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REPLY: The Role of Valve Implantation Height

Are We Measuring Depth the Right Way?

We thank Dr. Sawaya and colleagues for their valuable comments on our paper (1).

We fully agree that the precise measurement of implantation height has some methodological limitations. More important, even with more sophisticated planning, the final position and implantation height cannot be precisely predicted. Although the valve remains relatively stable during expansion in most patients, the foreshortening of the stent that should predominantly occur on the outflow tract side varies to some degree. Thus, an approximate implantation height can be intended but not precisely estimated before deployment. Although the manufacturer recommended the central valve marker to be at the annular level or slightly below, we eventually changed our implantation technique to place the marker just above the annular line. This resulted in the observed change in implantation height over time, which was then accompanied by a reduction in new conduction abnormalities and pacemaker requirement.

There are indeed several limitations with regard to the measurement of implantation height, and we simply chose a compromise as far as methods were concerned.

Ideally, the projection should not require modification after implantation. We pre-defined the projection by computed tomography before implantation and confirmed it (and eventually modified it) with initial angiography during the procedure. We always intend to have the right coronary sinus centrally in the middle between the left and noncoronary sinuses. Although slight modification of the projection may sometimes be required, this is usually minor and does not result in a complete overlay of the sinuses, as demonstrated in the figure by Dr. Sawaya and colleagues. The reason for the necessity to modify the projection after implantation can be either that the pre-defined projection was not ideal or that the valve ended up in a somewhat oblique position. Another limitation is that the foreshortening of the valve is not always symmetrical. For all these reasons, the implantation height may vary around the valve circumference, and measuring at 1 site is therefore indeed a simplification for practical reasons. Because the measurement could in general be best defined and was best reproducible at the left sinus, we chose to use this site, although this does not correspond to the part of the stent in contact with the interventricular septum.

We also accept that one could have measured the stent length in the left ventricular outflow tract instead of the percentages of stent extension into the aorta and left ventricular outflow tract with the advantage of becoming independent of valve size. Because balloon-expandable valve positions have traditionally been defined by the manufacturer as a percentage of stent extension into the aorta and left ventricular outflow tract, and stent positions have widely been described by using this method in the published research, we preferred this measurement.

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REFERENCE

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