JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 7, NO. 12, 2014

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER INC.
http://dx.doi.org/10.1016/j.jcin.2014.07.013

IMAGES IN INTERVENTION

The Role of Frame Geometry Assessment During Transcatheter Aortic Valve Replacement by Rotational Angiography

Ramón Rodríguez-Olivares, MD, Nicolas M. Van Mieghem, MD, Peter P.T. De Jaegere, MD, PhD

Aortic regurgitation (AR) post-transcatheter aortic valve replacement (TAVR) frequently occurs and is associated with increased mortality during follow-up (1). Insight into its cause is essential for the adjunctive treatment selection to reduce or correct AR. In case of underexpansion of the frame, balloon dilation may be performed. The question is how to reliably assess underexpansion and its cause.

We present a 78-year-old female patient who received a 23-mm Portico valve (St. Jude Medical, St. Paul, Minnesota) for aortic stenosis (multislice computed tomography [MSCT] annulus: Dmin 18 mm, Dmax 22 mm, perimeter 61 mm, area 280 mm^2) (**Figure 1A**). Despite correct position, there was a Sellers grade 2 to 3 AR (qRA [2] 2.4) (**Figure 1B**). Rotational angiography (R-angio) using dedicated motion compensation software (Siemens AG, Healthcare Sector, Forchheim, Germany) (3) identified an ellipsoid underexpansion of the inflow portion (**Figures 1C and 1D**). This coincided with the spot of calcium that was seen on MSCT before TAVR. For that reason, it was decided to perform another balloon dilation (22-mm Z-med, B. Braun Interventional Systems Inc, Allentown, Pennsylvania) (**Figure 1E**), with a reduction of AR by contrast angiography and qRA (2) (Sellers grade 1 and 1.1, respectively) (**Figure 1F**). Repeat R-angio demonstrated a more circular appearance with increased diameters (perimeter 44 mm, area 132 mm^2 before, and perimeter 50 mm and area 177 mm^2 after post-dilation) (**Figures 1G and 1H**).

R-angio with dedicated motion compensation software offers online and high-quality images for the evaluation of the valve frame and may help to elucidate the cause of periprocedural complications such as AR, which in turn may lead to improved periprocedural strategy or measures.

REPRINT REQUESTS AND CORRESPONDENCE: Professor Peter P.T. De Jaegere, Department of Cardiology, Erasmus Medical Center, Thoraxcenter, 's-Gravendijkwal 230, 3015 CE Rotterdam, the Netherlands. E-mail: p.dejaegere@erasmusmc.nl.

From the Department of Cardiology, Erasmus Medical Center, Thorax Center, Rotterdam, the Netherlands. Dr. Rodríguez-Olivares has received a grant from EAPCI and Edwards Lifesciences. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

JACC: CARDIOVASCULAR INTERVENTIONS VOL. 7, NO. 12, 2014
DECEMBER 2014:e191–2

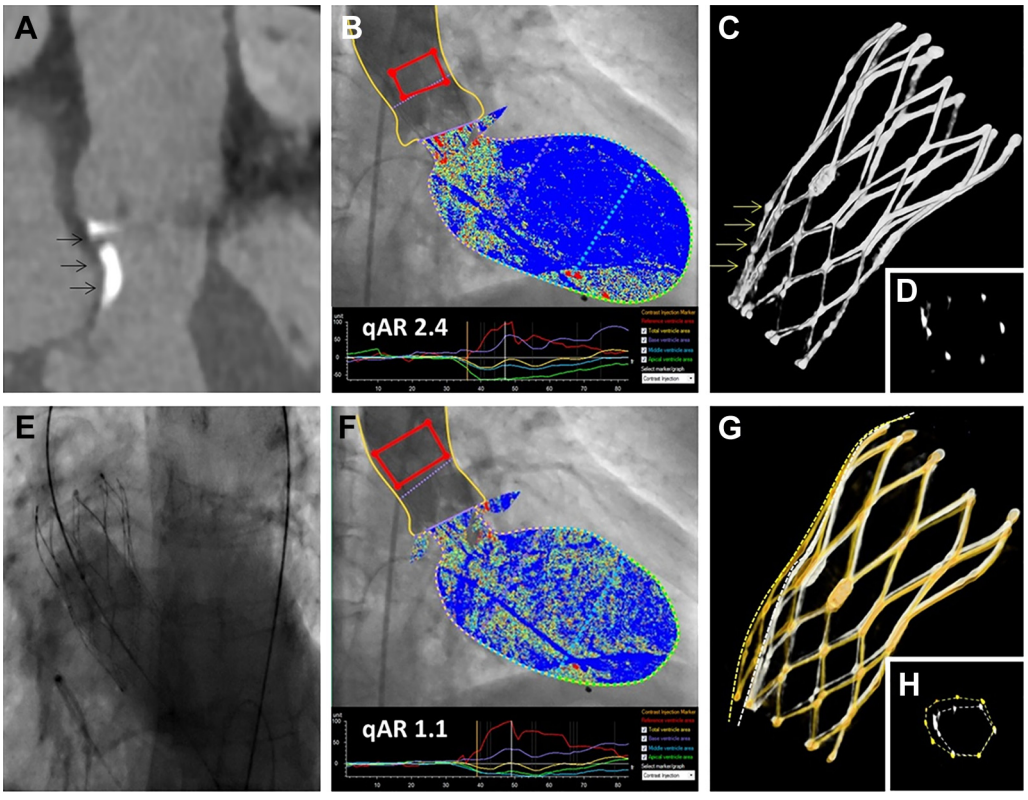

FIGURE 1 Rotational Angiography

(A) Computed tomography scan with a bulky region of calcium in the aortic valve and left ventricular outflow tract (LVOT) **(arrows)**. **(B)** Portico 23-mm valve with moderate aortic regurgitation (AR). **(C and D)** Rotational angiography (3-dimensional [3D] reconstruction **[C]** and cross-sectional view of the prostheses inflow **[D]**) showing a region of underexpansion most likely caused by calcium located in the aortic valve and LVOT **(arrows)**. **(E)** Post-dilation guided by the information provided by rotational angiography. **(F)** Residual AR after post-dilation. **(G and H)** Rotational angiography after post-dilation showing improved expansion in the aforementioned underexpanded region (3D reconstruction and cross-sectional view of the prosthesis inflow before **[in white]** and after **[in yellow]** post-dilation).

REFERENCES

1. Athappan G, Patvardhan E, Tuzcu EM, et al. Incidence, predictors, and outcomes of aortic regurgitation after transcatheter aortic valve replacement: meta-analysis and systematic review of literature. J Am Coll Cardiol 2013;61:1585–95.

2. Schultz CJ, Slots TLB, Yong G, et al. An objective and reproducible method for quantification of aortic regurgitation after TAVI. EuroIntervention 2014;10:355–63.

3. Schultz CJ, Lauritsch G, van Mieghem N, et al. Rotational angiography with motion compensation: first-in-man use for the 3D evaluation of transcatheter valve prostheses. EuroIntervention 2014 Jun 30 [E-pub ahead of print].

KEY WORDS frame geometry, rotational angiography, TAVI