Device versus ice

U surgeons breathe new life into the practice of lung transplantation— with implications for heart transplants, too

At the University of Minnesota Medical Center today, the lung transplant waiting list is half the length it was six months ago, thanks in part to a new technology that’s making more donated lungs worthy of transplantation.

“For some patients, that is the difference between life and death,” says U assistant professor of surgery and cardiothoracic surgeon Gabriel Loor, M.D.

The TransMedics Organ Care System is a device that keeps donated lungs warm and breathing during transportation instead of the standard practice of putting them on ice. The machine pumps blood and oxygen through the donated lungs to simulate what they’d be doing in a living human body. In a sense, the lungs are virtually alive until they reach their recipient.

The device also may be able to rescue marginal lungs, meaning that doctors might be able to improve lungs that otherwise would have been turned away for being not-quite-perfect enough to be transplanted. It gives the lungs time to be nursed in a sterile and protective environment and monitors their progress until they meet or exceed standard donor organ criteria.

TransMedics has a similar machine that’s used to transport donated hearts for transplantation, and today a University team is gearing up to explore in the lab the technology’s potential for improving the quality of donor hearts as well.

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Gabriel Loor, M.D., says the TransMedics Organ Care System helps doctors evaluate the quality of donated organs for transplantation and may even be able to improve those that are considered marginal.
It’s an important quest. Today about 80 percent of heart and lung donor organs aren’t used in a transplant because there’s no standard method to monitor them and make sure they’re good enough, Loor says. But the TransMedics Organ Care System helps surgeons evaluate the quality of those organs and may even be able to improve some that previously would have been considered marginal.

“It’s revolutionizing the way that we look at transplants,” Loor says of the technology. “Instead of bringing it over on ice, we’re keeping the organ in its own native state. It’s like bringing it over in a miniaturized ICU—transporting it from point A to point B without any downtime.”

**Taking the next step**

TransMedics is developing different versions of the technology to use for liver and kidney transplants, as well. Its technology for hearts is already in use at some transplant centers, and one clinical trial deemed it just as good as transporting the organ on ice. The amount of time the hearts spent on the device far exceeded the time they’d normally spend on ice but showed equal outcomes, Loor says.

At the University, Loor and colleagues Paul Iaizzo, Ph.D., Angela Panoskaltsis-Mortari, Ph.D., Demetri Yannopoulos, M.D., and others are taking what they already know about hearts a step further.

With a generous grant from biotech company United Therapeutics, the University researchers purchased another TransMedics Organ Care System for lungs to be used only for laboratory investigations. They expect to purchase another machine for heart research, too, and answer a few important questions: When an organ is hooked up to the device, can the amount of time that a donated heart or lung is out of the body be extended beyond the four- to five-hour maximum now considered safe? Can the device help improve the quality of those organs? Can an infusion of a protective agent provide more stability to the organs? Could the technology even allow diseased hearts or hearts that failed time to regenerate if stem cells are introduced?

“It’s been an amazing collaboration that would only be possible at a place like this,” Loor says.

**Encouraging results**

In November, a team of University surgeons performed the first “breathing lung” transplant in the Midwest using the TransMedics Organ Care System. The recipient, a 51-year-old Minnesota man who had suffered from emphysema, left the hospital at a “record pace” and is still doing well today, Loor says.

The TransMedics Organ Care System for lungs is young; the first ever recipient of “breathing lungs” is less than a year out from the transplant. So its true long-term benefit is yet to be discovered. But Loor is encouraged by what he has seen so far.

“Preliminary results suggest that the amount of what they call primary graft dysfunction, how much injury the lung sustains, is significantly reduced—50 percent reduced—if the lungs are procured with the device versus ice,” he says. “That’s probably going to turn out to be a big deal. We already know that the amount of lung injury in the first one to three days [posttransplant] predicts how patients are going to do in the long term. Anything we can do now to make [the process] better is worth it.”
Lifesaving heart surgery five decades ago inspires a gift of gratitude

Though Tom Anderson is a University of Minnesota alumnus (’80 B.S.), his most vivid memories of campus are from his childhood. “What I remember is going on walks along River Road, in front of Coffman [Memorial] Union, across the bridge to Northrop Mall with my mom,” he says. “I remember that like it was yesterday.”

