KARDIOLOGIA POLSKA

Polish Heart Journal
The Official Peer-reviewed Journal of the Polish Cardiac Society since 1957

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

ISSN 0022–9032 e-ISSN 1897–4279

Impella 5.0 as a bridge to recovery in severe left ventricular disfunction

Authors: Jerzy Sacha, Jarosław Bugajski, Natalia Wężyk, Joanna Płonka, Maciej Molsa, Piotr Kunicki, Robert Żurawel, Małgorzata Ziółkowska, Witold Gwóźdź, Piotr Feusette, Marek Gierlotka

Article type: Clinical vignette

Received: April 24, 2023

Accepted: May 19, 2023

Early publication date: July 28, 2023

Impella 5.0 as a bridge to recovery in severe left ventricular disfunction

Short title: Impella 5.0 as a bridge to recovery

Jerzy Sacha[1, 2], Jarosław Bugajski[1], Natalia Wężyk[1], Joanna Płonka[1], Maciej Molsa[3], Piotr Kunicki[4], Robert Żurawel[4], Małgorzata Ziółkowska[4], Witold Gwóźdź[5], Piotr Feusette[1], Marek Gierlotka[1]

[1]Department of Cardiology, University Hospital, Institute of Medical Sciences, University of Opole, Opole, Poland
[2]Faculty of Physical Education and Physiotherapy, Opole University of Technology, Opole, Poland
[3]Department of Anesthesiology, University Hospital, Institute of Medical Sciences, University of Opole, Opole, Poland
[4]Department of Surgery, University Hospital, Faculty of Natural Sciences and Technology, University of Opole, Opole, Poland
[5]Department of Cardiac Surgery, University Hospital, Faculty of Natural Sciences and Technology, University of Opole, Opole, Poland

Correspondence to:
Jerzy Sacha, MD, PhD,
Department of Cardiology,
University Hospital in Opole,
Witosa 26, 45–401 Opole, Poland,
phone: +48 77 452 06 60,
e-mail: sacha@op.pl

Impella 5.0 and 5.5 constitute an efficient mechanical circulatory support (MCS) in patients with cardiogenic shock (CS) or extremely decompensated heart failure. In addition to generating high blood flow, these pumps significantly unload the left ventricle, reducing wall tension and changing myocyte metabolism in a way that allows for some recovery [1]. We report two patients who presented late with anterior myocardial infarction (ant-MI) and developed CS. They were treated with Impella 5.0 for 27 and 42 days (respectively) and eventually discharged home without MCS.

The first patient was a 69-year-old man who was admitted with CS (SCAI-B) 24 hours after the onset of ant-MI. Despite percutaneous coronary intervention (PCI) of the left anterior ascending artery (LAD), he required noradrenaline infusion and frequent cardioversions due to ventricular tachycardia. Echocardiography showed a left ventricular ejection fraction (LVEF) of 20%, a velocity time integral of left ventricular outflow tract of 13 cm, and an apical thrombus. During the following days, frequent episodes of ventricular tachycardia/fibrillation occurred despite administering amiodarone, lidocaine, ranolazine, and general anesthesia. Ablation of ventricular arrhythmias was not possible due to an apical thrombus. Therefore, ICD was implanted to avoid frequent external cardioversion/defibrillation. After 13 days of anticoagulation, the thrombus resolved and the electrical ablation was performed, which however turned out to be ineffective; moreover, the patient developed SCAI-C CS. Then, Impella 5.0 was implanted via the right axillary access (Figure 1A). After several days on Impella, the patient's condition improved, and no complex ventricular arrhythmia reoccurred. The man was on pump for 27 days, during which time beta-blocker and SGLT-2 inhibitor therapy was started, MCS was slowly deescalated, the patient was mobilized (Figure 1B), LVEF increased to 30% and finally, Impella was removed (Figure 1C, Supplementary material, *Video S1*). Thereafter, the patient underwent COVID-19, however without complications, and was eventually discharged home. During the 12-month observation, he did not experience any major cardiovascular events, and he was New York Heart Association (NYHA) I/II class.

The second case involved a 53-year-old man with type I diabetes who was transferred to our centre from another hospital after PCI of LAD because of CS. The patient presented late after the onset of ant-MI and quickly developed SCAI-D CS. He underwent several cardiac arrests, required intubation, and high doses of noradrenaline and adrenaline (LVEF was 10%, Figure 1D, E, Supplementary material, *Video S2*). As a last resort, Impella 5.0 was implanted through a left axillary access.

Several days later, the lactate level returned to normal, and the man was extubated. During 42 days on pump, SGLT-2 inhibitors and beta-blockers were initiated, and the patient was mobilized (Figure 1F). His condition slowly improved, LVEF increased to 28%, and finally, Impella was removed. The man was transferred to a rehabilitation centre and then readmitted for ICD implantation before being discharged home. During the 3-month observation, he remained in NYHA II/III class.

These cases demonstrate that Impella 5.0/5.5 constitutes a big hope for heart recovery even in severe cardiac damage.[2] Alternatively, these pumps may be a bridge to permanent MCS or heart transplantation.

Supplementary material

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

Article information

Conflict of interest: None declared.

Funding: None.

