

This is a provisional PDF only. Copyedited and fully formatted version will be made available soon.

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

Authors: Wojciech Wojakowski, Grzegorz Smolka, N. Piazza, Radosław Gocoł, Damian Hudziak, Marek Jędrzejek, Piotr Pysz

Article type: Clinical vignette

Received: March 1, 2021.

Accepted: April 11, 2021.

Published online: April 16, 2021.

ISSN: 0022-9032

e-ISSN: 1897-4279

This is an Open Access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International License ([CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)), allowing third parties to download articles and share them with others, provided the original work is properly cited, not changed in any way, distributed under the same license, and used for noncommercial purposes only. For commercial use, please contact the journal office at kardiologiapolska@ptkardio.pl.

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

Short title: Transseptal mitral valve replacement

Wojciech Wojakowski¹, Grzegorz Smolka¹, N. Piazza², Radosław Gocoł³, Damian Hudziak³,
Marek Jędrzejek¹, Piotr Pysz¹

(1) Department of Cardiology and Structural Heart Diseases, Medical University of Silesia, Katowice, Poland

(2) Division of Cardiology, Department of Medicine, McGill University Health Centre, Montreal, Quebec, Canada; Faculty of Medicine, McGill University, Montreal, Quebec, Canada

(3) Department of Cardiac Surgery, Department of Cardiac Surgery, Medical University of Silesia, Katowice, Poland

Corresponding author:

Wojciech Wojakowski MD, PhD,

Division of Cardiology and Structural Heart Diseases

Medical University of Silesia

Ziołowa 45, 40-635 Katowice, Poland

wwojakowski@sum.edu.pl

We present the initial Polish experience with trans-septal (TS) transcatheter mitral valve implantation (TSMVR) using the HighLife valve, specifically developed, for patient with moderate-severe to severe functional mitral regurgitation (MR). HighLife is a TS self-expandable valve consisting of 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 NYHA III class heart failure (HF). The medical history consisted of coronary artery disease (16 years after CABG), atrial fibrillation, pacemaker, hypertension, diabetes mellitus, and obesity (BMI 35). Echocardiography showed LV enlargement (EDD 70 mm, EDV 211 ml) with mildly depressed LV ejection fraction (52%) and severe functional MR (Figure S1). The Heart Team deemed the patient inoperable. Preprocedural multislice computed tomography showed proper size of the mitral annulus and low risk of left ventricle outflow tract obstruction. The procedure was performed under general anesthesia. The procedural steps consisted of retrograde crossing of the aortic valve (AV) and introducing the loop placement catheter below the AV 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 (IAS) was punctured and balloon septostomy with 10 mm balloon performed. A stiff Lunderquist wire was placed across the IAS 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. The TEE confirmed the proper function of the valve with no mitral regurgitation and no paravalvular regurgitation (Figure S2). Arterial access site was closed with Manta 18 F device and venous access with „8” suture. The patient was extubated in the hybrid room and ambulated the next day. He initially reported alleviation of HF symptoms, but at 1 month FU presented overt signs of right ventricular decompensation. TEE visualized

significant right to left shunt across persistent iatrogenic ASD (oblong shaped with max. dimension of 2.95 cm and an area of 2.15 cm²) which was subsequently closed using the ASD Amplatzer plug (Figures S3-4). 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 fifteen 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 transseptal approach is clearly the advantage of this technology and as a less invasive technique it is a goal of the progress of TSMVR field [2]. The key features of the HighLife valve is a stable landing zone formed by the subannular ring, and controlled deployment and fully percutaneous access. Most important anatomic requirements currently are not over-large mitral annulus, and no evidence of LVOTO on pre-procedure CT review and adequate arterial vascular access.

References:

- [1] Barbanti M, Piazza N, Mangiafico S, Buithieu J, Bleiziffer S, Ronsivalle G, et al. Transcatheter Mitral Valve Implantation Using the HighLife System. *JACC Cardiovascular interventions*. 2017; 10: 1662-1670.
- [2] Overtchouk P, Piazza N, Granada J, Soliman O, Prendergast B, Modine T. Advances in transcatheter mitral and tricuspid therapies. *BMC cardiovascular disorders*. 2020; 20: 1.

