Mechanical circulatory support in acute and chronic percutaneous coronary interventions settings

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Cardiogenic shock is a life-threatening condition in which the heart suddenly cannot pump adequately blood to meet the body's need, that is mostly driven by the lack of oxygen. This condition is mostly caused by a severe heart attack – up to 10% of AIMs (Acute Myocardial infarction) end up with cardiogenic shock. If the cardiogenic shock is not treated immediately, it is often deadly. Even if treated immediately, it ends up with 50% of survival in one year follow-up. Temporary mechanical circulatory support (MCS) is the tool that can help to overcome such a serious condition. The main MCSs are Impella (CP, 5,5, RP), ECMO (Extracorporeal Membrane Oxygenation) (Vein-Arterial, Vein-Vein), IABP (Intraaortic Balloon Pump) or the combination of two of them, most often ECMO and Impella – called ECpella. Impella CP is the most frequently used MCS in our institution regarding acute and chronic PCI setting. The main indication in acute setting is cardiogenic shock provoked by AMI[1], especially in abrupt occlusion of proximal parts of main vessels (having no collaterals). Impella could be used before urgent PCI procedure (upfront), or after the procedure is done, with better clinical outcomes achieved (survival) using Impella upfront (if possible), respectively. By unloading the left ventricle, Impella stabilizes the patient hemodynamically in that critical situation, and gives needful time to intervene properly. Another very important indication, where the use of Impella is recognized and established, is chronic (or subacute) coronary syndrome[2]. These are so called "CHIP" (complex and high-risk procedure) interventions. The main indication is need for revascularization and surgical ineligibility, whatever the reason is. Impella provides the needed comfort and increases the safety for such complex, time-consuming, procedures. Using Impella in a such manner, showed improved outcomes regarding survival, ejection fraction enhancement, amelioration of heart failure and angina status, predominately by achieving a completeness of revascularization (if not always anatomically, then functionally). Impella CP is great mechanical circulatory support device in surmounting cardiogenic shock, especially in ACS, and excellent tool in providing conditions to solve complex and high-risk coronary patients.

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LITERATURE

1. Møller JE, Engstrøm T, Jensen LO, Eiskjær H, Mangner N, Polzin A, et al; DanGer Shock Investigators. Microaxial Flow Pump or Standard Care in Infarct-Related Cardiogenic Shock. N Engl J Med. 2024 Apr 18;390(15):1382-1393. https://doi.org/10.1056/NEJMoa2312572
2. van den Buijs DMF, van den Brink FS, Wilgenhof A, Zivelonghi C, Verouden N, Knaapen P, et al. Complex High-Risk Indicated Percutaneous Coronary Intervention With Prophylactic Use of the Impella CP Ventricular Assist Device. J Invasive Cardiol. 2022 Sep;34(9):E665-E671. https://doi.org/10.25270/jic/22.00031