JCS Journal of Chest Surgery
https://doi.org/10.5090/jcs.24.042
pISSN: 2765-1606 eISSN: 2765-1614
J Chest Surg. 2024;57(3):289-290

Commentary

Commentary: The Multifaceted Art of Fighting against Time

Ha Lee, M.D., Suk-Won Song, M.D., Ph.D.

Department of Thoracic and Cardiovascular Surgery, Ewha Womans University Aorta and Vascular Hospital, Ewha Womans University Medical Center, Seoul, Korea

ARTICLE INFO
Received April 18, 2024
Accepted April 18, 2024

Corresponding author
Suk-Won Song
Tel 82-2-6986-2110
Fax 82-2-6986-2111
E-mail stevensong@ewha.ac.kr
ORCID
https://orcid.org/0000-0002-9850-9707

See Article page 281.

Ha Lee, M.D.

Suk-Won Song, M.D., Ph.D.

Since the first description of extracorporeal cardiopulmonary resuscitation (ECPR) was published in 1966 [1], the use of ECPR has expanded significantly. The increasing incidence of cardiovascular disease correlates with a rise in ECPR cases reported by the Extracorporeal Life Support Organization [2]. Additionally, the incidence of out-of-hospital cardiac arrest (OHCA) in Korea has been increasing, with a rate of 59.5 per 100,000 population reported in the 2018 survey [3]. Many centers in Korea are now performing ECPR.

ECPR is typically performed through femoral cannulation, which leads to retrograde aortic blood flow. For effective treatment, the reinfused oxygenated blood must achieve sufficient cardiac output to support coronary and cerebral perfusion. This is crucial because ECPR needs to surpass the efficacy of conventional cardiopulmonary resuscitation (CPR), which is estimated to provide less than 30% of normal cardiac output. Numerous studies have demonstrated that ECPR is more effective than CPR in stabilizing patients. Additionally, it provides time to identify and address the underlying causes of cardiac arrest [4,5].

The insertion technique for ECPR is a highly specialized procedure that requires a skilled and experienced multidisciplinary team. This team should include cardiovascular surgeons, critical care physicians, and perfusionists, along with access to medical facilities such as ultrasound or fluoroscopic guidance for vascular access. Close attention must be paid to vascular access, cannula placement, and the securing of connections to minimize the risk of complications, including bleeding, vascular injury, infection, and thrombosis.

This study analyzed the outcomes of different insertion techniques in patients undergoing ECPR [6]. Although there were no statistically significant differences in mortality between the surgical cutdown group and the percutaneous group, the insertion time was shorter in the percutaneous group. Given the urgency of ECPR and the critical condition of patients, the percutaneous technique should be the preferred method of treatment. However, if ultrasound guidance is not available, surgical cutdown should be considered as the alternative insertion technique. Despite the challenges of studying ECPR, such as the heterogeneity of patients experiencing OHCA and in-hospital cardiac arrest, and variations between centers, this study was well-organized, and both groups exhibited similar characteristics. The only potential limitation of this study may be the small number of patients involved.

Although the insertion technique did not affect mortality in this study, the author demonstrated that timing is crucial. The outcomes of ECPR are significantly influenced by time, which in turn is affected by factors such as institutional support, hospital facilities, effective team commu-

nication, surgeons' skills, and insertion techniques. The complexity of these interrelated factors underscores why ECPR is a multifaceted art of fighting against time, making it challenging to prove definitively how the insertion technique impacts mortality. Surgeons who are proficient in multiple insertion techniques have a broader range of strategies to employ during an ECPR event. In exceptional circumstances, the ability to apply the appropriate technique at the right time is critical. Researching the role of time in ECPR is difficult, but necessary.

Article information

ORCID

Ha Lee: https://orcid.org/0000-0003-3976-8554
Suk-Won Song: https://orcid.org/0000-0002-9850-9707

Author contributions

All the work was done by all authors.

Conflict of interest

Suk-Won Song serves as an associate editor of the Journal of Chest Surgery, but he has no role in the decision to publish the present manuscript. Except for that, no potential conflict of interest exists.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Kennedy JH. The role of assisted circulation in cardiac resuscitation. JAMA. 1966 Aug 22;197(8):615-8. https://doi.org/10.1001/jama.1966.03110080055017
2. Extracorporeal Life Support Organization. ECLS International Summary of Statistics [Internet]. Extracorporeal Life Support Organization; 2024 [cited 2024 Apr 10]. Available from: https://www.elso.org/registry/internationalsummaryandreports/internationalsummary.aspx
3. Hwang SO, Cha KC, Jung WJ, et al. 2020 Korean Guidelines for Cardiopulmonary Resuscitation. Part 2. Environment for cardiac arrest survival and the chain of survival. Clin Exp Emerg Med 2021;8(S):S8-14. https://doi.org/10.15441/ceem.21.022
4. Abrams D, MacLaren G, Lorusso R, et al. Extracorporeal cardiopulmonary resuscitation in adults: evidence and implications. Intensive Care Med 2022;48:1-15. https://doi.org/10.1007/s00134-021-06514-y
5. Granfeldt A, Holmberg MJ, Andersen LW. Extracorporeal cardiopulmonary resuscitation for cardiac arrest. JAMA 2023;329:1693-4. https://doi.org/10.1001/jama.2023.5585
6. Lee HS, Lee CH, Jang JS, Cho JW, Jeon YH. Differences in treatment outcomes according to the insertion method used in extracorporeal cardiopulmonary resuscitation: a single-center experience. J Chest Surg 2024;57:281-8. https://doi.org/10.5090/jcs.23.118