

See Article page 49.



Commentary: Donation after circulatory death (DCD) transplantation—something old is new again (and better)

Magdy M. El-Sayed Ahmed, MD, MS,^{a,b}
 Samuel Jacob, MD,^a and
 Kevin P. Landolfo, MD, MSc^a

The first human-to-human heart transplant in history, performed by Christian Barnard in 1967, involved recovery of the heart from a donor using the donation after circulatory death (DCD) technique.¹ This method of transplantation, however, declined after the definition of brain death was established and criteria published in 1968.² Due to the increasing time and mortality on the waiting list, and the discrepancy between the available donors and the waiting recipients, the option of DCD has recently re-emerged as a means to expand the current donor pool.³ Cardiac DCD has had a limited acceptance due to the fact that unlike donation after brain death, DCD organs are exposed to warm ischemia and therefore susceptible to potential damage. In 2015, an ex situ perfusion platform (Organ Care System [OCS]; TransMedics) emerged as a new technology for cardiac preservation, with a randomized DCD trial launched in the United States in 2019.⁴

In the current issue of the *Journal*, Funamoto and colleagues⁵ summarize the 2 general approaches to DCD donor heart recovery: normothermic regional perfusion and direct procurement with ex vivo perfusion (DPEP). The manuscript highlights logistics and technical nuances

From the ^aDepartment of Cardiothoracic Surgery, Mayo Clinic, Jacksonville, Fla; and ^bDepartment of Surgery, Zagazig University Faculty of Human Medicine, Zagazig, Egypt.

Disclosures: The authors reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

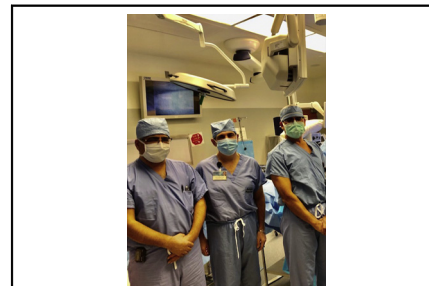
Received for publication Nov 22, 2021; revisions received Nov 22, 2021; accepted for publication Dec 4, 2021; available ahead of print Jan 11, 2022.

Address for reprints: Kevin P. Landolfo, MD, MSc, Department of Cardiothoracic Surgery, Mayo Clinic, Alix School of Medicine, 4500 San Pablo Rd, Jacksonville, FL 32224 (E-mail: Landolfo.kevin@mayo.edu).

JTCVS Techniques 2022;11:57-8
 2666-2507

Copyright © 2022 The Author(s). Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jtc.2021.12.004>



Samuel Jacob, MD, Kevin P. Landolfo, MD, MSc, and Magdy M. El-Sayed Ahmed, MD, MS

CENTRAL MESSAGE

Multiorgan recovery after declared circulatory death (DCD) is a re-emerging technique. Team communication is critical to ensure successful transplant outcomes following cardiac DCD recovery.

for multiorgan recovery with DPEP using the OCS system. DCD differs substantially from donation after brain death cardiac retrieval. DCD necessitates a period of warm ischemia, and total donor warm ischemic time is predictive of clinical outcomes after transplantation. The technical nuances reviewed include location of extubation (intensive care unit vs operating room), the “no-touch” interval, and the steps of DCD cardiac DPEP. The video clip summarizes the specific technical aspects of multiorgan (cardiac) DCD organ recovery. The authors address the potential points of conflict between surgical teams and suggest solutions to ensure a smooth and successful organ procurement. They elaborate on the most challenging (and often anxiety-producing) step of the procurement procedure, the collection of 1.1 L of the donor’s blood, used to prime the OCS system for cardiac DPEP before the abdominal team starts infusing the K-rich antegrade flush to the abdominal organs. Collection should be accomplished by the heart team in a predetermined time to avoid jeopardizing the viability of the abdominal organs. Potential pitfalls and techniques for the collection process are presented.

Although individual specifics of the procedure may evolve in centers performing DCD recovery, the salient point of the manuscript relates to “optimal collaboration among recovery teams (which) is critical.” The preoperative

team “huddle” serves as the important step in the process to set the parameters for unfamiliar teams working together; the importance of this step cannot be overstated. Successful DCD recovery must be judged by the outcomes of all patients receiving organs following procurement. Techniques will evolve and modifications will continue to improve the DCD recovery operation. The importance of expanding the potential donor pools for cardiac organ transplantation mandate that DPEP and normothermic regional perfusion for cardiac recovery be evaluated on a national basis to fully define appropriate techniques and outcomes in cardiac transplantation.

References

1. Barnard CN. The operation. A human cardiac transplant: an interim report of a successful operation performed at Groote Schuur Hospital, Cape Town. *S Afr Med J*. 1967;41:1271-4.
2. A definition of irreversible coma. Report of the Ad Hoc Committee of the Harvard Medical School to examine the definition of brain death. *JAMA*. 1968; 205:337-40.
3. Macdonald P, Verran D, O’Leary M, Cavazzoni E, Dhital K. Heart transplantation from donation after circulatory death donors. *Transplantation*. 2015;99:1101-2.
4. Dhital KK, Iyer A, Connellan M, Chew HC, Gao L, Doyle A, et al. Adult heart transplantation with distant procurement and ex-vivo preservation of donor hearts after circulatory death: a case series. *Lancet*. 2015;385:2585-91.
5. Funamoto M, Pierson RN, Nguyen JH, D’Alessandro DA. Surgical and logistical concerns for ex vivo-based perfusion strategies for “donation after circulatory death” multiorgan recovery. *J Thorac Cardiovasc Surg Tech*. 2022;11:49-56.