

# Effectiveness of the extracorporeal membrane oxygenation system in improving cardiac function

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Extracorporeal membrane oxygenation (ECMO) is an important component of cardiogenic shock management, temporarily performs the functions of the heart and lungs - allowing them to "rest" and recover. As circulatory support, ECMO has been successfully used in clinical practice, prevents metabolic disorders. However, ECMO is only supportive therapy, not a disease-modifying treatment.<sup>1</sup> It does not treat heart failure. In order to be counted as cardiac support, ECMO should have an effect on reducing the loading and unloading conditions of the heart. Contrary to that, in certain situations, ECMO has a harmful effect on the function of the heart, leads to distension and decrease its recovery potential. Distension occurs in 10-30% of patients with implanted femoral ECMO support.<sup>2</sup> The large variability in incidence is probably related to the condition of the left ventricle when connecting the patient to ECMO. If the ejection fraction of the left ventricle is somewhat preserved, there will be no distension of the ventricle, ECMO will improve the flow through the coronary arteries and thereby further improve the contractile function of the left ventricle, proportionally to the circuit flow rate.<sup>2</sup> If patient has a very poor contractile function venous return to the heart exceeds the ECMO drainage. Venous return cannot be counterbalanced by the impaired LV contractility, and on the other hand, there is retrograde flow generated by the ECMO system, the ventricle becomes distended, backflow into the pulmonary circulation results in pulmonary edema. Permanent damage can occur to the heart if it remains overdistended. Management of distended heart consists modification of ECMO flow, medical management and mechanical decompression techniques. Decompression strategies usually begin with modification of ECMO flow, adequate for end-organ perfusion, but determined by cardiac contractile function and retrograde ECMO flow. Medical management consists of pharmacological interventions to reduce mean arterial pressure, inotropic therapy to improve pulsatility, and measures to reduce circulation volume. Where medical management is insufficient consideration should be given to provision of mechanical decompression. The intra-aortic balloon pump is first line mechanical decompression. Another possibility is to use an Impella, blood pump, which can generate continuous blood flow contributing to LV unloading. An alternative approach is to vent blood from the pulmonary artery, left atrium or left ventricle with cannulas connected to the ECMO system.

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## LITERATURE

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