References

1. Swain L, Reyelt L, Bhave S, et al. Transvalvular ventricular unloading before reperfusion in acute myocardial infarction. J Am Coll Cardiol. 2020; 76(6): 684–699, doi: 10.1016/j.jacc.2020.06.031, indexed in Pubmed: 32762903.
2. Sacha J, Kaperczak J, Gwóźdź W, et al. Impella CP in cardiogenic shock due to acute myocardial infarction: From primary angioplasty to LIMA-LAD grafting. Kardiol Pol. 2021; 79(12): 1389–1390, doi: 10.33963/KP.a2021.0152, indexed in Pubmed: 34734407.

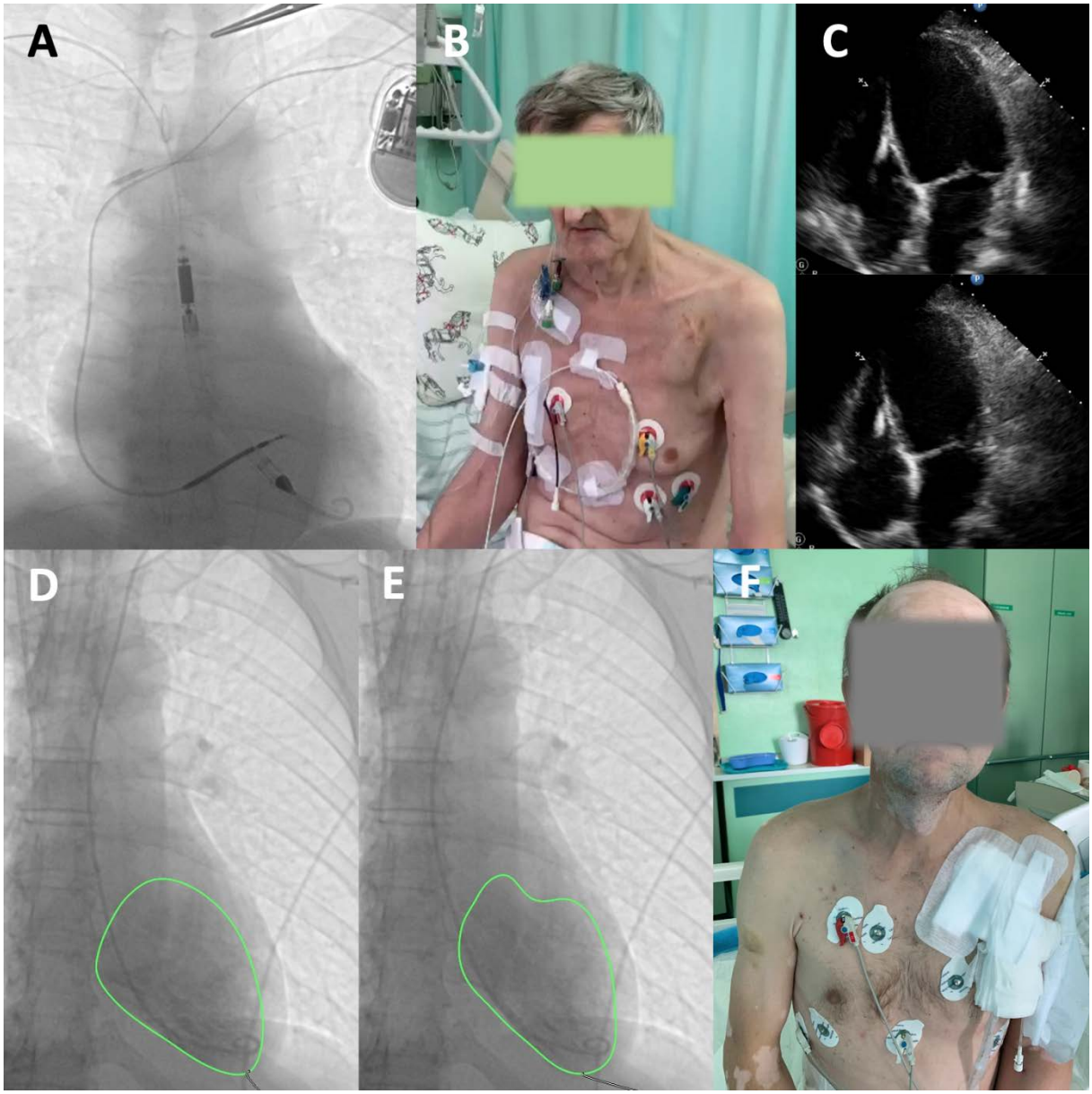

Figure 1. The first 69-year-old patient was implanted with Impella 5.0 via the right axillary access using a surgical approach (**A**). He was on pump for 27 days, during which time, he was mobilized (**B**). Finally, his left ventricular ejection fraction increased to 30%, and the pump was removed (**C**) — see Supplementary material, *Video S1*. The second 53-year-old patient was admitted in cardiogenic shock. The ventriculography showed the left ventricular ejection fraction of 10% (diastole [**D**] and systole [**E**]) – see Supplementary material, *Video S2*. Impella 5.0 was implanted via a left axillary surgical approach, and the patient was on pump for 42 days (**F**). He was discharged home without mechanical circulatory support