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The bailout transseptal approach during valve-in-valve transcatheter aortic valve implantation with difficult crossing of the degenerated Mitroflow bioprosthetic valve

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Short title: The use of transseptal access in the valve-in-valve TAVI procedure

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Valve-in-valve transcatheter aortic valve implantation (ViV TAVI) is an accepted treatment of patients with structural valve deterioration (SVD) who are not good candidates for a reoperation [1, 2]. A 70-year-old male patient with NYHA III heart failure was admitted with SVD of a Mitroflow 21 bovine pericardial prosthesis (Sorin Group Inc.) implanted 7 years ago concomitantly with coronary artery bypass grafting (CABG). The transthoracic echocardiography (TTE) showed severe valve stenosis (effective orifice area 0.7 cm², mean gradient 62 mm Hg) and 50% left ventricle (LV) ejection fraction. Because of obesity [body mass index (BMI) 37.8] and high perioperative mortality risk (EuroSCORE 6.31%) the heart team after analyzing the multislice contrast computed tomography (MSCT) (Figure 1A-1B) recommended transfemoral ViV TAVI. The procedure was attempted by the right femoral approach under local anesthesia. Despite the use of several catheters (AL1, AL2, JR, pigtail, IMA), as well as various straight tip wires [0.035’ soft diagnostic, hydrophilic coated (Terumo), coronary (BMW)] the valve crossing was impossible. The patient was switched to general anesthesia, intubated, and transesophageal echo (TOE) was used. The right femoral vein was cannulated, and under the TOE guidance, the atrial septal puncture was done. The transseptal sheath was introduced into the left atrium, the JR diagnostic catheter was pushed into the LV (Figure 1C), and the aortic valve was easily crossed anterogradely with a 0.035’ straight tip diagnostic wire. After navigating the JR catheter into the ascending aorta the soft guidewire was extended and snared (EnSnare) using the snare introduced through femoral artery. The JR catheter was pulled into the left ventricle along with snare and guide catheter (Figure 1D-1E). It allowed retrograde placement of the stiff wire (Confida, Medtronic Inc) and implantation of self-expanding Evolut R valve (Figure 1F). The procedure time was 3,5 hours. Control TTE revealed mild paraavalvular leak and reduction mean gradients to 13 mmHg. The patient was discharged home without complications. Although ViV TAVI is a widely accepted, less invasive alternative to reoperation in patients with SVD it can pose
some technical challenges during the procedure. Usually crossing of the prosthesis is straightforward because in many cases there is some degree of regurgitation and the less calcifications than in the native valve which makes the leaflet opening more symmetrical. In this case we found the crossing using variety of catheters and wires impossible. Antegrade aortic valve crossing via the transseptal access is a solution in such case. This approach was used by Cribier et al. during the first successful TAVI [3]. Alternatively to our method snaring of the retrograde wire can be done in the ascending aorta with a snere introduced by the antegrade catheter. Other challenges with ViV TAVI are coronary artery obstruction, elevated post-procedural gradient, and malposition [2,4]. According to Bapat et al. careful procedure planning includes type, size, true stent internal diameter and fluoroscopic appearance of the degenerated bioprosthesis, and choosing the right size and model new transcatheter heart valve is important in correct implantation and to reduce complications [5].
References:


Figure 1. A - multislice contrast computed tomography imaging of implanted bioprosthesis and ascending aorta: short axis view.

B - multislice contrast computed tomography imaging of implanted bioprosthesis and ascending aorta: long axis view.

C - fluoroscopy of the transeptal sheath in the left atrium and the diagnostic catheter in left ventricle.

D - fluoroscopy of the diagnostic catheter in the ascending aorta after crossing bioprosthesis aortic valve and the snare introduced through femoral artery.

E - fluoroscopy of the snared antegrade wire in the ascending aorta.

F – fluoroscopy of the selfexpandable valve (Evolute R) in the implantation position.