

# Transseptal implantation of HighLife self-expandable mitral valve in a patient with severe secondary mitral regurgitation and heart failure

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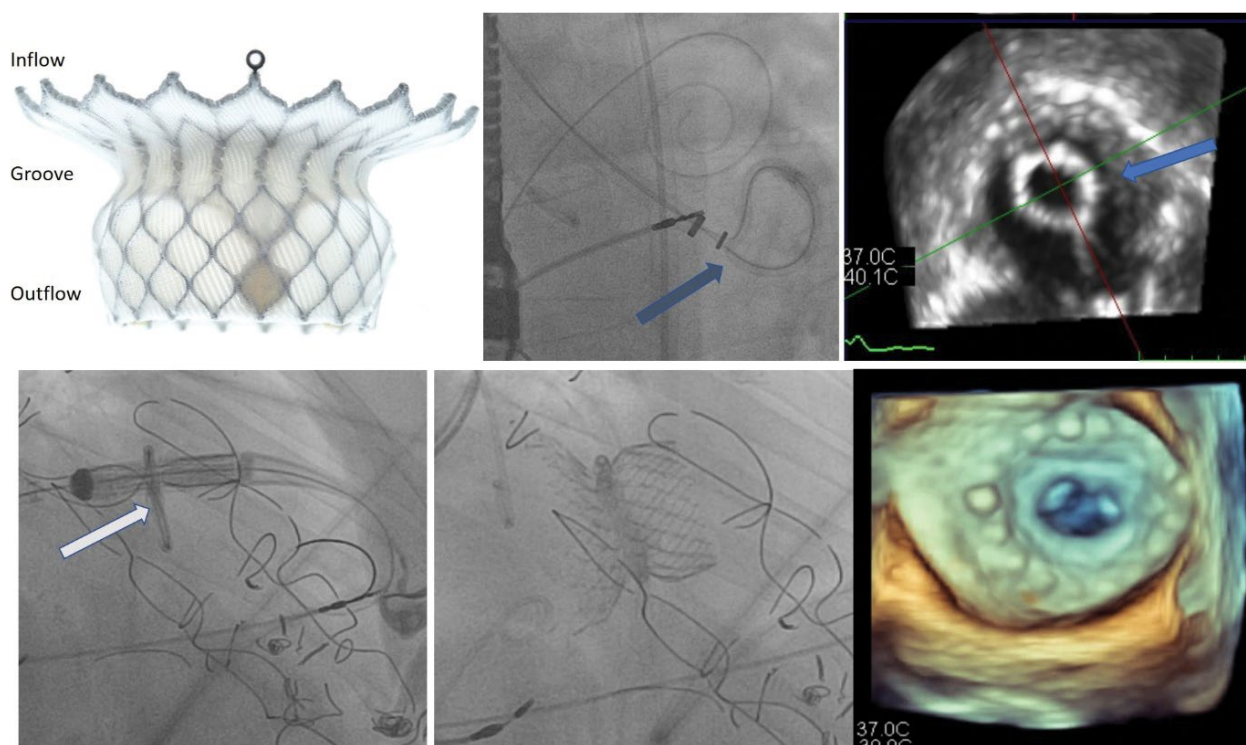
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The report presents the initial Polish experience with trans-septal transcatheter mitral valve implantation using the HighLife valve, specifically developed, for a patient with moderate-severe to severe functional mitral regurgitation. HighLife is a trans-septal self-expandable valve consisting of a nitinol frame with bovine pericardial leaflets and a post-implant mitral annular diameter of 28 mm. The patient was a 70-year-old male with *New York Heart Association* (NYHA) III class heart failure. He had a history of coronary artery disease (16 years after coronary artery bypass grafting [CABG]), atrial fibrillation, pacemaker implantation, hypertension, diabetes mellitus, and obesity (body mass index [BMI], 35 kg/m<sup>2</sup>). Echocardiography showed left ventricular (LV) enlargement (end-diastolic diameter [EDD], 70 mm, end-diastolic volume [EDV], 211 ml) with mildly depressed LV ejection fraction (52%) and severe functional mitral regurgitation (Supplementary material, *Figure S1*). The Heart Team deemed the patient inoperable. Preprocedural multi-slice computed tomography showed a proper size of the mitral annulus and a low risk of LV outflow tract obstruction. The procedure was performed under general anaesthesia. The procedural steps consisted of the retrograde crossing of the aortic valve and introducing the loop placement catheter below the aortic valve and creating a loop with a guidewire encircling the chordae tendineae. Using the ring delivery catheter in the LV the subannular ring was advanced and closed after confirmation of proper positioning. The ring formed a landing zone for the valve. The interatrial septum was punctured and balloon septostomy with

10 mm balloon performed. A stiff Lunderquist wire was placed across the interatrial septum and the transeptal valve delivery system introduced into the LV. The LV portion of the valve was gradually deployed within the subannular ring, the valve is pulled against the ring, pushing the ring against the native mitral annulus, then the atrial portion is released (*Figure 1*). The transesophageal echocardiography (TEE) confirmed the proper function of the valve with no mitral regurgitation and no paravalvular regurgitation (Supplementary material, *Figure S2*). The arterial access site was closed with Manta 18 F device and venous access with an „8” suture. The patient was extubated in the hybrid room and ambulated the next day. He initially reported alleviation of heart failure symptoms, but at 1 month FU presented overt signs of right ventricular decompensation. TEE visualized significant right to left shunt across persistent iatrogenic atrial septal defect (ASD; oblong-shaped with max. dimension of 2.95 cm and an area of 2.15 cm<sup>2</sup>) which was subsequently closed using the ASD Amplatzer plug (Supplementary material, *Figure S3–S4*). Further course was uneventful and the patient remains stable in NYHA class II at 5 months post-TMVR. This case is one of the first 15 transseptal HighLife valves implanted worldwide. Previous clinical data showed the feasibility and safety of the earlier transapical version of this device [1]. The possibility of a transseptal approach is the advantage of this technology and as a less invasive technique, it is a goal of the progress of the transcatheter mitral valve implantation field [2]. The key features of the HighLife valve is a stable landing zone formed by the subannular ring



**Figure 1.** Fluoroscopy and transoesophageal echocardiography depicting the steps of High Life valve implantation. **A.** 28 mm HighLife self-expandable valve. **B.** Fluoroscopic image of loop placement catheter across the aortic valve with a closed ring encircling the mitral valve chords. **C.** Echocardiographic short-axis view showing the ring (arrow) and loop placement catheter. **D.** Fluoroscopic view of the valve in the capsule positioned to match the groove with the subvalvular ring. **E.** Deployed valve. **F.** 3D atrial view in transoesophageal imaging of the valve

controlled deployment and fully percutaneous access. The most important anatomic requirements currently are not over-large mitral annulus and no evidence of LV outflow tract obstruction on pre-procedure computed tomography review and adequate arterial vascular access.

### Supplementary material

Supplementary material is available at [https://journals.viamedica.pl/kardiologia\\_polska](https://journals.viamedica.pl/kardiologia_polska).

### Article information

**Conflict of interest:** The authors are investigators in the HighLife clinical trial.

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