

IMAGES IN INTERVENTION

An Exceptional Case of Frame Underexpansion With a Self-Expandable Transcatheter Heart Valve Despite Predilation

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An 86-year-old female patient with symptomatic, severe aortic stenosis at high surgical risk was referred for transcatheter aortic valve implantation. After balloon valvuloplasty (BAV) with a 22-mm

Nucleus balloon valvuloplasty catheter (NuMED, Baylis Medical, Montreal, Quebec, Canada), we implanted a self-expandable CoreValve 29-mm bioprosthesis (Medtronic, Minneapolis, Minne-

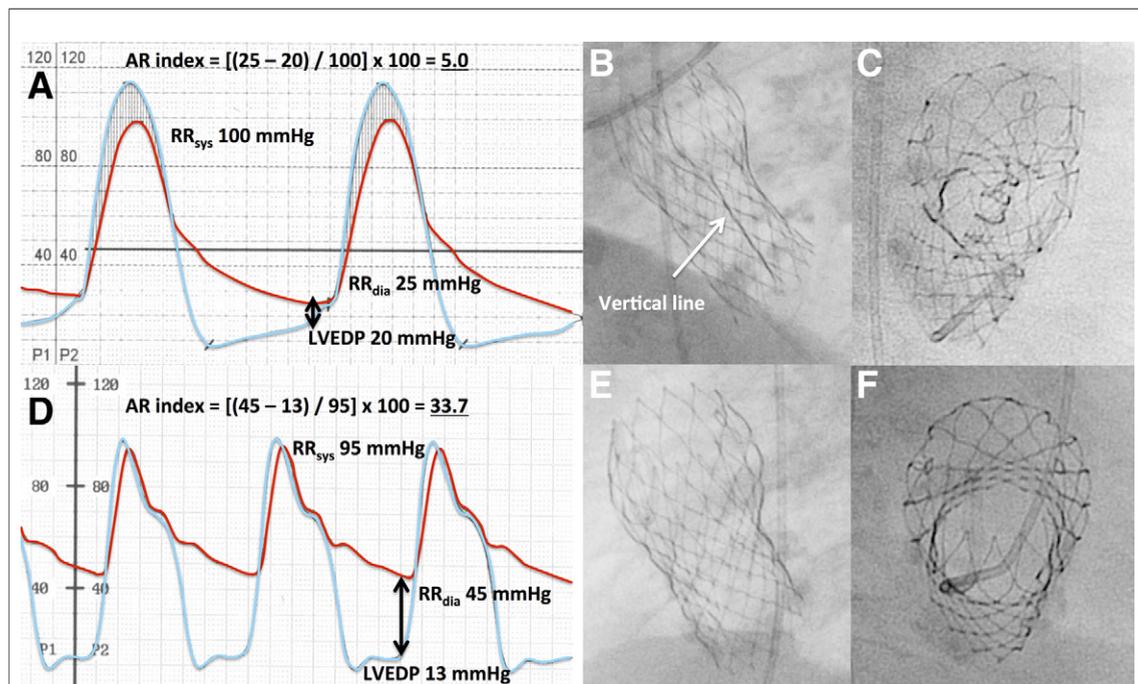


Figure 1. AR Index With Pressure Equalization Between the Left Ventricle and the Aorta

Pressure equalization for the left ventricle is indicated by the blue line and for the aorta by the red line (A). Atypical vertical line in the form of the CoreValve prosthesis indicating that the stent frame has not expanded properly (B). Orthogonal view of the prosthesis with inversion of the stent frame before post-dilation (C). AR Index (D) and lateral/orthogonal view of the prosthesis with fully expanded stent frame after post-dilation (E and F). AR index = aortic regurgitation index; RR_{sys} = systolic blood pressure in the aorta; RR_{dia} = diastolic blood pressure in the aorta; LVEDP = left ventricular end-diastolic pressure (Online Videos 1, 2, 3, 4, and 5).

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sota). After final release of the prosthesis, we encountered severe paravalvular aortic regurgitation (AR), a remaining gradient of 15 mm Hg, and determined a highly pathological AR index (1) with pressure equalization between the aorta and left ventricle (AR index = 5.0) (Fig. 1A), although the valve was deployed with proper implantation depth. However, we noticed an atypical vertical line in the form of the CoreValve prosthesis suggesting that the stent frame had not expanded properly (Fig. 1B). In orthogonal fluoroscopy of the CoreValve prosthesis (right anterior oblique: 82°, cranial: 40°), a severe underexpansion of the prosthesis with inversion of the stent frame (Fig. 1C) as reason for the suboptimal implantation result became obvious (Online Videos 1 and 2). By post-dilation with a 28-mm balloon, we managed to properly expand the CoreValve frame and to unbend the inversion (Online Video 3). After this countermeasure, the AR Index increased considerably to 33.7 (Fig. 1D), the prosthesis frame expanded properly (Fig. 1E), the inflow tract was finally

round shaped (Fig. 1F), and only mild paravalvular AR was found in the final angiogram (Online Videos 4 and 5).

In rare cases, an inversion of the stent frame might be the reason for severe paravalvular leakage after deployment of self-expanding transcatheter heart valves—despite pre-dilation with BAV—and might be resolved by post-dilation.

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