Preservation Solutions for Static Cold Storage in DCD Liver Transplantation in the United States

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Abstract

Goal

Static cold preservation remains the cornerstone for storing donor livers following procurement. However, the choice between the University of Wisconsin (UW) and histidine tryptophan-ketoglutarate (HTK) solutions remains controversial. The use of HTK solution has gradually increased in frequency due to the perceived advantages, which include lower cost, decreased risk of hyperkalemia, and reduced viscosity culminating in improved microvascular perfusion. Based on older reports, recent ILTS guidelines have recommended avoiding the HTK solution for donation after circulatory death (DCD) grafts in cases where cold ischemia is estimated to be >8 hours. The purpose of this study is to provide a current review of the outcomes using UW or HTK in deceased donor liver transplantation (LTX).

Method

Adult deceased-donor LTX recipients between 2006 and 2019 were identified from the UNOS/Organ Procurement and Transplantation Network (OPTN) database within the LTX recipient dataset. In order to mitigate period effects on the analysis (e.g., improved medical care, LTX recipient and donor selection changes, learning curve using the HTK solution), the analysis was divided into three eras: 2006-2010, 2011-2015, and 2016-2020.

Results

Among 5,956 DCD LTX: 3,873 (65.0%) used UW and 1,944 (32.7%) used HTK. Out of 82,679 donations after brain death (DBD) liver transplantations (LTX): 63,511 (76.8%) used UW and 15,855 (19.2%) used HTK. The use of DCD LTX increased threefold during the study period, with the annual number increasing from 269 in 2006 to 828 in 2020 (Figure 1).

The HTK group had higher 1- and 5-year graft survival rates of 89.7% and 74.3%, respectively, compared with 85.9% and 70.8% in the UW group in the 2016-2020 era (p=0.005, Figure 2C). This difference remained when adjusted for important potential confounders (donor age, cold and warm ischemia time, recipient age, race, MELD score, and individual transplant centers). There were no differences between groups among DCD LTX in the earlier eras (Figure 2A, B) and DBD LTX in all eras (all p-values>0.05).