

Successful pulmonary homograft re-implantation after previous surgical and percutaneous interventions

Wszczepienie homografu płucnego sześć lat po nieudanej przezskórnej implantacji zastawki płucnej u 23-letniego pacjenta z tetralogią Fallota

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A 23-year-old man diagnosed with tetralogy of Fallot with absent pulmonary valve underwent primary repair at the age of two years. Surgical allograft repair was performed at the age of 10 due to allograft stenosis. Seven years later, due to recurrence of pulmonary allograft stenosis, transcatheter pulmonary valve implantation (TPVI) was applied. After prestenting with a bare metal stent Medtronic Melody (MM) valve was adopted with a 20-mm delivery system. The right ventricular outflow tract (RVOT) peak gradient measured after procedure was 18 mmHg. However, transthoracic echocardiography (TTE) performed in the following week revealed a gradient of 76/36 mmHg. Two months later the valve was expanded with a 22-mm balloon. Post-procedure gradient was 35 mmHg, and subsequent TTE showed the RVOT gradient of 78/44 mmHg. Recurrent stent recoil was diagnosed and the patient was referred to surgery, to which he disagreed. Six years later on admission to our institution the patient presented with heart failure New York Heart Association class III, paroxysmal atrial flutter, which significantly impaired the cardiac function causing dyspnoea at rest and peripheral oedema. TTE revealed pulmonary valve stenosis with peak/mean gradient of 130/75 mmHg and small pulmonary valve insufficiency. Cardiac magnetic resonance imaging showed large dysfunctional right heart chambers: right ventricular end-diastolic volume — 514 mL, right atrium — 70 cm³, right ventricular ejection fraction — 35%. Computed tomography scan showed stenosis of the pulmonary artery close to the bifurcation, with the smallest diameter of 1.32 cm (Fig. 1) and damaged leaflets of the implanted valve (Fig. 2). Upon receiving patient agreement for surgical treatment the MM valve was removed (Fig. 3) and the allograft was excised. A 25-mm pulmonary allograft was implanted using root-replacement technique. In the postoperative period the patient suffered from right heart insufficiency, which was treated with diuretics. TTE confirmed good allograft function: reflected by a peak transvalvular gradient of 16 mmHg. The patient was discharged home 13 days after surgery in good condition without peripheral oedema. TPVI is a relatively novel intervention in such patients. Exclusion criteria for the procedure are questionable due to relatively little experience. Complex allograft morphology, as in the case described above, may lead to stent recoil and rapid valve degeneration with the subsequent right heart failure. Other complications, including allograft rupture, stent migration, or fracture, have been reported. The influence of mentioned complications on valve durability is still unknown. Furthermore, subsequent surgical re-intervention could be more challenging. Based on this case, re-operation seems to be a preferable treatment to TPVI, especially when a complex allograft morphology occurs in a young patient. Adequate allograft implantation is essential for success of further required percutaneous procedures. Once observed stent recoil should be considered as an indication for surgery to avoid right ventricular impairment.



Figure 1. Computed tomography scan performed six years after transcatheter pulmonary valve implantation. Stenosis close to the bifurcation and complex allograft morphology

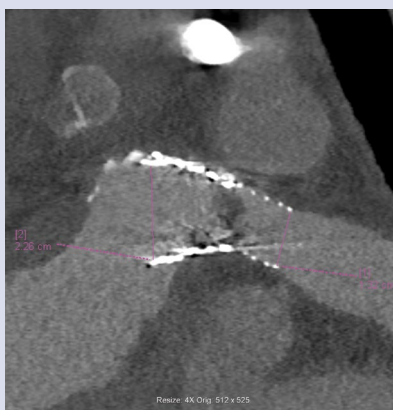


Figure 2. Computed tomography scan performed six years after transcatheter pulmonary valve implantation. Damaged valve leaflets and stenosis close to the bifurcation

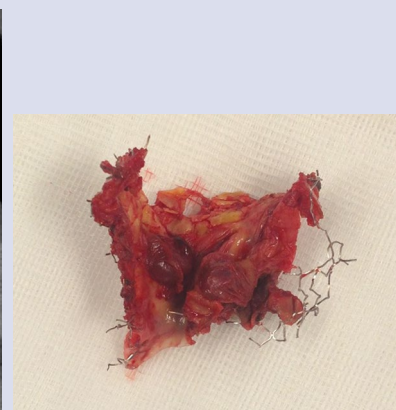


Figure 3. Explanted Medtronic Melody valve. Damaged valve leaflets

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Conflict of interest: Marcin Demkow — proctor for Medtronic

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