Never Give Up: A Case Report on Transcatheter Mitral Valve Replacement by MyVal for Degenerated Mitral Bioprosthesis During Hostilities in Ukraine

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SOUHRN

Tato kazuistika popisuje zkušenosti s katetrizační implantací bioprotézy MyVal (Meril Life Sciences) s cílem odstranit těžkou insuficienci biologické mitrální chlopně, k jejíž degeneraci došlo v průběhu nepřetržitých vojenských operací a s tím souvisejících leteckých poplachů a výpadků proudu, což komplikovalo logistiku popisovaného výkonu.

ABSTRACT

The following clinical case presents the experience of using the MyVal (Meril Life Sciences) transcatheter biological aortic valve prosthesis to eliminate severe insufficiency of a degenerated mitral valve (MV) bioprosthesis, which occurred in the context of constant military operations, related air alerts, and power outages, which complicated the logistics of this procedure.

Introduction

One of the most common diseases of the heart valve apparatus is mitral valve (MV) disease, which is diagnosed with a frequency of about 10%.[1] This article presents the case of using the MyVal (Meril Life Sciences) transcatheter biological aortic valve prosthesis to eliminate severe insufficiency of a degenerated mitral valve bioprosthesis, which occurred in the context of constant military operations, related air alerts, and power outages, which complicated the logistics of this procedure.

Clinical case

The 70-year-old patient K. was admitted to the State Institution "Heart Institute of the Ministry of Health of Ukraine" with complaints of severe shortness of breath during physical activity and at rest for 4 months, and unproductive cough. According to the patient, due to the occupation of her village by Russian troops, she was unable to seek assistance earlier and receive proper medical care, which led to an exacerbation of her condition. Anthropometric data on admission: height – 157 cm, weight

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Table 1 – Relevant past interventions with outcomes

Year	Events
2010	Successful MV prosthetics with Hancock 2 – 27 mm bioprosthesis for severe mitral insufficiency, posterior leaf mitral valve detachment, chordal damage
2020	Successful transcatheter closure of paraprosthetic mitral valve fistula with Occlutech PLD occluder
2021	Severe form of COVID-19, with severe respiratory failure – SpO_2 <85%, which required artificial lung ventilation
2022	Repeated appeal to the State Institution "Heart Institute of the Ministry of Health of Ukraine" with the above complaints

– 58 kg, BMI – 23,53 kg/cm^2. The medical history of the disease is shown in **Table 1**.

A general clinical blood test and biochemical analysis without any special features. NT-proBNP level – 1496 ng/ml (normal 0–125). According to the electrocardiogram: sinus rhythm, correct; PQ interval – 0.14 s; QRS complex – 0.08 s, not extended; pathological Q waves – absent.

Echocardiography (EchoCG) data: aortic valve – tricuspid, maximal Δp = 10 mm Hg, regurgitation – 1+; mitral valve – bioprosthesis, severe eccentric regurgitation along the posterior-lateral wall of the left atrium, Δp = 21/6 mmHg; tricuspid valve – normal leaves, mild regurgitation; left atrium – 5.8 cm, volume/volume index – 121 cm^3/75 ml/m^2; right atrium – volume/volume index – 48 cm^3/30 ml/m^2; right ventricle – 3.5 cm; pulmonary hypertension (PH) – 48 mmHg; left ventricular end-diastolic volume (LVEDV) – 90 ml, left ventricular end-systolic volume (LVESV) – 33 ml; left ventricular ejection fraction (LVEF) – 63%; interventricular septal thickness – 1.2 cm, posterior wall – 1.0 cm.

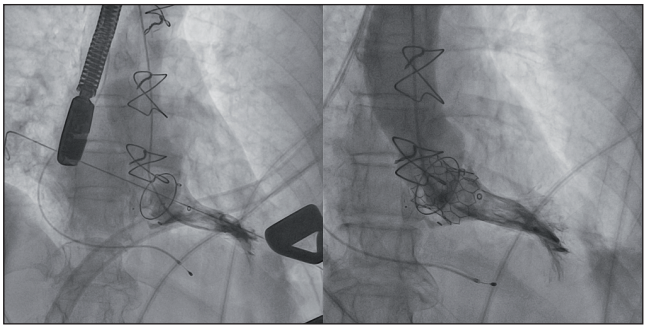

Fig. 1 – Left ventriculography showing mitral valve insufficiency before implantation (left). Left ventriculography without mitral valve insufficiency after implantation (right).

According to the results of computed tomography with intravenous contrast, the left ventricular outflow tract (LVOT) was 337.3 mm^2.

Given the high risk of repeat surgery (EuroSCORE II – 7.98%, STS – 9.209%), a decision was made to transcatheter implant a balloon-expandable biological aortic valve prosthesis into the degenerated mitral valve prosthesis.

