

Editorial



Key Factors in Improving Clinical Outcomes in Patients with Cardiac Arrest Undergoing Extracorporeal Cardiopulmonary Resuscitation: a Multidisciplinary Team Approach

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Despite numerous efforts to improve clinical outcomes in patients with cardiac arrest, the overall survival rate after cardiac arrest remains low.¹⁾ To improve the overall survival rate of patients with cardiac arrest, high-quality cardiopulmonary resuscitation (CPR) should be implemented as quickly as possible.²⁾ Extracorporeal membrane oxygenation (ECMO) has been suggested as a therapeutic option for refractory cardiac arrest in selected patients with a reversible cause, and this technique has extended the accepted CPR called extracorporeal CPR (ECPR).³⁾⁴⁾ However, the current guideline indicates that there are insufficient evidences to support the routine use of ECPR for patients with cardiac arrest.²⁾⁵⁾ ECPR may be considered for selected patients with potentially reversible cause of cardiac arrest after receiving mechanical cardiorespiratory support for a limited period (class IIb LOE C).²⁾

Lee et al.⁶⁾ reported that a multidisciplinary team approach was associated with improved clinical outcomes in in-hospital cardiac arrest patients undergoing ECPR in the emergency department. The importance of the multidisciplinary team for patients with cardiac arrest has been emphasized in the guidelines and consensus²⁾⁷⁾; however, there are few reports on the association between the multidisciplinary team approach and the clinical outcome. Lee et al.⁶⁾ investigated the association in 125 patients who underwent ECPR in a single-center observational analysis. Although no differences were shown in the clinical outcomes between the pre-ECMO team and the post-ECMO team in the overall population, a multidisciplinary team approach was reported as a key factor in improving clinical outcomes for patients with in-hospital cardiac arrest. Lee et al.⁶⁾ suggested that more active preemptive approach and appropriate follow-up protocol for cardiac arrest via the multidisciplinary team would result in the improvement of the clinical outcomes.

The most important factor for improving overall survival in patients with cardiac arrest is the minimization of CPR time.²⁾ In this study,⁶⁾ the patients who received treatment from the post-ECMO team, defined as a multidisciplinary team, resulted in significant reductions in

Conflict of Interest

The authors have no financial conflicts of interest.

Data Sharing Statement

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

Author Contributions

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chest compression time and CPR-to-ECMO-pump-on-time. In addition, a multidisciplinary team approach was particularly effective in improving the clinical outcome of patients with in-hospital cardiac arrest. It could be self-explainable that clinical outcomes of in-hospital cardiac arrest are superior to those from out-of-hospital cardiac arrest, probably due to reduced delays in initiation of high-quality CPR,⁸⁾ and a similar result was shown in this study.⁶⁾ Although improvement in clinical outcomes after the multidisciplinary team approach was not shown in all populations such as patients with out-of-hospital cardiac arrest in this study, it could be explained by inevitable characteristics of patients with out-of-hospital cardiac arrest (i.e., time delay to hospital visit). Thus, the potential of the multidisciplinary team approach should be more emphasized for the management of patients with in-hospital cardiac arrest.

Another benefit of the multidisciplinary team approach was post-cardiac arrest care. In this study, the multidisciplinary ECMO team performed more distal perfusion catheters insertion and used less mechanical ventilation.⁶⁾ Therefore, the multidisciplinary ECMO team could reduce complications including limb ischemia, ventilator-induced diaphragm dysfunction, and ventilator-/intubation- associated pneumonia, delirium, and could facilitate enhanced rehabilitation. Not only preemptive approaches (ECPR) but also proper post-ECPR management could be translated to improvement in the clinical outcomes in this study. Accordingly, the guidelines emphasize the need for a multidisciplinary system for comprehensive and structured management.²⁾⁹⁾

Expert consensus recommends that an institution providing ECPR should engage in a multidisciplinary process between clinicians and administrators to include: a needs assessment, program feasibility and sustainability, expectations, and resource availability.⁷⁾¹⁰⁾ Lee et al.⁶⁾ showed an excellent representative case of a multidisciplinary team, which consisted of emergency physicians, interventional cardiologists, critical care physicians, cardiovascular surgeons, heart failure physicians, a pharmacist, a nutritionist, and perfusionists, and demonstrated how it worked. In conclusion, a multidisciplinary team approach should be performed to improve clinical outcomes in patients with cardiac arrest.

REFERENCES

1. Sawyer KN, Camp-Rogers TR, Kotini-Shah P, et al. Sudden cardiac arrest survivorship: a scientific statement from the American Heart Association. *Circulation* 2020;141:e654-85.
[PUBMED](#) | [CROSSREF](#)
2. Panchal AR, Bartos JA, Cabañas JG, et al. Part 3: adult basic and advanced life support: 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation* 2020;142:S366-468.
[PUBMED](#) | [CROSSREF](#)
3. Holmberg MJ, Geri G, Wiberg S, et al. Extracorporeal cardiopulmonary resuscitation for cardiac arrest: a systematic review. *Resuscitation* 2018;131:91-100.
[PUBMED](#) | [CROSSREF](#)
4. Choi MS, Sung K, Cho YH. Clinical pearls of venoarterial extracorporeal membrane oxygenation for cardiogenic shock. *Korean Circ J* 2019;49:657-77.
[PUBMED](#) | [CROSSREF](#)
5. Panchal AR, Berg KM, Hirsch KG, et al. 2019 American Heart Association focused update on advanced cardiovascular life support: use of advanced airways, vasopressors, and extracorporeal cardiopulmonary resuscitation during cardiac arrest: an update to the American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation* 2019;140:e881-94.
[PUBMED](#) | [CROSSREF](#)

6. 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](#)
7. Tonna JE, Selzman CH, Mallin MP, et al. Development and implementation of a comprehensive, multidisciplinary emergency department extracorporeal membrane oxygenation program. *Ann Emerg Med* 2017;70:32-40.
[PUBMED](#) | [CROSSREF](#)
8. Virani SS, Alonso A, Benjamin EJ, et al. Heart disease and stroke statistics-2020 update: a report from the American Heart Association. *Circulation* 2020;141:e139-596.
[PUBMED](#) | [CROSSREF](#)
9. Nolan JP, Sandroni C, Böttiger BW, et al. European Resuscitation Council and European Society of intensive care medicine guidelines 2021: post-resuscitation care. *Intensive Care Med* 2021;47:369-421.
[PUBMED](#) | [CROSSREF](#)
10. Richardson ASC, Tonna JE, Nanjayya V, et al. Extracorporeal cardiopulmonary resuscitation in adults. Interim guideline consensus statement from the extracorporeal life support organization. *ASAIO J* 2021;67:221-8.
[PUBMED](#) | [CROSSREF](#)