That’s because in the fall of 1963, Anderson spent about a month at the Variety Club Heart Hospital after having a risky open-heart surgery to repair his congenital atrial septal defect, which causes reduced oxygen in the body’s blood supply and gets progressively worse. At the time, even under the skilled care of the University team that pioneered the procedure, it carried a 50-50 chance of success.

Anderson’s parents debated about whether then-5-year-old Tom should have the surgery. But with faith and confidence in legendary University surgeon and innovator C. Walton Lillehei, M.D., Ph.D., they decided to go ahead with it.

People in his hometown of Alexandria, Minnesota, pitched in to help the family, raising the 30 pints of blood he needed to have the surgery. (“I still keep a list to this day of the people who did that, just to remind me that, as you go through life, you can’t do everything alone,” Anderson says.)

The surgery was success, and Anderson has gone on to lead a pretty normal life. “My mother always pushed me to do as much as I could,” he says of his childhood. “I can remember her saying, ‘Tom, you can do that. Dr. Lillehei says it may be harder for you, but he says you can do that.’”

Since then, Anderson has graduated from college, taken over as the fourth-generation owner of his family’s funeral business, gotten married, and fathered two sons. He runs 3 miles every other day to help keep his heart healthy.

And he considers Lillehei a major reason behind it all. “My life has been a gift from that man,” he says.

Anderson admits that he didn’t fully realize the profound effect that Lillehei and the University had on him until later in life. “There’s really nothing I can do to pay the University back, to pay Dr. Lillehei back,” he says.

So instead, he’s paying it forward. In Lillehei’s honor, on the 50th anniversary of his surgery, Anderson made a generous gift to the University’s Lillehei Heart Institute to help fund the exploration of other novel ideas—ideas like Lillehei had back in the 1950s that ended up saving Anderson’s life and the lives of countless others.

A gift with a double tax benefit

Giving a gift of appreciated stock, bonds, or mutual fund shares that have been held more than one year can provide an immediate benefit to the Lillehei Heart Institute—and it may be more tax-efficient than giving cash.

By making your gift using appreciated securities, you avoid capital gains tax on the appreciation of the donated asset, and you may claim an immediate deduction for the current fair-market value of the property—up to 30 percent of your adjusted gross income.

You may carry forward any unclaimed portion of the deduction for up to five additional years, subject to the same annual limit. Because the donated property is appreciated, the benefit of your gift to the University may be considerably greater than its original cost to you.

For more information, contact Jennifer White of the University of Minnesota Foundation at 612-625-8676, 800-775-2187, or whit0559@umn.edu.
At Family Camp Weekends hosted by the University of Minnesota’s Paul and Sheila Wellstone Muscular Dystrophy Center, “you’ll see families just being families,” says Joline Dalton, M.S., C.G.C., a U genetics counselor who helped start the wildly popular camp five years ago.

“The Family Camp is a wonderful way to meet other families going through the same struggles,” Dalton explains. “It’s a place where you don’t have to worry if your child can participate, because everything is geared toward MD.”

Camps catering to families affected by neuromuscular diseases are rare—and much appreciated by families living with MD. More than 150 people attended last year’s camp, where activities include everything from swimming and canoeing to campfires and mini golf. And now the program, supported by philanthropy, has expanded to offer a Transition Camp designed especially for young adults with MD.

“Happily, patients with MD are now living to adulthood,” says Dalton, “but they face special challenges—learning to navigate college, getting jobs, finding apartments ... Transition Camp deals with these kinds of issues.”

Dalton emphasizes that donations help ensure that no family is turned away from the camps for financial reasons.

“Families are so hungry for these kinds of programs,” says Dalton, “where kids with MD can enjoy activities they normally don’t get to experience, to just be kids.”

Your gift of $600 sponsors one family’s camp experience. Give today at giving.umn.edu/giveto/mdcamp.