

Editorial



Editorial on Paper Titled Comparison of Veno-Arterial Extracorporeal Membrane Oxygenation Type in Patients Listed for Heart Transplantation

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The timing of the transition from peripheral to central extracorporeal membrane oxygenation (ECMO) remains controversial. Since peripheral ECMO is mainly inserted through the femoral artery and vein, there is an inherently high risk of lower extremity ischemia, and due to the relatively small size of the cannula, it is sometimes difficult to supply sufficient cardiac output and is vulnerable to hemolysis in patients requiring high revolutions per minute. In addition, there is a disadvantage in that it is difficult to rehabilitate the patient due to the limitation of movement of the lower limbs.¹⁾ However, the decisive reason for not being able to boldly switch to the central ECMO in the real-world practice is the complication of fatal bleeding. In this study by Hong et al., the frequency of heart transplantation was relatively low in patients who switched from peripheral ECMO to central ECMO compared to peripheral ECMO alone and central ECMO alone groups.²⁾ However, the ECMO maintenance period was much longer in this group, so it is highly likely that they switched to central ECMO due to complications of peripheral ECMO or unmeasured reasons that may contribute to poor clinical outcomes. In general, extracorporeal circulation induces systemic inflammation and coagulation activation due to the exposure of the patient's blood to non-endothelialized surfaces of the ECMO circuit.³⁾ In previous studies, the incidence of disseminated intravascular coagulation (DIC) was reported to be very high, exceeding 40% in patients supported with ECMO and the longer the ECMO maintenance period, the higher the frequency of coagulation disorders including DIC.⁴⁾ Since patients with conversion to central ECMO in this study were overall high-risk subjects due to longer ECMO maintenance and mechanical ventilator duration, fatal bleeding complications of central ECMO, inevitably may occur more frequently. Since this study was conducted on the patients who the purpose of ECMO is the bridging therapy of heart transplantation, the results might have been different if it was switched to central ECMO as early as possible. Accordingly, a well-designed randomized controlled trial is needed to confirm these results because it is fundamentally unfair to compare the strategies of both groups, including those who switch to central ECMO in the event of complications in patients with peripheral ECMO.

Nowadays, as left ventricular assist device (LVAD) therapy is becoming more common worldwide, concerns about the optimal timing of central ECMO are increasing.⁵⁾ In the case

Data Sharing Statement

The data generated in this study is available from the corresponding author(s) upon reasonable request.

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of young patients with irreversible cardiomyopathy, proceeding to heart transplantation through LVAD bridging therapy can be a more effective cardiac replacement treatment strategy in the real practice of donor shortages. However, in patients with acute myocardial infarction, which is a representative disease of reversible heart disease,⁶⁾ it is very difficult to determine the timing of cardiac replacement therapy because it is difficult to predict the timing of cardiac function recovery, so it is difficult to switch to central ECMO for the purpose of heart transplantation.

Taken together, the author suggests that, in patients with irreversible end stage disease who requiring cardiac replacement therapy, early conversion to central ECMO before advanced coagulopathy that can proceed with long-term maintenance of ECMO can reduce bleeding complications. The case of reversible heart disease is still controversial and well-designed randomized trials are needed to draw conclusions about it.

REFERENCES

1. Lee JH, Ko RE, Park TK, Cho YH, Suh GY, Yang JH. Association between a multidisciplinary team approach and clinical outcomes in patients undergoing extracorporeal cardiopulmonary resuscitation in the emergency department. *Korean Circ J* 2021;51:908-18.
[PUBMED](#) | [CROSSREF](#)
2. Hong JA, Kim AR, Kim MJ, et al. Comparison of veno-arterial extracorporeal membrane oxygenation configurations for patients listed for heart transplantation. *Korean Circ J* 2023;53:535-47.
[PUBMED](#) | [CROSSREF](#)
3. Millar JE, Fanning JP, McDonald CI, McAuley DF, Fraser JF. The inflammatory response to extracorporeal membrane oxygenation (ECMO): a review of the pathophysiology. *Crit Care* 2016;20:387.
[PUBMED](#) | [CROSSREF](#)
4. Kim HS, Cheon DY, Ha SO, et al. Early changes in coagulation profiles and lactate levels in patients with septic shock undergoing extracorporeal membrane oxygenation. *J Thorac Dis* 2018;10:1418-30.
[PUBMED](#) | [CROSSREF](#)
5. Park Y, Kim D, Yang JH, Cho YH, Choi JO, Jeon ES. Clinical outcome in patients with end-stage heart failure who underwent continuous-flow left ventricular assist devices in a single center. *Korean J Intern Med* 2022;37:340-9.
[PUBMED](#) | [CROSSREF](#)
6. Kim MC, Ahn Y, Cho KH, et al. Benefit of extracorporeal membrane oxygenation before revascularization in patients with acute myocardial infarction complicated by profound cardiogenic shock after resuscitated cardiac arrest. *Korean Circ J* 2021;51:533-44.
[PUBMED](#) | [CROSSREF](#)