Reply to Dainese

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We thank Dr Dainese from Milan for his comments [1], although we are a little surprised by his first comment. As was already stated in our paper [2], our first implantation was done on 16 December 2008, our second implantation was done in January 2009 and Dainese [3] performed an implantation on 3 February 2009. Nevertheless, we would like to congratulate Dr Dainese and his colleagues and we acknowledge his contribution to this new field of valve treatment. In the interests of correctness of information, we would also like to draw attention to the first published report regarding TAVI in a degenerated homograft [4] written by Schmoeckel et al. and published in October 2009 in the same journal (JTCVS) as the paper by Dr Dainese [3]. The colleagues from Munich performed the reported procedure in 2009, as was stated in their publication [4]. Therefore, according to both the contemporary literature and information from the valve manufacturing company, the first ‘TAVI in homograft’ procedure with a balloon expandable valve was done in December 2008 (in Berlin), the second in January 2009 in Berlin and then in Milan (February 2009) and Munich (in 2009).

We completely agree with Dr Dainese that conventional reoperation in patients with homograft degeneration may be a challenging procedure, either because of the patients’ comorbidities or because of completely calcified homograft (so-called ‘porcelain aorta’). As pointed out by Dr Dainese, TAVI represents a valid alternative in these cases.

We also agree with Dr Dainese about the modified implantation technique [5]. We have used a similar technique almost from the very beginning of the TAVI programme at our institution in April 2008 [6]. We additionally prefer to perform simultaneous angiography during slow and gradual valve deployment which enables perfect visualization of the aortic root and the coronary arteries and fine adjustment to the position of the new valve [6].

REFERENCES


Do Edwards SAPIEN valves fit to the annulus?

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Keywords: Aortic annulus • Cross-sectional area • Calculated average diameter • Transcatheter aortic valve implantation
Congratulations to the authors for this valuable study [1]. In this paper, it was stated that it was controversial whether the measurements regarding the aortic annulus should be made from the virtual annulus or the coronal hinge-to-hinge while deciding on transcatheter aortic valve implantation (TAVI). As seen in Figure 1d, the prosthetic valve sits on the thick aortic leaflet in TAVI for aortic stenosis. This means that thick leaflets may obstruct the coronary orifices during deployment of the prosthetic valve after opening the valve in order to fit the annulus.

Instead of measuring the annulus, one should take into consideration the orifice area, three-dimensional configuration of the aortic leaflets (including leaflet thickness), desired orifice area and from where the orifice area could be gained. The leaflet thickness is an important issue and as seen in Figure 2e, the right side of the valve stent is so close to the aortic wall that it may obstruct the coronary ostium.

When five patients with paravalvular leak were investigated, it was found out that Edwards SAPIEN valves were inserted in smaller sizes (26, 23, 23 and 23 mm) than the measured virtual ring diameters (28.2, 27.4, 26.9, 25.8 and 26.8 mm). However, no paravalvular leak was observed in patients with smaller sizes (26, 23, 23, 23 and 23 mm) than the measured virtual ring diameters (28.2, 27.4, 26.9, 25.8 and 26.8 mm). This finding supports our theory. This topic was investigated in the ‘Discussion’ section and it indicates the inappropriateness of the measurement method of calculated average annulus diameter (CAAD).

The aortic orifice area increased from 0.7 to 3.6 cm² with TAVI. The risk of leaflet rupture is high at the point of least firmness. This has nothing to do with aortic stenosis as seen in Figure 4b.

The pre- and post-TAVI measurements in Table 2 showed no significant differences. Our opinion is that there is no correlation between the TAVI procedure and the measurement methods. We must clarify that the following CAAD measurement is wrong:

\[ \text{CAAD} = 2 \times \left( \frac{\text{CSA}}{\pi} \right)^{1/2}, \]

where CSA is the cross-sectional area. This formula is valid only when the geometrical figure is a circle (CAAD = 2 × radius). The area decreases as this figure approaches to an ellipsoid while the circumference is being kept a constant.

REFERENCES


LETTER TO THE EDITOR RESPONSE

Reply to Yurekli et al.

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Keywords: Transcatheter aortic valve implantation • Aortic valve stenosis • Computed tomography • Aortic annulus

We appreciate Yurekli et al.’s [1] comments on our work [2]. However, based on the knowledge of our previous and ongoing research as well as growing clinical experience with transcatheter aortic valve replacement, we disagree with the stated critique points. The optimal sizing of a transcatheter heart valve (THV) by non-invasive imaging is the aim of currently ongoing research. The role of computed tomography is evolving. The well-studied ellipsoidal shape of the native annulus plane at the level of the most basal attachment points of all three cusps stays in contrast to the circular shape of the unfolded Edwards SAPIEN THV. To accommodate this, both an area-derived diameter, as used in our study [2], and a perimeter-derived diameter appear conceivable, and have been investigated by others [3]. Both derived diameters assume a perfect circle by using the formula for the area of a circle (area = \(\pi \times \text{radius}^2\)) and the circumference of a circle (circumference = \(\pi \times \text{diameter}\)). Up to now, no ‘gold standard’ for sizing the aortic annulus prior to transcatheter aortic valve implantation has been defined.

The approach presented by our working group was validated and is now fully implemented in our clinical routine. Other leading European centres independently report a similar approach [4].

Yurekli’s brave statement of our measurement being ‘wrong’ appears unjustified to the authors, particularly, as there is currently no evidence supporting this. Their suggested