

UCLA studying “breathing lung” transportation device



An experimental transportation device that keeps lungs warm and “breathing” rather than frozen in an ice cooler is being studied at UCLA and several other lung transplantation centers around the world. Known as the Organ Care System for lungs or OCS™ Lung, the transportation device has a ventilator and blood supply that keep donor lungs in a near-physiological state that simulates the human body. Because the donor lungs arrive warm and ventilated, surgeons can assess their health and may be able to improve their function by expanding a collapsed lung or clearing out infections, which could lead to better outcomes and make more donor lungs available for transplant recipients. UCLA was the first center in the United States to successfully perform a “breathing lung” transplant.

UCLA on forefront of lung transplantation medicine

A clinical trial of an experimental transportation device that keeps lungs warm, breathing and nourished during transport is underway at UCLA and several other centers around the world to compare how donor lungs fare when they are not subjected to cold storage.

Abbas Ardehali, MD, professor of cardiothoracic surgery and director of the Heart and Heart-Lung Transplant Program at the Ronald Reagan UCLA Medical Center, helped design the OCS Lung and performed the first successful lung transplant in the United States using the device to transport donor lungs. A key advantage of the device, he says, is that it provides surgeons with an opportunity to perform procedures on donor lungs to improve their health before transplantation.

“If we can improve the quality of the organs, we can potentially use lungs we are not currently able to use,” Dr. Ardehali says. “That could potentially allow us to expand the donor pool, which would benefit more patients.”

Cold storage is standard for transporting donor lungs

Lung transplantation is an effective treatment for end-stage lung disease that benefits as many as 1,500 patients in the United States each year. But each year another 500 patients die while waiting for an appropriate donor lung to become available. Although living donors can donate a lung lobe to someone in need of a lung transplant, most donor lungs come from cadavers. When a suitable recipient is identified, donor lungs are typically stored on ice for delivery — a transportation method that was meant to reduce metabolic demands and slow the rate of organ cell death but may contribute to rapid deterioration of the organ.

Unlike kidneys and other organs that can survive up to 24 hours outside the human body, lungs stored on ice typically remain viable only six to eight hours before they suffer too much ischemic injury to be used in a transplant. The narrow window of viability restricts the distance donor lungs can travel and contributes to a shortage of donor lungs. Another limitation of cold storage is that surgeons cannot fully assess the health of donor lungs and perform procedures to improve them until after transplantation.

OCS Lung may offer key advantages over cold storage

OCS Lung is a sophisticated medical device that may solve many of the problems associated with cold storage of donor lungs. The device is manufactured by Transmedics, makers of the “heart in a box” transport device for hearts also being tested at UCLA. Like that system, the OCS Lung is a three-part system that includes a portable platform with a wireless monitor and equipment to keep the organ perfused with oxygen. The transport device for lungs also has a ventilation module to keep donor lungs “breathing” or ventilated with oxygen. The lungs are kept moist in a proprietary solution rich in red blood cells to preserve their viability.

UCLA has lead role in INSPIRE study

Since it performed its first lung transplant in 1988, UCLA has consistently held its place as one of the top lung transplantation programs in the country and the leading center on the West Coast. It has made significant advances in lung transplantation for extremely ill and high-risk patients and has pioneered many novel technologies in lung preservation, recipient immune monitoring and immunosuppression.

UCLA is now leading the U.S. arm of INSPIRE, an international, multi-center clinical trial of the OCS Lung. In November 2012, UCLA surgeons who helped design the device performed the first successful “breathing lung” transplant surgery in the United States on a 57-year-old man with pulmonary fibrosis.

The INSPIRE clinical trial, which will enroll 264 randomized patients in the United States, Europe, Australia and Canada, compares the condition of donor lungs transported with the device with those transported in standard cold storage. If the new storage method proves superior to standard cold storage, many experts believe the portable device could revolutionize lung transplantation.

Participating Physicians

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