Combined mechanical circulatory support: when and why?

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Cardiogenic shock is described as a clinical entity characterized by low cardiac output (less than or equal to 2.2 L/min/m^2) resulting in organ hypoperfusion and tissue hypoxia[1]. The most common cause is acute myocardial infarction, which leads to myocardial hypoperfusion and ischemia, as well as impaired left ventricular systolic and diastolic function and reduced myocardial contractility. The goal of treatment is to prevent irreversible damage to vital organs while restoring cardiac output. This is achieved by establishing a timely diagnosis, early initiation of drug therapy with respiratory support. Given the unfavorable prognosis and high mortality rate in cardiogenic shock, pharmacological therapy is often insufficient, and mechanical circulatory support is required to ensure adequate perfusion of vital organs. The first choice of circulatory support is the veno-arterial extracorporeal membrane oxygenation (VA-ECMO) system, which enables complete hemodynamic stabilization with simultaneous blood oxygenation, effectively ensuring systemic perfusion of vital organs.

The use of the VA ECMO system leads to a decrease in end-diastolic volume and pressure due to blood extraction from the circulation, but retrograde blood return to the aorta increases the filling pressures of the already remodeled left ventricle, with reduced contractility, resulting in blood stasis in the aortic root and left ventricle, leading to the so-called "ECMO lung"[2]. By using the microaxial pump – Impella CP, we compensate for the shortcomings of the VA ECMO system by aspirating blood from the left ventricle, which the pump ejects proximally into the ascending aorta, ensuring anterograde flow while increasing coronary artery perfusion and reducing end-diastolic pressure and left ventricular volume[3].

Timely and optimal use of combined mechanical circulatory support (ECPELLA) is crucial for improving the outcome of treatment of patients with cardiogenic shock, and is becoming a standard therapeutic option in the treatment of patients.

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LITERATURE

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