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## UC San Diego Health Revives Non-Beating Donor Heart for Successful Transplantation

**Investigational procedure is first-ever on West Coast and could significantly decrease transplant waiting list times and improve patient outcomes**

UC San Diego Health is the first hospital on the West Coast to perform heart transplant surgery from a donor after circulatory death, or DCD, using a new portable organ care system. The successful surgery is part of a national interventional clinical trial that could increase organ donation by an estimated 20-30 percent, resulting in less waiting time for patients in need of a new heart.

DCD involves retrieving organs from hospitalized donors who have died because their heart has stopped, either naturally or because life support has been discontinued. In such cases, with prior consent, surgeons remove the organ — within 30 minutes — and connect it to a machine that perfuses the heart with warm blood, reviving and keeping the organ beating and functional for assessment and possible transplantation. The warm perfusion system can potentially keep the organ viable for longer periods than traditional cold storage, allowing for transporting organs over much longer distances.

“When it comes to how organs are procured and preserved from donors, this machine is changing the paradigm for heart transplants,” said Victor Pretorius, MBChB, surgical director of cardiac transplant and mechanical circulatory support at UC San Diego Health. “Not only will this increase the number of hearts available for those in need, but it can also optimize the timing of the transplant operation and utilization of operating room resources.”



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Until recently, only hearts from patients who had succumbed to “brain death” (DBD) qualified for potential transplantation in the United States and most countries. DBD hearts provided transplant specialists with the ability to perform a functional assessment of the organ before transplant, and helped ensure selection of donor hearts most likely to produce good patient outcomes.

However, the number of suitable DBD donors has remained steady and limited over the last two decades, while the number of patients with end-stage heart failure has steadily risen. Other countries, such as Australia and the United Kingdom, have approved DCD heart transplants.

“We have people on the wait list dying while waiting for hearts, and this is because we don’t have enough donors,” said Eric Adler, MD, cardiologist and medical director of cardiac transplant and mechanical circulatory support at UC San Diego Health. “By utilizing the pump, we are able to use hearts that would not be considered for transplant and can assess the organ for any issues or damage to ensure we’re matching the organ with the most appropriate recipient.”

The American Heart Association estimates 6 million Americans are living with heart failure, with approximately 60,000 suffering end-stage disease when conventional therapies no longer work. For these persons, a heart transplant becomes the only life-saving option.

In 2019, according to the federal Health Resources & Services Administration, 3,553 heart transplants were performed. More than 3,500 are currently on the national waiting list for a heart transplant, including 50 persons in the San Diego region, according to Lifesharing, a federally designated nonprofit group that coordinates organ and tissue donation in San Diego and Imperial counties.

Waiting times for a heart transplant vary, from days to, more often, months — and in some cases, years, depending upon listing status. Over the last five years, an average of 318 persons on the heart transplant wait list have died each year waiting for a donor organ.

By employing the new warm perfusion transport system, developed by TransMedics, a U.S.-based biotech company, surgeons have greater access to hearts that would otherwise not be used for transplant due to concerns about functionality or logistics.



*Victor Pretorius, MBChB, surgical director of cardiac transplant and mechanical circulatory support at UC San Diego Health.*

Currently, hearts intended for transplant are stored and transported in a cold preservation solution for a finite time, preferably under four hours to minimize tissue damage caused by oxygen deprivation. Because donor hearts must be transported and transplanted quickly, donor availability is restricted geographically.

“While cold preservation for organs has allowed for viable transplant options, we are severely limited by time in order to perform a successful transplant,” said Adler. “With the pump we can address this challenge as the heart is continually beating and receiving blood flow, resulting in an extended amount of time allowed between organ retrieval and transplant by up to 20 hours.”

As a result, Adler said transplant teams can travel longer distances to procure organs for those in need.

DCD transplants at UC San Diego Health are currently being performed for other organs, including kidneys and liver. Recently, UC San Diego Health teams began utilizing the pump during liver transplant, a process that may soon become the standard of care.

The clinical trial, sponsored by TransMedics, involves 25 participating sites across the country. UC San Diego Health is one of three sites in California, and the only one in the San Diego region. The trial seeks to evaluate the effectiveness of TransMedics’ OCS Heart System. It will recruit 90 participants and compare DCD heart transplants with subjects who receive a standard criteria donor heart transplant.

“This is the future of organ transplant and I couldn’t be more proud of our multidisciplinary team that is making heart transplant a reality for our patients here in San Diego and from around the world,” said Pretorius.

For the 2020-2021 U.S. News & World Report, UC San Diego Health ranked 31st for Cardiology and Heart Surgery in the nation’s top 50 programs, out of 4,500 hospitals nationwide. The Cardiovascular Institute at UC San Diego Health offers comprehensive care for advanced heart failure, heart and lung transplantation, complex coronary interventions, heart rhythm disorders,



*Eric Adler, MD, cardiologist and medical director of cardiac transplant and mechanical circulatory support at UC San Diego Health.*

robotic and minimally invasive cardiac surgery, structural and adult congenital heart disease, percutaneous and surgical treatment of thromboembolic pulmonary vascular disease and intensive cardiac rehabilitation.

The heart transplant program was recently awarded the 2019 Interlink Chairman's award for best outcomes among all heart transplant programs in the United States.

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