Transcatheter treatment tricuspid regurgitation by valve-in-ring implantation with a novel balloon-expandable Myval® THV

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Transcatheter tricuspid valve-in-valve (TVIV) and valve-in-ring (TVIR) implantation procedures have emerged as important alternatives for high-risk patients [1].

A 59-year-old female patient, who first underwent closed mitral commissurotomy for mitral stenosis in 1989, was admitted to our department with complaints of dyspnea and edema in the legs and abdomen. The patient had a mitral valve replacement in 1991 and, in 2016, an aortic valve replacement and implantation of a 34-mm Edwards MC3 rigid partial ring (Edwards Lifesciences, LLC, Irvine, CA, US) were performed, together with tricuspid commissurotomy and patch augmentation. Transthoracic echocardiography (TTE) reported massive tricuspid regurgitation, increased tricuspid gradient (mean gradient 8 mm Hg), functional aortic and mitral prosthetic valves, and a preserved left ventricular ejection fraction (LVEF; 55%). Multislice computed tomography (MSCT) demonstrated the shape of the annuloplasty ring very well, and measurements of the ring area, circumference (933 mm), and diameter (30 mm) were performed in detail without thrombus and vegetation (Figure 1A).

After analyzing the literature evaluating Edwards MC3 34-mm Tricuspid annuloplasty partial ring and the echocardiography and MSCT findings, it was decided to implant the 32-mm Myval transcatheter heart valve (THV) system (Meril Life Sciences Pvt. Ltd., Vapi, Gujarat, India). As the right femoral vein was large, tortuous and edematous on examination, the procedure was performed under sedation in the left femoral vein with TTE. We crossed the valve with 6 Fr Multipurpose MPA1 via a 0.35-inch hydrophilic guidewire, and the Lunderquist Extra-Stiff Wire Guide (LES; Cook Inc., Bloomington, IN, US) was placed into the right ventricle. After an unsuccessful placing of a temporary pacing catheter via a jugular vein in the right ventricle, the system was prepared for rapid pacing over the stiff guidewire that would carry the valve system. Then the 32-mm Myval THV balloon-expandable valve was slowly implanted to avoid deforming the partial annuloplasty under the rapid pacing (180 bpm) in the precise position on fluoroscopy (Figure 1B, Supplementary material, *Video S1*). Incomplete rings lead to a higher risk of valve overexpansion, embolization, and paravalvular leaks, which can be avoided by a cautious and slow positioning of the THV. For the Myval positioning, detailed preparation was performed with multimodality imaging before the procedure, various positions were searched under the scope, and implantation was attempted by seeing the annuloplasty ring nearly at the same level. After Myval functions were observed to be good in hemodynamic, echocardiographic, and fluoroscopic controls, the procedure was terminated by applying an eight-shaped suture to the femoral vein (Figure 1C, Supplementary material, *Video S2*). The patient was discharged the next day without complications, with mild valve and mild paravalvular tricuspid regurgitation with a mean gradient of 3.5 mm Hg on TTE (Figure 1D, Supplementary material, *Video S3*).

Valve dysfunction or degeneration after tricuspid valve replacement or repair with annuloplasty ring is frequent. It increases the

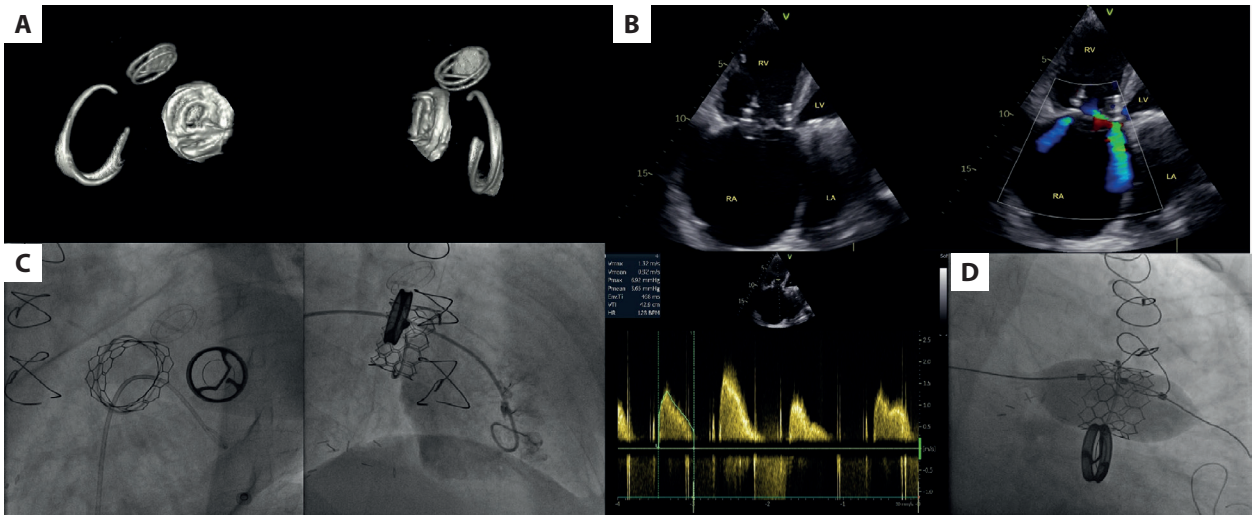

Figure 1. A. Cardiac computed tomography showed the ring shape and downward angle in the septal region. **B.** Echocardiographic images 2 days after transcatheter tricuspid valve-in-ring (TVIR). **C.** Angiographic images after transcatheter TVIR Myval implantation. **D.** Angiographic images of implantation of the 32-mm Myval transcatheter heart valve

morbidity and mortality of the patients and may require redo surgery. Currently, to overcome this dilemma, case series concerning transcatheter TVIV or TVIR have emerged due to the risk of redo surgery. Transcatheter TVIR is a more challenging procedure than transcatheter TVIV, and successful and unsuccessful cases with Edwards Sapien XT, SAPIEN 3 (Edwards Lifesciences, Irvine, CA, US), and Melody (Medtronic, Minneapolis, MN, US) THV systems have been described [2–5].

To our knowledge, this first case report showed that the novel balloon-expandable Myval THV system is suitable for transcatheter TVIR.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

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