How to re-shape a transcatheter heart valve

Wilhelm Roell1†, Jan Malte Sinning2†, Nikos Werner2, and Fritz Mellert1*

1Department of Cardiac Surgery, Heart Center Bonn, University Hospital Bonn, Bonn, Germany; and 2Department of Medicine II, Heart Center Bonn, University Hospital Bonn, Bonn, Germany

* Corresponding author. Email: fritz.mellert@ukb.uni-bonn.de
† These authors contributed equally to this work.

A 82-year-old female patient suffering from severe aortic stenosis presented with progressive dyspnoea NYHA class III after syncope. Due to severe calcifications of the ilio-femoral arteries, she underwent uneventful transapical transcatheter aortic valve implantation with a balloon-expandable Edwards SAPIEN 3 (23 mm) prosthesis. Three hours postoperatively, the patient had a sudden cardiac arrest due to ventricular fibrillation (VF). After 4 min of cardiopulmonary resuscitation (CPR) normal sinus rhythm was restored. Since neither signs of cardiac ischaemia (no ST-segment alterations in the electrocardiogram) nor troponin elevation were seen myocardial ischaemia could be ruled out as reason for VF. TEE after CPR confirmed a correct intra-annular position of the transcatheter heart valve (THV) but revealed a severe prosthesis deformation with consequent paravalvular leakage (Panels A and B). To overcome this THV-specific failure mode, which has been described recently for balloon-expandable THVs, we decided to re-dilate the SAPIEN 3 prosthesis via transfemoral access (Supplementary material online, Video S1), using a 9-French 20 mm Tyshak II Balloon Dilatation Catheter (NuMED Inc., Hopkinton, NY, USA).

After the first inflation of the balloon (Supplementary material online, Video S2), the prosthesis appeared reshaped in fluoroscopy without any signs of migration or any remaining transvalvular gradient. Furthermore, the significant paravalvular leakage had completely disappeared after re-dilation of the prosthesis stent frame, which now appeared round-shaped again (Panels C and D). The further clinical course of the patient was uneventful.

Long-term follow-up has to show whether re-dilation might impact stability of the stent frame or durability of the valve itself but this case demonstrates how to address successfully THV compression.

Supplementary material is available at European Heart Journal online.

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