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Kidney Pumping – What Does the Data Show?

What is kidney pumping?



When kidneys are recovered from a deceased donor there is a variable delay prior to transplantation. In order to minimize ischemic damage to the tissue cells, historically, kidneys would be preserved with static cold storage (CS), e.g. in a cool box. An alternative to CS is to utilize machine perfusion (MP), commonly known as kidney pumping.

How does kidney pumping work?



MP entails placing kidneys on a pump to provide circulation of preservation solution, usually at hypothermic temperatures.
The perfusion of the kidney promotes equilibration of the interstitium, removal of toxic metabolites, and delivers oxygen and nutrients, allowing for better graft preservation, pre-transplant assessment, and optimization.

Are all kidneys pumped?

Currently, in the U.S., mainly kidneys recovered from Extended Criteria Donors (ECD) and Donation after Circulatory Death (DCD) donors are being pumped.

What does the data show and how might this impact practice?

A randomized controlled trial in Europe demonstrated significant reduction in delayed graft function (DGF) with the use of MP (Moers et al, 2009). In this trial, Standard Criteria Donors (SCD), ECD, and DCD donors were included (n=336) and it was identified that DGF decreased from 26.5% to 20.8%.

The U.S. retrospective review study conducted by Dr. Franklin and Dr. Cannon hypothesized that machine perfusion in the U.S. will also decrease episodes of DGF (2013). This study reviewed all adult isolated kidney transplants from 1/1/2005 to 3/31/2011 (n=52,052), including all SCD, ECD, and DCD donors, comparing MP (38%) to CS (62%) kidney outcomes. Findings demonstrated, after propensity matching, that DGF occurred in 21% of MP kidneys vs 29% of CS kidneys ($p < 0.001$), which translates into every 12.5 MP kidneys one episode of DGF will be prevented.

Even for SCD donors, DGF rates were 16.8% for MP kidneys vs 25.3% for CS kidneys. This demonstrated an 8.5% absolute reduction in DGF (2015).



While further work is still needed to determine the ideal population and cost neutrality for MP benefit, the clinical conclusion recommends the expansion of MP beyond its current level of utilization would likely be beneficial in reducing DGF.

Taken from a webinar presentation by Glen A. Franklin, MD, (Professor & Vice Chairman for Education, Hiram C Polk Jr MD, Department of Surgery, University of Louisville, Louisville, KY, Medical Director, KY Organ Donor Affiliates). Special thanks to Dr. Franklin for his contributions to this inservice.

References:

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This inservice is also available on The Alliance blog along with more references: http://organdonationalliance.org/education-corner-kidney-pumping/

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