

Use of the Impella device in cardiogenic shock

 Ana Marinić*,
 Valentina Jezl^{1,2},
 Danijela Grgurević^{1,2},
 Vjera Pisačić¹

¹University Hospital Centre
Zagreb, Zagreb, Croatia

²University of Applied Health
Sciences, Zagreb, Croatia

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***ADDRESS FOR CORRESPONDENCE:** Ana Marinić, Klinički bolnički centar Zagreb, Kišpatićeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-92-162-6172 / E-mail: marinic.ana9@gmail.com

ORCID: Ana Marinić, <https://orcid.org/0000-0002-9349-8172> • Valentina Jezl, <https://orcid.org/0000-0002-7588-4571>
Danijela Grgurević, <https://orcid.org/0000-0002-2089-7463> • Vjera Pisačić, <https://orcid.org/0000-0002-0395-7487>

Cardiogenic shock is a clinical entity characterized by decreased cardiac output and resultant circulatory failure leading to organ hypoperfusion and tissue hypoxia.¹ There are numerous factors that can precipitate, but the most common cause is extensive acute myocardial infarction.² Despite advances in pharmacologic and reperfusion therapy, morbidity and mortality from cardiogenic shock remain high. In cases of worsening cardiogenic shock with conventional therapy, the treatment strategy is temporary mechanical circulatory support (MCS). The primary role of MCS is to improve native cardiac output, increase perfusion through the coronary arteries, decrease left ventricular pressure and filling volume, reduce oxygen consumption, and ensure perfusion of vital organs with minimal risk of complications.³ Microaxial transvalvular left ventricular support (Impella) is one of the most used mechanical circulatory support. The Impella system consists of a pigtail catheter with an integrated axial motor, which is placed percutaneously or surgically in the left ventricle, and automated Impella controller that displays flow rate, performance level, purge fluid rate, purge fluid pressure, alarm notes, and catheter position information. Blood is aspirated from the left ventricle using an axial motor, according to the Archimedes screw principle, and transferred to the ascending aorta. The smart assist technology possessed by two Impella pump models (Impella CP and Impella 5.5) enables monitoring of pump operation, control of catheter position and early recognition of the development of potential complications (catheter dislocation). Other complications associated with the Impella pump are hemolysis, aortic valve and papillary muscle injury, bleeding, thrombosis, and infection.⁴ Daily care for patients on Impella support in Cardiac Intensive Care Unit includes: monitoring the operation of the pump with continuous monitoring of the patient's hemodynamic status, control and daily documentation of the catheter position (by examining the catheter position on the external part of the catheter and echocardiographic imaging of the catheter position in the left ventricle), achieving and maintenance of the target values of anticoagulation therapy and prevention and early recognition of the development of complications. In addition to the timely selection of the moment to set the indication for implanting the Impella support, the success of the treatment, among other things, largely depends on the knowledge and experience of the members of the multidisciplinary team that cares for the patient, following the latest guidelines.

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LITERATURE

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