

# Trading Kidneys

## Innovative Program Could Save Thousands of Lives

Ann M. Hoppel, Managing Editor

While editing this month's Renal Consult (see page 16), I noted the mention of "paired kidney exchange" with particular interest. In 2005, I heard about a relatively new concept: matching two or more incompatible kidney donor-recipient pairs to create compatible matches. After conducting some research and interviewing experts, I wrote an article on paired kidney exchange for our sister publication, *Clinician News*. In the subsequent decade, the concept of paired exchange has expanded to the point that as many as 70 people have participated in a 35-kidney exchange. —AMH

Last year, almost 27,000 Americans received an organ transplant—a new national record, according to the US Department of Health and Human Services. Donations from living persons reached nearly 7,000, an increase of 2.3% from 2003. But despite these positive numbers, nearly 88,000 people are on the waiting list for an organ, and about 6,200 died last year before one became available.

But in some areas of the country, an innovative program is gaining momentum: paired kidney exchange, which puts together two or more incompatible donor-recipient pairs to create compatible matches. And while it will not close the gap between patients in need and those who receive, experts believe it could help thousands of people each year.

The real struggle is finding more willing donors. But Francis Delmonico, MD, Medical Director, New England Organ Bank, Newton, Massachusetts, says paired exchange is "an adjunct. When it can be of help, it's helped a number of people already. And as with any of this, it's a lot of work but it's a tactic that we ought to try and apply anytime we can."

"There are about 10,000 people who could be put into a program like this," says Michael A. Rees, MD, PhD, Associate Professor, Department of Urology, Medical College of Ohio, Toledo. "Once you put them into the program, we would hope that 2,000 to 3,000 per year could be matched up and we could do that many extra kidney transplants a year. And that would certainly help to close the gap."

### HOW IT WORKS

Paired kidney exchange got its start in the US at Johns Hopkins Comprehensive Transplant Center, Baltimore, in 2001. The concept is simple: Recipient A needs a kidney and has a family member or friend, Donor A, who is willing to give. However, testing reveals that Donor A and Recipient A are incompatible. Meanwhile, Recipient B and Donor B find themselves with the same problem. But, it turns out, Donor B could give to Recipient A and Donor A could give to Recipient B. The patients and their donors are approached with the idea of an exchange, and if they agree, two people receive needed organs.

Twenty-two patients have received kidneys through the Johns Hopkins program, according to Robert A. Montgomery, MD, PhD, Director, Incompatible Kidney Transplant Programs (InKTP). Surgeons at Johns Hopkins have also expanded the exchange to three donor-recipient pairs; "triple swap" operations were performed at the hospital in 2003 and 2004.

"Everyone, when they come for an incompatible transplant, is offered the option of a paired exchange, because ... if there's any way to get a compatible kidney, that's what you try for first," says Janet Hiller, RN, MSN, Clinical Nurse Specialist, InKTP. "We've only had probably two out of a hundred [patients] who have thought, 'No, I'd rather just get the kidney from my spouse or loved one.'"

"Patients are surprisingly open to this option, and

almost all of them ... request it when they are initially seen by me," Montgomery told *Clinician News* via e-mail. "Some [recipients] have expressed apprehension about not knowing the donor and not being sure they have taken good care of their kidney. The donors have rarely expressed any concerns; they just want their loved one to receive a kidney.... It has universally been a positive experience."

Ohio's Rees first heard about paired exchange at a conference in 2001. He returned to his institution and consulted with the living donor coordinator to see if any pairs could be formed from people who had been willing to donate but unable due to blood type or other incompatibility problems. After identifying two pairs (out of 10 possibilities) for whom an exchange might work, Rees brought the patients and donors in for testing. But alas, the match wasn't quite right.

"It became clear to me that if I really wanted to make this work, I needed a lot more than 10 pairs [to start with]," Rees says. "The numbers—if you try to match up people—go up logarithmically the more pairs that you have. So the chances you have of creating pairs go up exponentially."

With this realization in mind, Rees set out to find someone willing to write a computer program that could identify potential matches from a larger bank of people pooled from several facilities. After some false starts—no computer programmer would work on the project for academic glory, the only reward Rees could offer—he convinced his father, Alan, to help. The senior Rees' prototype was the basis for the current system, which links 10 transplant centers in Ohio.

