

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

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Impella 5.0 and 5.5 are efficient mechanical circulatory support (MCS) devices 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 on 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 and eventually discharged home without MCS.

The first patient was a 69-year-old man who was admitted with CS (stage B, according to the Society for Cardiovascular Angiography and Interventions [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 left ventricular ejection fraction (LVEF) of 20%, a velocity time integral of the 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 the apical thrombus. Therefore, an implantable cardioverter defibrillator (ICD) was implanted to avoid frequent external cardioversion/defibrillation. After 13 days of anticoagulation, the thrombus resolved, and electrical ablation was performed, which

turned out to be ineffective. Moreover, the patient developed SCAI-C CS. Then, Impella 5.0 was implanted via right axillary access (Figure 1A). After several days on Impella, the patient's condition improved, and no complex ventricular arrhythmia reoccurred. The patient was on the pump for 27 days, during which time beta-blocker and SGLT-2 inhibitor therapies were started, MCS was slowly de-escalated, 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 follow-up, he did not experience any major cardiovascular events, and he was in New York Heart Association (NYHA) class I/II.

The second case involved a 53-year-old man with type I diabetes, who was transferred to our center from another hospital due to CS following anti-MI treated with PCI of the LAD. 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 left axillary access.

Several days later, the lactate level returned to normal, and the man was extubated. During 42 days on the 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

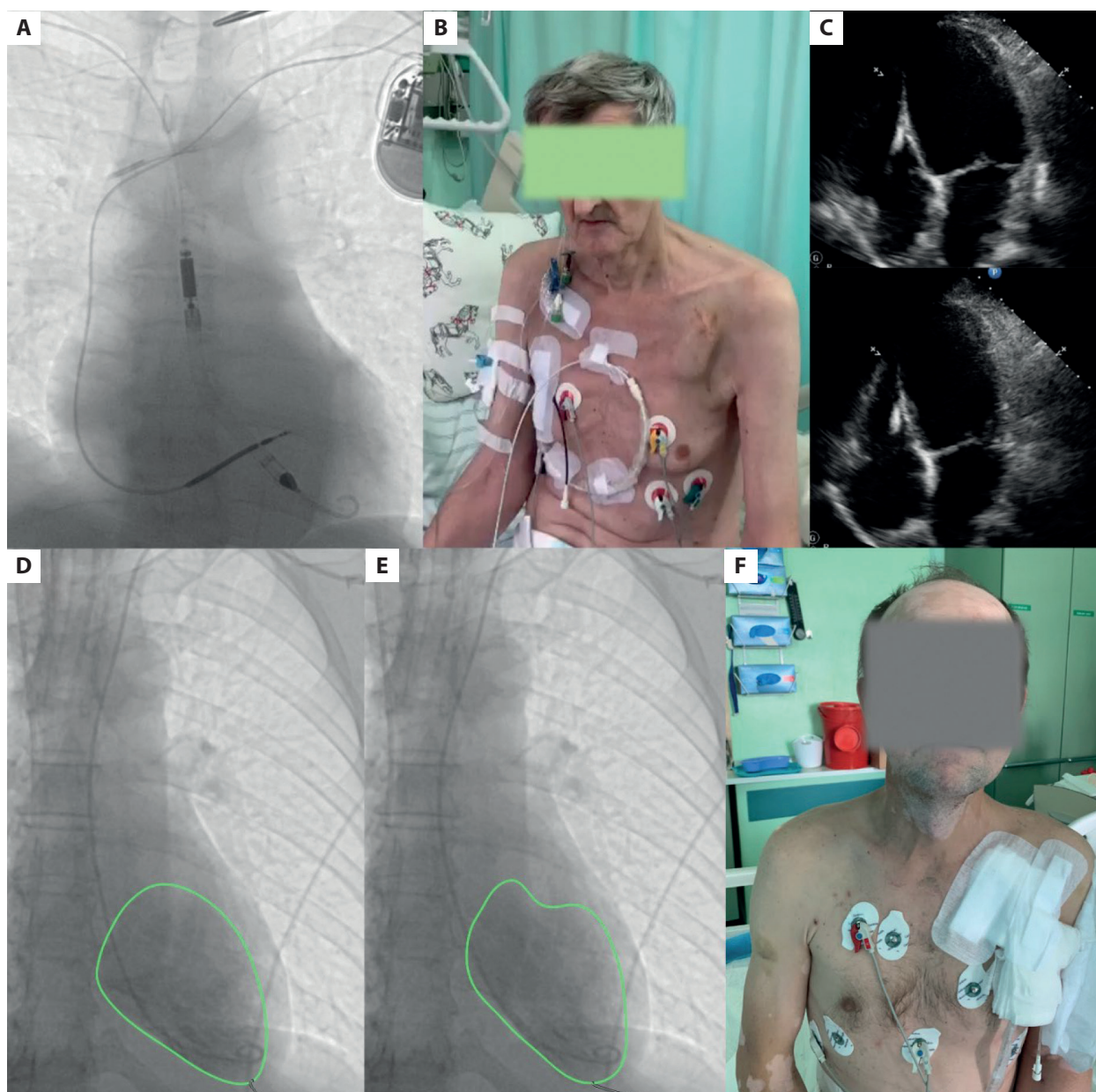


Figure 1. The first 69-year-old patient was implanted with Impella 5.0 via right axillary access using a surgical approach (A). He was on the pump for 27 days, during which time he was mobilized (B). Finally, his left ventricular ejection fraction increased to 30%, and the pump was removed (C) — see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

transferred to a rehabilitation center and then readmitted for ICD implantation before being discharged home. During the 3-month follow-up, he remained in NYHA class II/III.

These cases demonstrate that Impella 5.0 and 5.5 offer significant 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

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