



International Society for Heart & Lung Transplantation
www.isHLT.org

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NEW PARADIGMS FOR ORGAN PRESERVATION IN HEART AND LUNG TRANSPLANTATION

NICE, FR (April, 18, 2015) – During the [35th Annual International Society for Heart and Lung Transplantation \(ISHLT\) Meeting and Scientific Sessions](#), April 15-18 in Nice, France, several abstracts were presented calling attention to the novel approaches in heart and lung organ preservation including the supercooling of organs for transplant. The study found that keeping an organ at below-freezing temperatures could extend preservation time by further slowing metabolism. The study, conducted on rat livers, found that supercooling of the organ can more than triple the length of time organs currently can be preserved. Additional studies presented added new data in organ preservation.

“Research presented this week at the ISHLT conference and scientific sessions on organ preservation show promise in creating options for transplant patients,” said Andreas Zuckermann, MD, ISHLT 2015 Scientific Program Committee Chair. “Progress in organ preservation means improving early results after transplantation and extending donor criteria to marginal donors around the globe.”

Supercooling of Organs for Transplantation

Since the 1980s donor organs have been preserved at temperatures at or just above freezing (0° Celsius or 32° Fahrenheit) which reduces metabolism and organ deterioration ten-fold, with liver preservation limit clinically up to 16 hours. Extending that preservation time could increase both the distance a donor organ could safely be transported and the amount of time available to prepare a recipient for the operation. The study, presented by Korkut Uygun, PhD, Harvard Medical School, during the meeting was the result of a successful transplantation of rat livers after supercooled preservation for as long as four days, more than tripling the length of time organs currently can be preserved. The specific procedure presented combines extended preservation of rat livers at -6° C, along with use of additional preservative agents, and an end-preservation recovery from cold storage injury by machine perfusion.

Going the Distance with Donation after Circulatory Death (DCD) Hearts

Associate Professor Kumud Dhital, Cardiothoracic & Transplant Surgeon at St. Vincent’s Hospital, Sydney, presented research which has allowed the Australian team, led by Transplant Cardiologist Professor Peter Macdonald, to perform successful heart transplants with distantly procured DCD hearts.

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The first successful transplant was performed in July 2014 and since then three more cases have been added to the initial case series. Heart transplants in this case were only possible through the adoption of two innovative strategies. Firstly, the use of supplemented cardioplegia (intentional and temporary stoppage of cardiac activity) for initial myocardial protection. Secondly, through the use of a transportable ex-vivo perfusion platform for reanimation, support and reconditioning of the donor heart. Dhital reported all four patients remain healthy with normal heart function at 4-9 months post-transplant.

[Ex Vivo Lung Perfusion \(EVLP\) Study on Marginal Donor Lungs](#)

EVLP is a common method to test marginal donor lungs. Researchers from the Medical University of Vienna in Austria set out to analyze if anaerobic glucose metabolism might serve as a way to decide if lungs are acceptable for transplant. The results show that glucose consumption and lactate production are significantly higher in unusable donor lungs and should be considered for deciding if lungs should be rejected or not during EVLP.

[Lung Compliance During Ex Vivo Lung Perfusion \(EVLP\) Predicts Early Post Transplant Outcomes](#)

Researchers analyzed data to determine which physiologic variables during EVLP correlated to lung usage and effective post-transplantation management. A total of 76 lungs were assessed with EVLP and 40 were transplanted into 42 recipients. Researchers concluded that pulmonary compliance, a lungs ability to stretch and expand, during EVLP can predict early outcomes after lung transplant.

[Lung Lavage and Surfactant Administration for the Ex Vivo Lung Perfusion Treatment of Injured Donor Lungs Shows Superior Post-Transplant Lung Function](#)

Gastric acid aspiration is a common reason to decline donor lungs for transplant. Researchers in Canada sought to prove that lung lavage could remove debris, reduce inflammatory and an even surfactant to aid in lung recovery and improve overall lung function. The study separated lungs at random into four groups, no treatment, lung lavage (LL), surfactant administration (SF) and surfactant administration following lung lavage (SL). Lung compliance was higher in the SL group at four hours after transplant, compared to other groups. The study concluded that lung lavage, followed by surfactant administration provided greater post-transplant lung function using injured donor lungs with gastric acid aspiration.

[Ex Vivo Use of Carbon Monoxide on Injured Donor Lungs Produces Increase in Lung Function After Transplantation](#)

Porcine donor lungs were prolonged to cold ischemic time of 18 hours followed by six hours of ex vivo lung perfusion. A group of lungs were delivered 500 ppm of carbon monoxide (CO) for one hour by ventilation. Four hours after the lungs were transplanted, lung function was assessed. Results showed that after transplant the group that received the CO ventilation saw a decrease in inflammatory response and cell death was significantly lower in the CO group.



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[LVAD Bridging to Heart Transplantation with Ex Vivo Heart Preservation Shows Positive Outcomes](#)

A study from 2007 to 2014 at the Harefield Hospital NHS Trust in the United Kingdom sought to discover if using the Organ Care System (OCS) minimizes cold ischemic time, the time between the chilling the heart and the time it is warmed by having its blood supply restored, and analyze ex vivo heart perfusion on the outcome in left ventricular assist devices (LVAD) patients bridged to heart transplant compared to cold storage preservation. Researchers observed better postoperative results in the ex vivo preservation group (n=15) with 30-day survival at 100 percent compared to 73 percent of patients using cold storage preservation (n=15). The study concluded that the use of OCS in continuous flow LVAD patients bridged to transplant is now the standard of care at Harefield Hospital.

The International Society for Heart and Lung Transplantation (ISHLT) is a not-for-profit professional organization with more than 2,700 members from over 45 countries dedicated to improving the care of patients with advanced heart or lung disease through transplantation, mechanical support and innovative therapies via research, education and advocacy. For more information, visit www.isHLT.org.

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