©Copyright by Croatian Cardiac Society. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/) which permits users to read, download, copy, distribute, print, search, or link to the full texts of these articles in any medium or format and to remix, transform and build upon the material, provided the original work is properly cited and any changes properly indicated.

From cardiogenic shock to heart transplantation: mechanical circulatory support and inter-hospital collaboration

Ružica Mrkonjić[1]*, Milka Grubišić[2]

[1]Dubrava University Hospital, Zagreb, Croatia
[2]University of Applied Sciences Ivanić-Grad, Ivanić-Grad, Croatia

KEYWORDS: cardiogenic shock, mechanical circulatory support, shock network, perfusion.

CITATION: Cardiol Croat. 2026;21(11-12):413. | https://doi.org/10.15836/ccar2026.413

***ADDRESS FOR CORRESPONDENCE:** Ružica Mrkonjić, Klinička bolnica Dubrava, Avenija Gojka Šuška 6, HR-10000 Zagreb, Croatia. / Phone: +385915057090 / E-mail: ruzicam@kbd.hr

ORCID: Ružica Mrkonjić, https://orcid.org/0000-0002-4454-7708 • Milka Grubišić, https://orcid.org/0000-0003-2092-5396

Introduction: Cardiogenic shock is a state in which severe cardiac injury prevents the heart from maintaining adequate cardiac output, leading to tissue hypoperfusion, hypoxia, and progressive multiple organ failure. Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) can help maintain tissue perfusion, providing time to assess myocardial recovery and decide on further treatment. Successful management requires timely initiation of ECMO support, continuous monitoring of the patient's response, and collaboration between hospitals able to provide the required treatment[1,2]. This report aims to present ECMO support as a bridge to a decision on further treatment and the importance of a timely change in the treatment strategy for patients in cardiogenic shock, from initial stabilization to heart transplantation.

Case report: 52-year-old woman was treated at Zadar General Hospital for acute anterior ST-segment elevation myocardial infarction with left main coronary artery occlusion. Despite percutaneous coronary intervention, she developed refractory cardiogenic shock with a left ventricular ejection fraction (LVEF) of 16–20%. VA-ECMO was initiated and stabilization was achieved. On day 2, conscious and breathing spontaneously, she was transferred to Dubrava University Hospital. Due to persistent severe left ventricular dysfunction, support was continued with an Impella 5.5 device, providing left ventricular unloading[3]. The perfusionist monitored the ECMO circuit, flow, and oxygenation during transfer and treatment, and took part in the transition of support. The patient remained hemodynamically stable without vasopressors or inotropes. LVEF improved to 25–30%, but the native cardiac index remained low (1.4 L/min/m²), with early aneurysmal remodeling of the apex. As cardiac function had not recovered sufficiently to sustain circulation independently, orthotopic heart transplantation was performed on day 18. The early postoperative course was uneventful.

Conclusion: This case illustrates a shock network functioning before its formal establishment. Collaboration between Zadar General Hospital and Dubrava University Hospital enabled initial ECMO support, transfer, and treatment through to transplantation. With available technology and a trained multidisciplinary team, in which clinical perfusion plays a key role, successful treatment depends on timely escalation and de-escalation of support and in choosing the right moment for definitive treatment. The same model could be applied to extracorporeal cardiopulmonary resuscitation in selected patients with refractory cardiac arrest, where conventional resuscitation provides only 20–30% of normal cardiac output and timely ECMO flow may improve neurological outcome[4]. Formal establishment of a shock network could make such an outcome achievable for a greater number of patients.

RECEIVED:
October 10, 2026
UPDATED:
November 4, 2026

LITERATURE

1. Baran DA, Billia F, Randhawa V, Cowger JA, Barnett CM, Chih S, et al. Consensus statements from the International Society for Heart and Lung Transplantation consensus conference: Heart failure-related cardiogenic shock. J Heart Lung Transplant. 2024;43(2):204-216. https://doi.org/10.1016/j.healun.2023.10.007
2. Thiele H, Zeymer U, Akin I, Behnes M, Rassaf T, Mahabadi AA, et al. Extracorporeal Life Support in Infarct-Related Cardiogenic Shock. N Engl J Med. 2023;389(14):1286-1297. https://doi.org/10.1056/NEJMoa2307227
3. Møller JE, Engstrøm T, Jensen LO, Eiskjær H, Mangner N, Polzin A, et al. Microaxial Flow Pump or Standard Care in Infarct-Related Cardiogenic Shock. N Engl J Med. 2024;390(15):1382-1393. https://doi.org/10.1056/NEJMoa2312572
4. Abrams D, MacLaren G, Lorusso R, Price S, Yannopoulos D, Vercaemst L, Bllohlávek J, Taccone FS, Aissaoui N, Shekar K, Garan AR, Uriel N, Tonna JE, Jung JS, Takeda K, Chen YS, Slutsky AS, Combes A, Brodie D. Extracorporeal cardiopulmonary resuscitation in adults: evidence and implications. Intensive Care Med. 2022 Jan;48(1):1-15. https://doi.org/10.1007/s00134-021-06514-y