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

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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 mm²) (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 mm² before, and perimeter 50 mm and area 177 mm² 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.

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KEY WORDS frame geometry, rotational angiography, TAVI