The intervention was postponed 2 times due to missiles attack. The operation was performed as follows: after intercostal thoracotomy and U-shaped sutures, a pouch suture was made at the apex of the LV and the apex was punctured with a needle, followed by insertion of a working J-shaped guide through the valve into the left atrium with the placement of a 14Fr introducer. Then a temporary rhythm driver is connected. Due to the absence of effective contraction (rapid ventricular pacing) of the left ventricle, a 24.5 mm diameter MyVal balloon-expandable valve was implanted.

The intervention was performed under the control of angiography (Philips AZURION) (**Fig. 1**) and transesophageal echocardiography (**Figs. 2 and 3**).

The early postoperative period was not complicated. After 1 day in the intensive care unit, the patient was transferred to the ward. The control computed tomography showed that the Neo LVOT was 143.6 mm^2, the aorto-mitral angle was 57.9°, which was considered an acceptable risk of LVOT obstruction after ViV-TMVR.

The patient was discharged in a satisfactory condition on the 8th day after the intervention. The HF functional class according to NYHA decreased from class III–IV to class II. A visit 3 months later revealed no significant abnormalities according to the EchoCG. HF grade = II FC according to NYHA.

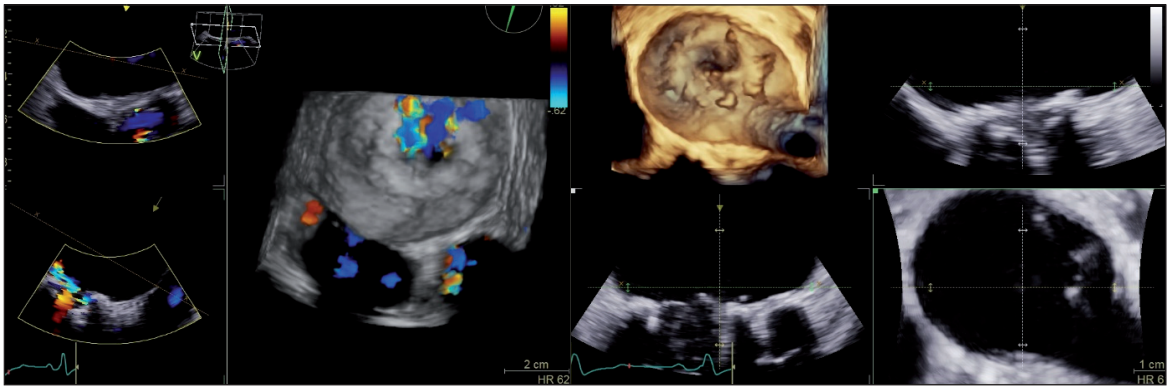

Fig. 2 – The results of TEEchoCG before implantation of the bioprosthesis: Eccentric regurgitation on the MV bioprosthesis (left). Prolapse of the anterior leaf of the MV bioprosthesis (right).

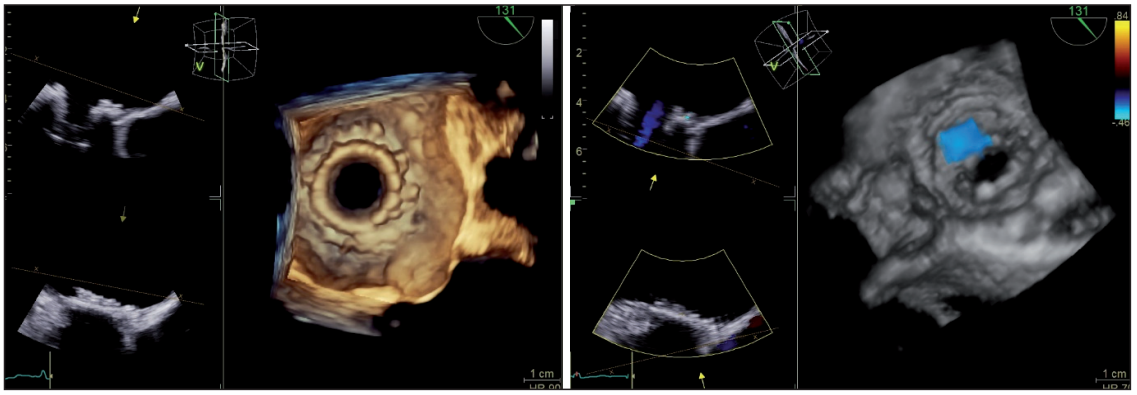

Fig. 3 – The results of TEEchoCG after implantation of the bioprosthesis: MV bioprosthesis (left). No regurgitation (right).

Conclusion

The use of transapical transcatheter prosthetics of the degenerated mitral valve with the MyVal aortic prosthesis together with a detailed CT analysis with contrast can be considered as the main treatment method in high-risk patients.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethical statement

IRB number and date of approval: Heart Institute Ministry of Ukraine Ethics Committee protocol №10 from 7. 10. 2022.

Informed consent

The written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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