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IMAGES IN CARDIOVASCULAR INTERVENTION

Transcatheter closure of an aorto–right ventricular fistula after TAVR

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A male over the age of 90 years presented with chest pain on exertion and recent myocardial infarction. His coronary angiogram showed no significant coronary artery disease. CT demonstrated a heavily calcified trileaflet aortic valve (Fig. 1), with a mean gradient of 44 mmHg and an aortic valve area of 0.46 cm^2 on transthoracic echocardiography (TTE). Our heart-team elected transfemoral transcatheter aortic valve replacement (TAVR) because of advanced age and frailty. After pre-dilation with a 26 × 30 mm balloon, a 29-mm Sapien 3 valve (Edwards Lifesciences, Irvine, CA) was deployed with a reduction of the balloon volume by 1 cc (nominal CT-based oversizing was calculated as 13%). Postprocedural TTE showed a small continuous flow jet from right coronary sinus into the right ventricle (RV, i.e., Aorto–RV fistula) at the TAVR-stent's distal edge (Fig. 2). Initially, the patient was managed conservatively because he was asymptomatic and hemodynamically stable. After 1 month, however, he was admitted with severe heart failure (NYHA III-IV). Transesophageal echocardiography (TEE) revealed a worsening fistula (Qp/Qs = 1.7, Fig. 3). On CT, the defect measured 4.5 mm (Fig. 4). We performed transcatheter closure using a retrograde approach. An exchanged-length, angled-Glidewire (Terumo, Somerset, NJ), which was supported by a telescoped 100 cm 6-French multipurpose guide and 125 cm 5-French multipurpose diagnostic catheter, was used to cross the defect. With the Glidewire in place we then exchanged for a 6-French shuttle sheath (Cook Medical, Bloomington, IN) and advanced it across the defect without a wire-rail (Fig. 5). A 6-mm Amplatzer Duct Occluder II (ADO-II, St. Jude Medical, Fridley, MN) was successfully deployed (Figs. 6, 7). After deployment of the ADO-II, only mild shunting was observed

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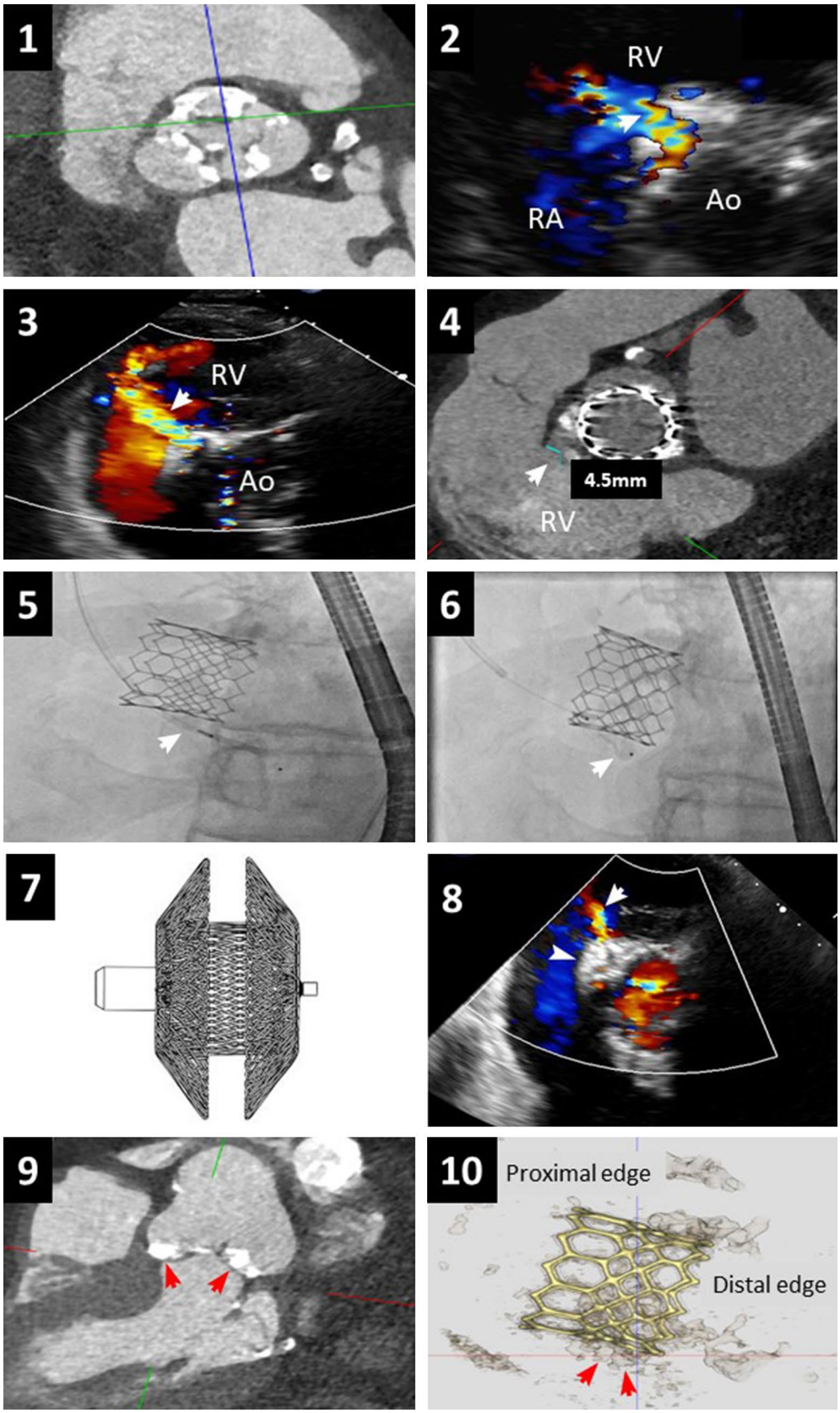
1
2
RV
RA
Ao
3
RV
Ao
4
4.5mm
RV
5
6
7
8
9
10
Proximal edge
Distal edge

◂**Fig. 1–10** **1** CT shows a heavily calcified trileaflet aortic valve. **2** TTE (short-axis view) shows a small continuous flow jet at the distal edge of the TAVR-stent (arrow). *RA* right atrium, *RV* right ventricle, *Ao* aorta. **3** TEE (short-axis view) shows a worsening aorto–RV fistula (arrow). **4** CT shows a 4.5 mm defect (arrow) located at the bottom of the right coronary sinus. **5** Intraprocedural fluoroscopy. 6-French shuttle sheath (arrow) is advanced across the defect without an externalized wire-rail. **6** Intraprocedural fluoroscopy. Placement of a 6-mm ADO-II (arrow). **7** Figure of an Amplatzer Duct Occluder II (ADO-II). **8** Post-procedural TEE shows the ADO-II (arrowhead) and reduced residual shunting (arrow). **9** CT shows severe calcification at the level of the LVOT (arrows). **10** 3D-CT imaging shows two displaced calcium nodules (arrows) at the distal edge of the TAVR- stent

on TEE (Fig. 8). The patient's symptoms improved dramatically, and he was discharged to home the next day.

An aorto–RV fistula after TAVR is a rare, but serious complication associated with high mortality [1]. In our case, an extensive calcium nodule in the LVOT (Fig. 9) that was displaced during TAVR deployment (Fig. 10) lead to the fistula despite balloon volume reduction to avoid aggressive oversizing.

Reference

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