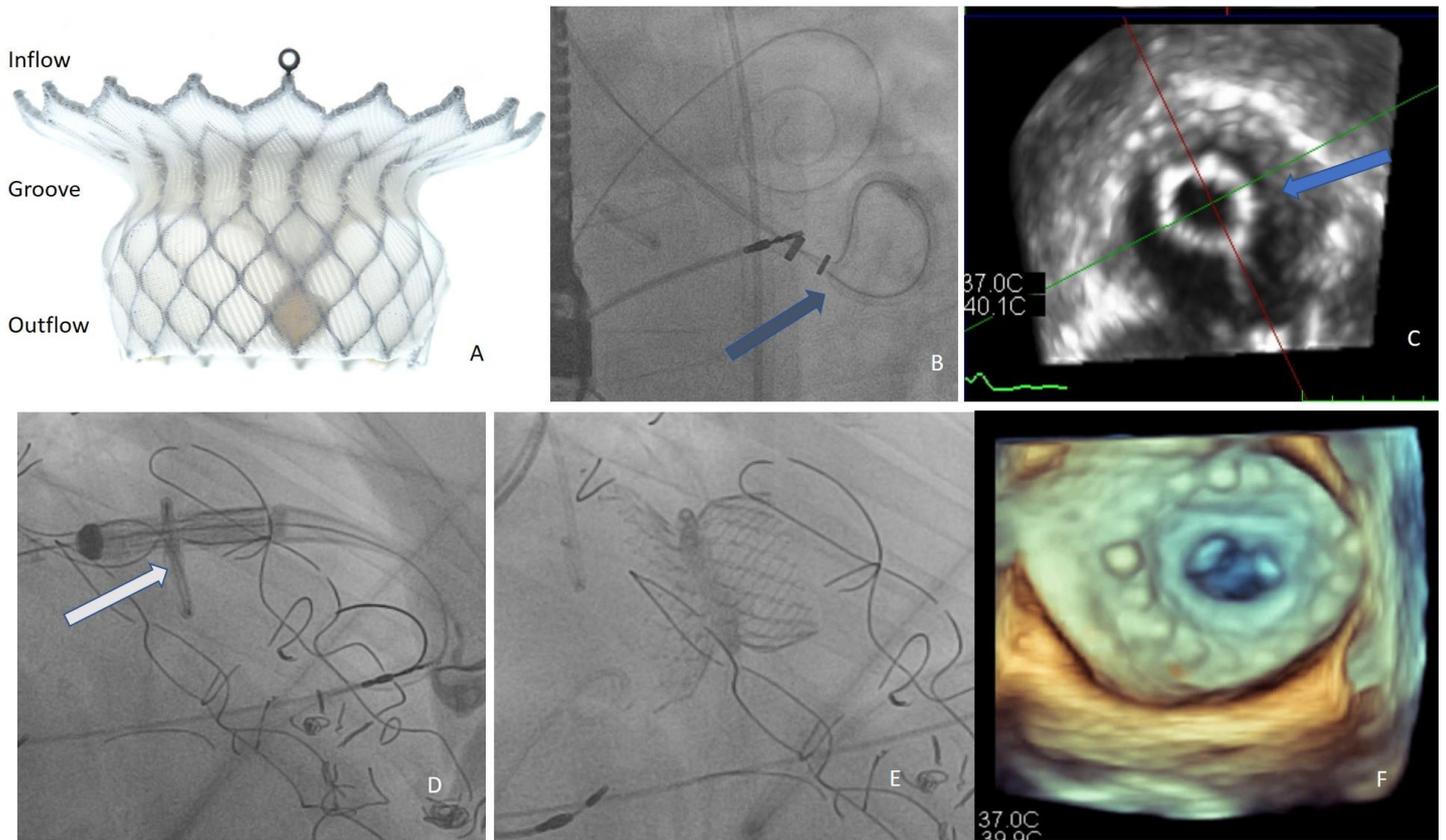


Figure 1. Fluoroscopy and transesophageal echocardiography depicting the steps of High Life valve implantation.

(A) 28 mm High Life 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 transesophageal imaging of the valve