Commentary: Warm ischemic injury to human donor hearts – when is it too much?

Valluvan Jeevanandam, MD

PII: S0022-5223(23)00983-2
DOI: https://doi.org/10.1016/j.jtcvs.2023.10.026
Reference: YMTC 19330

To appear in: The Journal of Thoracic and Cardiovascular Surgery

Received Date: 15 October 2023
Accepted Date: 16 October 2023

Please cite this article as: Jeevanandam V, Commentary: Warm ischemic injury to human donor hearts – when is it too much?, The Journal of Thoracic and Cardiovascular Surgery (2023), doi: https://doi.org/10.1016/j.jtcvs.2023.10.026.

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Copyright © 2023 Published by Elsevier Inc. on behalf of The American Association for Thoracic Surgery
Commentary: Warm ischemic injury to human donor hearts – when is it too much?

Valluvan Jeevanandam MD

1. Section of Cardiac Surgery, Department of Surgery, University of Chicago Medicine

Word count: 923

Disclosure: none

Correspondence:

Valluvan Jeevanandam MD
5841 S Maryland Ave MC 5040
University of Chicago
Chicago, IL 60637
jeevan@uchicago.edu
Central Message: Warm ischemia combined with cold preservation damages donor hearts for transplantation.

Central Picture Legend: Dr. Valluvan Jeevanandam

Dr. Mondal and colleagues must be congratulated for this very impressive study. They obtained human hearts that were not used for transplantation and analyzed the differences in edema and inflammatory markers between donation after brain death (DBD) and donation after circulatory death (DCD) organs. The amount of work involved in obtaining these organs and performing the detailed analyzes was tremendous. This is the largest series of essentially normal “usable” donor hearts and contributes to our overall knowledge about organ heart preservation and transplant.

They obtained 24 hearts (6 DBD and 18 DCD) with close collaboration from their OPO. These hearts were not used for clinical transplant, although, they met criteria for donation. Other than an average age of 47, all other parameters regarding coronary disease, heart function and infection were within acceptable category for transplant. It is surprising that these organs were not used but that enhances this study as it is very rare to be able to analyze preservation in essentially normal hearts. The DBD hearts were arrested with DelNido solution and stored in saline. The DCD organs had variable warm ischemic times (WIT) and were grouped into three groups of 20, 40 and 60 minutes. They were also perfused with DelNido solution and stored in saline. Current practice for DBD organs is to use solutions like UW, HTK or Celsior for preservation. Standardization by using saline in all groups reduces some variables. However, pre-clinical primate studies and results of a randomized trial between crystalloid solution vs UW did demonstrate superiority of UW with regard to heart function and duration of preservation. Perhaps the injury seen during cold ischemic times would have been different if a clinically applicable preservation solution was used.

The primary goal for this study was to show the differences in myocardial injury following warm ischemia and imply that the costly methods of DCD reperfusion might not be necessary compared to direct preservation. They very nicely demonstrated that the DBD hearts with zero WIT had less edema, injury and inflammation than those with longer WIT. The WIT injury was additive during the cold preservation period. The authors wanted to see if injury during short WIT is minimal enough to permit use of DCD organs without reperfusion either using an ex-vivo system or normothermic regional perfusion. WIT of 60 minutes lead to hearts that were severely damaged. Heats with 20 and 40 minutes WIT were not as damaged but did have injury more than DBD organs. The data is not compelling enough to project that WIT 20 minutes would allow for organs to be used without any method of reperfusion. Pre-transplant reperfusion of DCD hearts is used to determine heart function and to rebuild myocardial energy stores. The authors acknowledge that further studies will need to be done to compare DCD organs with reperfusion to DCD hearts with direct cold preservation to determine the feasibility eliminating the need for reperfusion. That future study might demonstrate equivalence with static
parameters. But with the success of reperfusion techniques, who will have the courage to re-visit direct procurement with DCD organs?

References:


