Any abnormal ascending aorta should at

least be checked once with CTA or MRA for a more accurate measurement. In addition, any patient at risk for aortic disease (bicuspid aortic valve, Turner Syndrome, Marfan Syndrome, etc.) should have at least one scan of the entire aorta, not just the ascending portion, and this can only be achieved with CTA or MRA (patient's characteristics such as renal function, pregnancy and history of allergy to contrast agents must be considered for this choice). Serial imaging examinations over time should be performed with the same imaging technique (MRA may be the first choice in order to avoid excessive radiation exposure) at the same institution and measurements carefully taken at given landmarks for optimal reproducibility, with comparisons made side-by-side by the same experienced operator or team [1–3]. Furthermore, dimensions of the aorta should not be taken as an “absolute value” but in relation to the patient's age, anthropometric characteristics (height, weight, application of Z-score, etc.) and changes described as growth rate in a given time window. In this context, it should be highlighted that the International Registry of Acute Aortic Dissection (IRAD) group has observed that most dissections occur in patients with aortic diameters <5.5 cm, thus not meeting current guidelines for prophylactic, elective aneurysm surgery [1,8]. Methods other than size measurement were therefore thought to be needed to identify patients at risk for dissection. One potential method is the use of functional imaging to better identify inflammation/metabolism of the aorta using 18F-fluorodeoxyglucose (FDG)-positron emission tomography (PET) combined with CT. FDG-PET/CT has been shown to be useful to discriminate acute/unstable versus chronic/stable dissections, and to predict unfavorable outcome of progression and rupture after dissection, and further might be predictive of onset of dissection [9,10]. We expect in the near future other imaging biomarkers coming to add to aortic dimensions in the decision process of when and how appropriate therapeutic interventions should be implemented in patients at risk of aortic dissection/rupture.

## Conflict of interest

No conflicts of interest.

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