

Normalization of pulmonary hypertension after experimental pulmonary denervation therapy and MitraClip implantation in a patient initially disqualified from heart transplant

Adam Banasiak¹, Jerzy Pręgowski¹, Jarosław Skowroński¹, Michał Orczykowski², Tomasz Zieliński³, Adam Witkowski¹

¹ Department of Interventional Cardiology and Angiology, National Institute of Cardiology, Warsaw, Poland

² Department of Arrhythmia, National Institute of Cardiology, Warsaw, Poland

³ Department of Heart Failure and Transplantology, National Institute of Cardiology, Warsaw, Poland

One of the contraindications for the orthotopic heart transplantation (OHT) is irreversible pulmonary hypertension (PH). A 62-year-old man was admitted with heart failure (HF) of ischemic etiology in NYHA class III with reduced ejection fraction (EF, 15%), atrial fibrillation, and diabetes. Previously, the CRT was implanted. The patient underwent screening as a candidate for OHT. Echocardiography, apart from revealing impaired left ventricular contractility, showed also PH (right ventricle systolic pressure, 70 mm Hg), dilatation of the left ventricle (left ventricular end diastolic diameter, 74 mm) and moderate / significant mitral regurgitation (FIGURE 1A and 1B). Right heart catheterization confirmed severe PH: mean pulmonary artery pressure (mPAP) of 54 mm Hg, pulmonary capillary wedge pressure (PCWP) of 25 mm Hg, pulmonary vascular resistance (PVR) of 10.3 Wood units with cardiac index of 1.46 l/min/m². No satisfactory response to the iloprost was observed, PVR dropped to 3.6 Wood units only. Due to irreversible PH, the patient was disqualified from OHT. Off-label sildenafil was started and routine heart failure treatment continued. During the next hospitalization 7 months later, right heart catheterization was repeated. Based on its results that confirmed persistence of PH, the patient was enrolled into the scientific protocol of experimental transcatheter pulmonary artery denervation. The key inclusion criteria for the study were nonreversible

mPAP (not reduced ≥ 10 mm Hg after administration of a vasodilator, iloprost) and PVR of 3.5 Wood units or more. Pulmonary artery denervation is a catheter-based ablation technique targeting afferent and efferent fibers of a baroreceptor reflex in the main pulmonary artery trunk.¹ This reflex is described as responsible for elevation of the PAP in PH. Immediately before the procedure, right heart catheterization showed mPAP of 45 mm Hg and PCWP of 19 mm Hg. After denervation, it showed mPAP of 36 mm Hg and PCWP of 17 mm Hg. Despite hemodynamic improvement, the patient still remained in NYHA class III with exacerbation periods and was scheduled for MitraClip therapy by the Heart Team. During the MitraClip procedure, a reduction of the mitral regurgitation grade from severe to mild was achieved (FIGURE 1C and 1D). Optimal medical treatment including sildenafil was continued. After 4-month follow-up, right cardiac catheterization revealed a profound decrease of PH (mPAP, 36 mm Hg; PCWP, 24 mm Hg; PVR, 2.05 Wood units); the cardiac index was 3.02 l/min/m². Following those findings and the patient's clinical condition, the Heart Team requalified him, and successful OHT was performed 5 months later.

After surgery, the patient received a standard triple immunosuppressive regimen: tacrolimus, mycophenolate mofetil, and glucocorticoid. Despite histopathological signs of acute

Correspondence to:

