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STRUCTURAL HEART DISEASE

IMAGING VIGNETTE: CLINICAL VIGNETTE

Patient-Specific Commissural Alignment With a Self-Expanding Transcatheter Heart Valve

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ABSTRACT

A simple and reproducible technique to achieve commissural alignment during transcatheter aortic valve replacement with the Allegra valve is described. Slight rotation of the system before system insertion is necessary. Moreover, thanks to its permaflow system (Biosensors) and its radiopaque markings, small adjustments before valve deployment can be made to reassess correct alignment. (J Am Coll Cardiol Case Rep 2024;29:102190) © 2024 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Transcatheter aortic valve replacement continues to expand, and achieving commissural alignment (CA) during the implantation is crucial. Different techniques have been previously described for several devices; however, there are no specific recommendations concerning the optimal implantation technique to achieve patient-specific CA with the Allegra transcatheter heart valve (THV) (Biosensors).[1,2]

This supra-annular THV has a nitinol frame with small cells in the inflow to ensure high radial force but larger cells in the outflow. Leaflets are attached to the stent by 3 commissures, which are placed between 3 T-bars displaced at the proximal edge of stent. Noneccentric coronary ostia with respect to the coronary sinus should be confirmed on preprocedural computed tomography, as it was in this case. Therefore, good CA is achieved if both coronary ostia match with 1 T-bar (**Figure 1A**). Moreover, at both sides of each commissure, there are 2 gold markers. One T-bar is aligned with the flush port on the delivery system (**Figure 1B**), and if the delivery system is positioned with this flush port at 12 o'clock at the time of insertion, then the T-bar should be anterior in the aortic annulus. If the conventional 3-cusp coplanar view is close to anterior-posterior, then the right coronary cusp is central and anterior. We know that the right coronary artery (RCA) frequently originates from the center of the right coronary sinus/cusp. Accordingly, if the T-bar is also anterior and central, then CA will be achieved in most cases with this simple technique. If the 3-cusp view has some degree of left anterior oblique or right anterior oblique rotation, then the right coronary sinus/cusp and, therefore, the origin of the RCA will not be anterior. In this situation, the delivery system should be rotated approximately 1 hour clockwise/counterclockwise for each 30° right anterior oblique/left anterior oblique from the anterior-posterior projection before insertion (**Figure 1C**).

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

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ABBREVIATIONS AND ACRONYMS

CA = commissural alignment

RCA = right coronary artery

THV = transcatheter heart valve

Importantly, once the permaflow is open, the orientation of the 6 gold markers allows us to assess the degree of CA before the deployment. In the 3-cusp view, a space between the middle 2 pairs of overlapping gold markers should be seen, and the guidewire should be in the center of this free space (**Figure 1D**). In the left-right cusp-overlap view, 3 pairs of overlapping gold markers should be visible, and the guidewire should be running through the middle pair (Supplemental Figure 1). If the delivery system has partially rotated during insertion and CA is not apparent, then minor (≤15°) clockwise/counterclockwise rotation can be performed easily in the aortic annulus and is usually sufficient to improve CA. This smooth rotation in the ascending aorta is feasible and, thanks to the permaflow, good hemodynamics will be maintained. Different wrong scenarios, in both the 3-cusp view and left-right cusp overlap, are shown in Supplemental Figure 2. The result of a patient with good CA using this novel technique in aortography (**Figure 1E**) and with computed tomography analysis after the procedure is shown in **Figure 1F**. Step-by-step summary is shown in Supplemental Figure 3.

Even though this technique is not useful with other THVs, it seems to be at least as easy as other CA techniques described previously. Further prospective studies are warranted to assess the safety and efficacy of this technique in a broader population.

Written and oral informed consent was recorded for the procedure and publication of this report.

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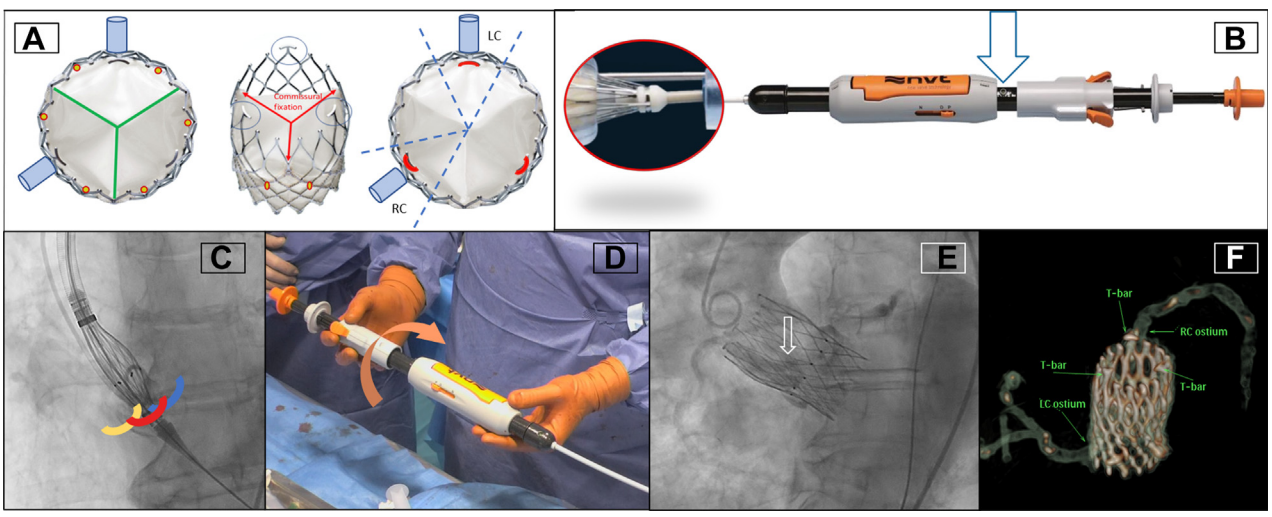
Dr Cruz Gonzalez has served as a proctor and consultant for Biosensors International. Drs Arnold and Oldroyd are employees for Biosensors International. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

FIGURE 1 Commissural Alignment With Allegra Valve



(A) T-bar (red lines), gold markers (yellow), and prosthesis commissures (green lines). A good commissural alignment example where the T-bar matches with both left coronary and right coronary ostia. (B) Flush port (arrow). Counterclockwise rotation. (C) Three-cusp view with the guidewire between the middle 2 pairs of overlapping gold markers. (D) Aortogram with T-bar at the level of the right coronary artery ostium (arrow). (E) A 3-dimensional reconstruction of postprocedural computed tomography shows correct commissure alignment. Red mark: right cusp. Blue mark: left cusp. Yellow mark: non-coronary cusp. LC = left coronary; RC = right coronary; NC = noncoronary.

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KEY WORDS Allegra, commissural alignment, TAVR, 3-cusp view

APPENDIX For supplemental figures, please see the online version of this paper.