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New system enables more donor lungs to be transplanted

The University of Florida (UF) Health Shands Transplant Center in Gainesville, FL, US is one of 15 centers in the United States testing a new system that could improve the viability of donor lungs, enabling more of them to be used and shortening the time patients have to wait for transplantation. The system allows donor lungs—about 80 percent of which are found unacceptable for transplant under the very high standards required for the organs—to essentially be kept alive and potentially improved to become eligible for transplant.

The XVIVO Lung Perfusion System (XPS™) (XVIVO Perfusion, Gothenburg, Sweden) was approved in 2014 by the United States Food and Drug Administration (FDA) under the humanitarian device exemption. The approval required that the manufacturer continue studies to collect additional information on the system's use.

“We have been working in the laboratory since 2010 with our own system and have been looking forward to finally seeing the clinical application of the FDA-approved system in the United States,” said Thomas Beaver, MD, MPH, who established UF's work in lung perfusion. “This is a major advance in the field of lung transplantation.”

Sustaining lungs for additional evaluation and potential improvement

Traditionally, lungs considered for transplant are evaluated once by a surgeon at the medical center offering the lungs, while the organs remain inside the donor. However, the assessments may not provide all information a transplanting surgeon needs and conclusions about the organs' viability can be difficult to reach. Without convincing proof of excellent lung health, the organs are sometimes rejected because doubt remains about their condition.

However, some of the rejected lungs may have potentially reversible problems, such as pulmonary edema or impaired gas exchange. If those problems can be corrected, the donor lungs could become excellent candidates for transplantation.

Using the XPS, candidate lungs are treated outside the body with a preservative and oxygen to maintain and potentially improve their health. The lungs contract and expand for hours under normal body temperature, allowing transplant surgeons to assess them over time. Studies have shown that lungs treated in the XVIVO system and rated acceptable through numerous careful assessments are safe for transplant.¹

Increasing the pool of acceptable donor lungs

“This technique will help to expand the pool of acceptable donor lungs, hopefully shortening the waiting period for donor lungs and, more importantly, preventing deaths of those whose health condition cannot afford the wait time,” said Tiago Noguchi Machuca, MD, PhD, the lung transplant surgeon who leads UF Health's lung perfusion program and who studied at the University of Toronto, where out-of-body lung perfusion technology was pioneered.¹

“With today's increased awareness of lung transplantation as a therapeutic alternative for many end-stage lung diseases, waiting lists are growing quicker than our ability to offer a transplant with our current donor selection criteria and practice,” explained Juan Salgado, MD, Medical Director for the UF Health Lung Transplant Program. “Dr. Machuca's expertise will allow us to consider an expanded pool of donor lungs to be able to increase our patients' chances of receiving new lungs.”

Disparities in donation supporters vs. registrants

In the US, 118,000 men, women and children are waiting for lifesaving organ transplants² and 8,000 deaths occur each year because organs are not donated in time.²

Yet there is a major disparity between the number of people who claim they support organ donation and the number who are registered donors. In the United Kingdom, more than 90 percent say they support organ donation but fewer than one-third are registered.³ In the US, 95 percent support donation but only 54 percent are registered.² Registration rates in the US also vary widely by state. In 2012, more than 80 percent of adults in Alaska were registered donors compared to 12.7 percent in New York.³

Among developed nations, the US ranks in the middle, whereas Spain has been the leader in organ donation for decades. Some of the difference is likely due to use of an opt-out policy in Spain where people are considered donors unless they choose not to participate (although the medical establishment routinely seeks permission from family members prior to donation).⁴ In the US, people must choose to be donors, usually when getting a driver's license. A 2014 article in *The Atlantic* examines why more people have not become donors.³

Still, in the US, 33,600 transplants brought new life to patients and their families in 2016² and since 1988, 683,000 transplants have been performed.²

References

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