Antegrade valve embolization after transcatheter treatment for pure aortic regurgitation

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A 75-year-old male with a left ventricular ejection-fraction of 20% and a Euroscore-II of 11.2% was referred for a TAVI due to severe aortic valve regurgitation and moderate–severe mitral regurgitation (AR) with NYHA class IV symptoms. The leaflets were free of calcification and with an annulus diameter of 27.7 mm, he was scheduled for the implantation of a 29 mm Direct Flow Medical valve (Direct Flow Medical Inc., Santa Rosa, CA, USA). The specific design of the prosthesis makes it an ideal choice for treatment of pure AR and its use in this application has already been reported. However, the prosthesis area of the 29 mm valve measures 660 mm², therefore not allowing for vigorous oversizing in this particular patient (563 mm²). After successful positioning and being aware of the potential risk for embolization into the left ventricle, a vigorous push test was carried out before releasing the valve.

Thirty minutes later there was a sudden increase of blood pressure (SBP 100 mmHg–240 mmHg), while the patient became symptomatic for abdominal pain and dyspnoea. Immediate fluoroscopy confirmed antegrade embolization of the valve to the upper descending aorta (Panel A, white arrow points to the valve). Since the valve was landed upside down, it caused a total occlusion with no flow to the abdomen and lower limbs (see Supplementary material online, Video S2). The patient became more symptomatic due to severe acute heart failure. After successful puncture of the femoral artery despite no blood flow, a Meier-Back-up wire was placed across the valve prosthesis. The implantation of two 50 mm Chemtham Platinum stent (CP-stent, NuMed Inc. Laboratories, Hopkinton, NY, USA) restored perfusion of the descending aorta and immediately relieved the patients’ symptoms (expanded stent shown in Panel B). The first stent was deployed but slipped off the balloon only marginally expanded. Therefore, a second stent was placed immediately, this time successfully opening the valve leaflets (see Supplementary material online, Videos S3–S5). Open surgical correction of the double valve regurgitation was carried out with an aortic 27 mm Carpentier-Edwards Perimount pericardial bioprosthesis and a 28 mm Edwards Physio Mitral ring (both Edwards Lifesciences, Irvine, CA, USA). The patient was discharged 16 days post-surgery in good condition and with no persisting neurological or renal impairment. He was discharged on oral anticoagulation for 3 months with Phenprocoumon due to the mitral valve repair. Thirty days later the patient remained in good condition (NYHA class I–II).

Even though embolization of TAVI has been previously described, there are neither large series nor cases with long follow-up indicating that the follow-up schedule should differ from normal patients. In absence of a strong oversizing, prosthesis stability is not ensured. This case highlights the importance of oversizing when treating pure AR in a non-calcified annulus. Also, the antegrade embolization suggests that not only a push test is required in these cases, but a pull test should be done to test the stability of the implant in both directions.

Supplementary material is available at European Heart Journal online.