Percutaneous treatment of a giant right ventricular outflow tract pseudo-aneurysm and severe pulmonary regurgitation

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A 20-year-old female patient with corrected Tetralogy of Fallot and pulmonary atresia was referred to us for assessment of suitability for percutaneous pulmonary valve implantation (PPVI). Previous surgical repair involved the use of a 26 mm homograft to establish a right ventricle (RV) to pulmonary artery connection. Magnetic resonance revealed free pulmonary regurgitation (PR) and severe RV dilatation. In addition, there was a giant pseudo-aneurysm arising from the anterior aspect of the proximal end of the homograft. There was no evidence for homograft obstruction and the dimensions were borderline for successful PPVI (20 × 23 mm).

These dimensions were confirmed by invasive angiography making safe anchoring of a valved stent difficult. Angiography also confirmed free PR and the presence of the pseudo-aneurysm (Panels A and B). It was felt that closure of the aneurysm would benefit future surgical or interventional therapies. Therefore, the neck of the aneurysm was closed with an Amplatzer PFO device (AGA Medical Corporation, MN, USA). On repeat angiography, the RV outflow tract dimensions were more favourable for PPVI, with the proximal disc of the PFO device providing additional anchoring for the valved stent. Thus, PPVI was performed with a 22 mm delivery system (Ensemble™, Medtronic, MN, USA) with complete abolition of PR in the absence of a RV to PA gradient (Panel C).

On post-procedural multi-detector computed tomography, the valved stent was well seated and widely patent within the RVOT. The PFO device was correctly positioned. There remained minimal contrast filling of the aneurysm, but there was already thrombus formation within the distal aneurysm (Panels D–F).

The patient was discharged 2 days after the procedure and had no post-procedural complications.

Panel A. RVOT angiography showing free PR and contrast filling of the pseudo-aneurysm.
Panel B. Selective angiography of the pseudo-aneurysm in lateral projection.
Panel C. Successful implantation of the device into the neck of the pseudo-aneurysm; angiography after PPVI showing a well positioned valved stent with valvar competence.
Panels D and E. Multi-detector computed tomography post procedure. 2D multi-planar reformatted images showing the valved stent positioned in the homograft (arrow) and the device at the neck of the pseudo-aneurysm (asterix) in oblique sagittal view and oblique axial view.
Panel F. Bone and metal threshold volume rendered image showing the valved stent in close apposition to the PFO device in oblique axial view. Note the presence of a right pulmonary artery stent placed during a previous procedure.

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