Impella 5.5 and mitral transcatheter edge-to-edge repair as a bridge to heart transplantation in a patient with cardiogenic shock

Roman Przybylski[1], Michał Kosowski[1], Maciej Bochenek[1], Krzysztof Reczuch[1], Barbara Barteczko-Grajek[2], Anna Kupiec[2], Michał Zakliczyński[1], Wojciech Zimoch[1], Mikołaj Błaziak[1], Wiktor Kuliczkowski[1]

[1]Institute of Heart Diseases, Wroclaw Medical University, Wrocław, Poland
[2]Department of Anaesthesiology and Intensive Therapy, Wroclaw Medical University, Wrocław, Poland

Correspondence to:
Michał Kosowski, MD,
Institute of Heart Diseases,
Wroclaw Medical University,
Borowska 213, 50–556 Wrocław,
Poland,
phone: +48 71 733 11 12,
e-mail:
michal.kosowski@umw.edu.pl

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In patients with cardiogenic shock, mechanical circulatory support using Impella 5.5 for hemodynamic stabilization provide a crucial tool as a bridge to further evaluation [1]. We present the first Polish case combined therapy of Impella 5.5 implantation followed by mitral transcatheter edge-to-edge repair (TEER) which finally ended with successful heart transplantation. A 57-year-old male was transferred to the University Hospital in Wroclaw from the remote center due to cardiogenic shock resistant to conservative treatment. Patient's history included percutaneous coronary intervention of left main, left anterior descending, intermediate and obtuse marginal arteries in the past, myocardial infarction 5 years ago and anterior myocardial infarction with ST-segment elevation one month ago treated with balloon angioplasty of left anterior descending. Hospitalization in the remote center was due to circulatory decompensation treated with levosimendan, furosemide and noradrenaline with dobutamine intravenous infusion. On the admission, the patient required escalation of inotropic therapy. Cuff blood pressure was 98/56 mm Hg, heart rate was 90 bpm. Electrocardiogram revealed sinus rhythm with left bundle branch block. Laboratory tests showed elevated N-terminal pro-B-type natriuretic peptide (20787 pg/ml), creatinine (2 mg/dl, estimated glomerular filtration rate 37 ml/min/1.73 m^2), arterial lactate (1.6 mmol/l) concentrations and hemoglobin of 12.9 g/dl. Right heart catheterization revealed a 3.0 l/min cardiac output, cardiac index of 1.72 l/min/m^2, central venous pressure 13 mm Hg, mean pulmonary pressure (mPAP) 38 mm Hg, capillary wedge pressure 24 mm Hg, pulmonary artery pulse pressure 3.0, and cardiac power output of 0.54. Echocardiographic examination showed dilated left ventricle (diastolic diameter 72 mm) with reduced left ventricular ejection fraction of 24% and severe mitral regurgitation. The Shock Team classified patient as New York Heart Association (NYHA) IV, INTERMACS 2 and decided on staged Impella 5.5 implantation and, as a later option, a TEER procedure. Impella 5.5 was implanted through axillary access with a surgically inserted Dacron graft. Six days later a successful TEER procedure was done with two MitraClip devices (XT, XTW) reducing mitral regurgitation from severe to mild with reduction of mPAP to 27 mm Hg and pulmonary capillary wedge pressure to 8 mm Hg (Figure 1). Despite this treatment repeated attempts to wean from Impella 5.5 were unsuccessful with minimal pump P-level of 4. On the 12th day of Impella treatment signs of thrombosis of the device occurred which prompted us to start catecholamic amines again and qualify the patient for heart transplantation (HTx) with high urgency status. In the next two days successful orthotopic HTx was performed. The postoperative course was uneventful with the absence of transplant dysfunction and 22 days after HTx patient was discharged home in NYHA class I. The four months of follow-up with control myocardial biopsies did not reveal cardiac allograft rejection.

In this interdisciplinary case, the implantation of Impella 5.5 was a bridge-to-decision enabling the application of all possible ther-

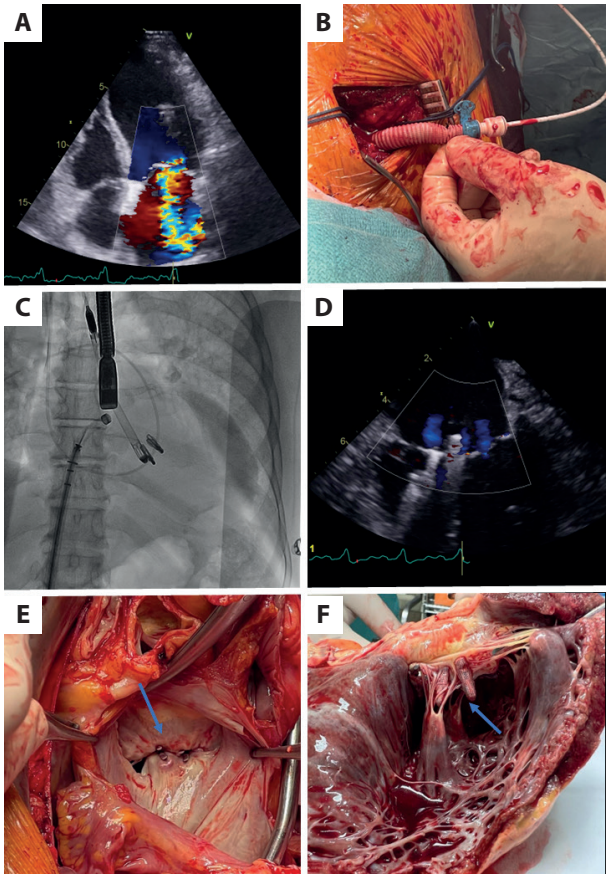

Figure 1. A. Transthoracic echocardiography, severe mitral regurgitation. **B.** Impella 5.5 implanted through axillary access with a surgically inserted Dacron graft. **C.** MitraClip implantation (angiographic view with previously implanted Impella 5.5). **D.** Transesophageal echocardiography, mitral regurgitation reduction after two MitraClip devices implantation. **E.** Surgical atrial view, MitraClip devices marked with an arrow. **F.** Explanted heart, MitraClip devices marked with an arrow

apies before HTx. In this regard although TEER procedure did not result in omitting HTx, it helped to improve right heart pressures and facilitate clinical course post operation. The Impella 5.5 therapy seems to be associated with a low risk of complications, nevertheless, as our case showed thromboembolic events still pose a risk [2].

Supplementary material

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

Article information

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