

Investigating organ donation practices following extracorporeal cardiopulmonary resuscitation

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With a global increase in the demand for organ transplants, the organ shortage crisis has taken a turn for the worse, as the supply of available

organs remains insufficient to meet this growing need. A way to improve this dire situation is to identify potential organ donors who can fulfill the requirement for organs. As a result, screening for brain death in the intensive care unit, specifically after a cardiac arrest, has become important for identifying potential organ donors.

Now, extracorporeal cardiopulmonary resuscitation (ECPR) is increasingly being used as a new rescue method for reviving people from out-of-hospital [cardiac arrest](#). However, implementing ECPR brings complex ethical challenges, mainly because it often leads to patients being placed on mechanical support with limited chances for neurological recovery.

Previous studies have shown that patients undergoing ECPR have higher [organ donation](#) rates than those receiving conventional CPR. This may suggest an increasing potential for organ donation through ECPR. However, data on the outcomes of organ recipients from donors who underwent ECPR as compared to those who did not undergo ECPR is scarce.

Addressing this issue, a research team led by Senior Lecturer Tetsuya Yumoto from the Department of Emergency, Critical Care, and Disaster Medicine and the Faculty of Medicine, Dentistry, and Pharmaceutical Sciences at Okayama University, Japan, examined organ donation patterns and recipient outcomes among donors with an episode of cardiac arrest who received ECPR followed by discontinuation of extracorporeal membrane oxygenation (ECMO) and those who did not receive ECPR.

Their paper, published in [Critical Care](#) on 13 May 2024, was co-authored by Assistant Professor Kohei Tsukahara from the Department of Emergency and Critical Care Medicine, Okayama University, Associate Professor Hiromichi Naito, and Professor Atsunori Nakao from the

Faculty of Medicine, Dentistry, and Pharmaceutical Sciences, Okayama University.

"The practice and prevalence of organ donation after decannulating donors from ECMO have not been studied well. So, a thorough investigation of organ donation practices post-ECPR, including [donor](#) characteristics and the impact on recipients, is needed to understand the feasibility of organ donation after an episode of cardiac arrest," Dr. Yumoto says.

To this end, the researchers rolled out a nationwide retrospective cohort study in Japan and extracted data from the Japan Organ Transplant Network Database. They included all deceased organ donors from July 17, 2010 to August 31, 2022.

Within this cohort, they specifically selected those donors who had at least one instance of cardiac arrest and divided them based on whether they received ECPR or not and the type of donation (after brain death or circulatory death). Researchers then compared the ECPR and non-ECPR groups in terms of the timeline of the organ donation process, from admission to organ procurement, and graft survival rates.

Notably, patients under ECMO treatment could not be diagnosed with brain death in Japan until revised guidelines were implemented on January 1, 2024. So, during this study, only patients decannulated from veno-arterial (VA) ECMO could be diagnosed with brain death.

A total of 370 donors were diagnosed with [brain death](#) after an instance of cardiac arrest. Among them, 7.0% of the patients underwent ECPR, and 93.0% did not. In the ECPR group, patients were on the VA ECMO support for a median duration of three days. Compared to the non-ECPR group, the ECPR group faced significantly longer intervals from hospital admission to organ procurement (13 days versus 9 days), indicating the

delayed opportunity for organ donation.

Explaining the observed results for each organ, Dr. Yumoto says, "In our examination, we found that the lung graft survival rates were much lower in the ECPR group than in the non-ECPR group. Meanwhile, the graft survival rates of other organs were not significantly different."

Of the 160 donors who experienced circulatory death, 27 underwent ECPR, while 133 did not. The interval from hospital admission to organ procurement and the graft survival rates were not significantly different between the ECPR and non-ECPR groups.

Irrespective of the cause of death (brain or circulatory), the number of organs donated was similar.

Considering these findings, using ECPR may be a potential way to address organ shortage as it could increase the number of viable organs for transplantation.

As Dr. Yumoto concludes, "Our study underscores the need to provide appropriate information regarding organ donation as one of the options for [end-of-life care](#), regardless of ECMO treatment as well as for training and education of clinicians in emergency or [critical care](#) settings so that the organ donation processes can be optimized."

More information: Tetsuya Yumoto et al, Organ donation after extracorporeal cardiopulmonary resuscitation: a nationwide retrospective cohort study, *Critical Care* (2024). [DOI: 10.1186/s13054-024-04949-5](https://doi.org/10.1186/s13054-024-04949-5)

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