Jerzy Pręgowski, MD,
National Institute of Cardiology,
ul. Alpejska 42, 04-628 Warszawa,
Poland, phone: +48 22 343 41 27,
email: jerzypręgowski74@gmail.com
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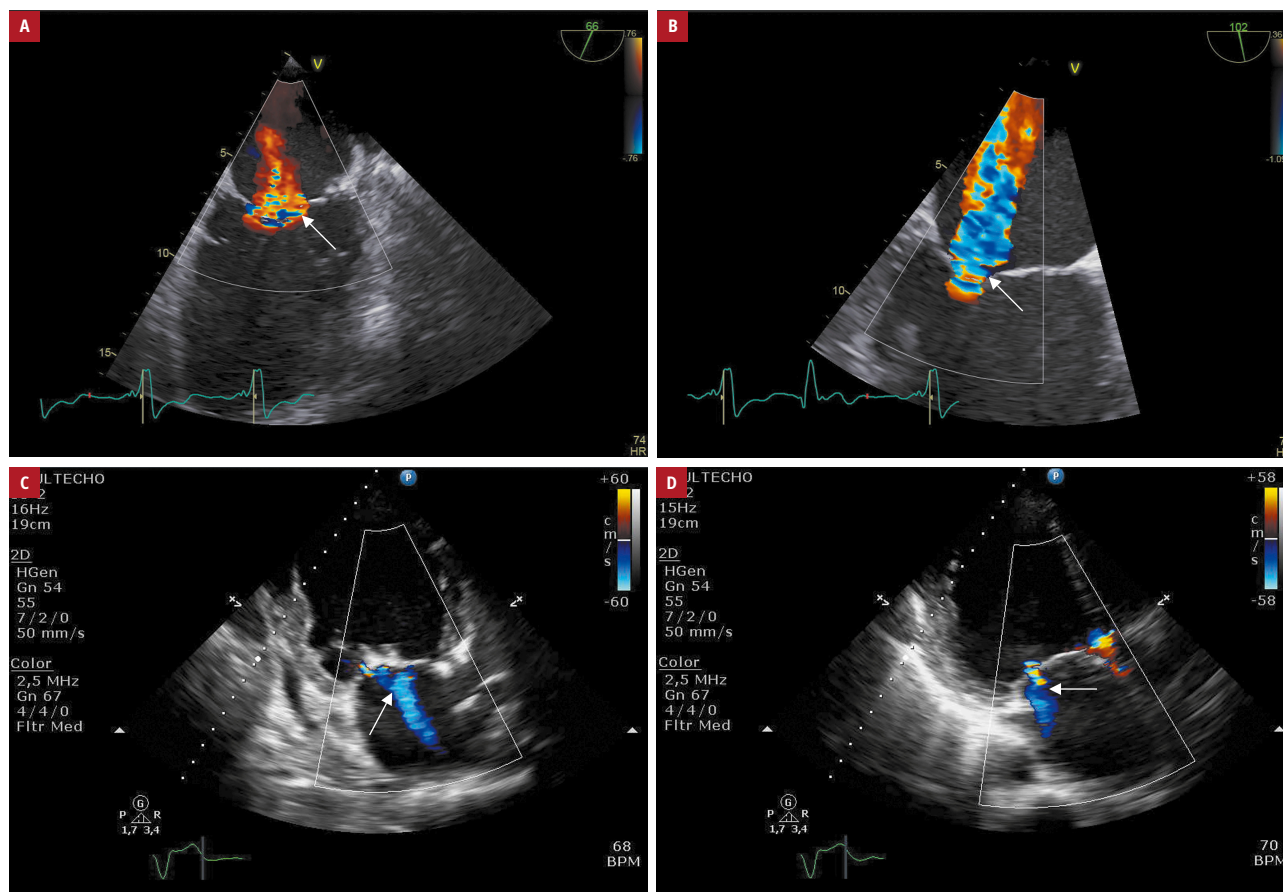


FIGURE 1 A, B – transesophageal echocardiography, X-plane view showing severe mitral regurgitation prior to the MitraClip implantation (arrows); C, D – transthoracic echocardiography showing mild residual mitral regurgitation after implantation of 2 MitraClip devices (arrows)

rejection in the first 3 biopsies, he remained stable. Follow-up echocardiography showed slight general hypokinesia with left ventricular ejection fraction of 50%.

Recently published data suggest that a successful MitraClip procedure may lead in some patients to an improvement of right ventricle function and reduction of pulmonary artery pressure.² We believe that in this patient, the complex advanced therapy including experimental pulmonary denervation and MitraClip procedure in addition to the optimal medical treatment led to the reversal of severe PH and facilitated the destination life-saving therapy. However, further studies are needed to better define the role of percutaneous procedures as potential bridges facilitating OHT.

ARTICLE INFORMATION

CONFLICT OF INTEREST None declared.

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