Working with a larger pool of colleagues required numerous teleconference calls to iron out details for the statewide program. Among the questions were, "Are we going to make the donor travel, or are we going to cut the kidney out at home and ship the kidney in a box of ice to the place where it's going to be transplanted?" he recalls. "And we decided that the donor has to travel."

The first kidney exchange in the state of Ohio was performed in early November 2004. The third was scheduled for mid-April.

Creating one system to be shared by medical institutions that would normally be competitors took



some work. "Trying to get us all to play in the same sandbox was very difficult," Rees acknowledges. "But we did that; we stuck it out. And we all agreed to come up with something that we all think is a great idea and should help our patients."

Delmonico, who is also a Professor of Surgery at Harvard Medical School and Visiting Surgeon in the Transplant Unit at Massachusetts General Hospital, Boston, has also seen the gratifying cooperation between medical professionals. "Institutions are competitive in terms of medical care—that's no mystery," he says. "But in this instance, the physicians have been simply magnificent in trying to help patients. Innovative programs can be developed and sustained through the kind of collaboration that is going on here."

The New England paired exchange program, dating back to 2002, is a collaboration involving a dozen hospitals. It started with a paper-and-pen effort (blood type-incompatible patients would be brought to the attention of Delmonico, who would then contact each transplant center, seeking others) but now has its own computer system.

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New England also has another variation on the exchange program that is unique to the region, according to Delmonico. “Let’s say I wanted to give to you but I can’t. I’ll give to somebody on the list, and as a result of that donation, you would get a priority for the next available deceased donor kidney in New England,” he explains. “We’ve done that about 20 times now.”

### **GOING NATIONAL**

So where does paired exchange go from here? Johns Hopkins’ Montgomery organized a consensus meeting in March to discuss the possibility of creating a national network; Hiller, Rees, and Delmonico attended.

“I think our goal should be to one day have a national program,” Rees says. “But shipping somebody from Toledo down to Cincinnati is a lot easier to sell to a patient than shipping somebody from Toledo to Los Angeles. And the logistics of trying to do that when you have a whole different set of insurance companies ... would be a lot more complicated. So, I think the way to begin is to do it on a more regional basis and prove that the concept works, that people can be satisfied with it, and then begin to expand it.”

Delmonico also thinks a national program is essential. “We need to enlarge the possibility of paired donation and exchange,” he says. “It will not happen successfully in a regional system. There aren’t enough patients that can be identified.” Questions to be answered before such a program could exist, Delmonico notes, include where the system will be based and who will administer it.

“There was a lot of agreement—though not total consensus—on the fact that UNOS, the United Network for Organ Sharing, would be the most likely place to ‘house’ and to manage the data,” Hiller reports.

“They have all those systems in place already [and] are capable of managing this large database.”

Delmonico, as Vice President of UNOS, points out, “We have no authority to do that yet. Whether or not the country wants us to do that also remains to be determined.” But the UNOS Board of Directors is open to the idea; last year, they endorsed the concept of establishing a national paired exchange program with the understanding that details would have to be worked out over time, according to a UNOS spokesperson.

Another obstacle to widespread paired donation may be perceptions of it in the eyes of the government and critics: Could it be construed as a violation of the 1984 National Organ Transplant Act, which says that an organ should not be transplanted for a “value consideration”? Legal experts have assured Delmonico that paired exchanges can be interpreted as a gift.

“The government is also, properly, not wanting to see this as a slope toward buying and selling organs,” Delmonico says. “And I am adamantly opposed to that. In the instances that we’ve done paired exchange here, that’s not in the mix. That’s not our motivation, nor has it been the motivation of these donors. We wouldn’t do it if we felt that was the case.”

Montgomery says it will take several years to get a national system set up. But the bottom line for transplant surgeons is that a national paired kidney exchange program would do a world of good, two people at a time. “This is clearly what is best for our patients,” Montgomery says.

“The bigger we can get, if we can spread it nationally, the more people it will help,” Rees says. “And so we have to think of a way to do this so that we’re all satisfied that it’s moving forward in a way that will make everyone happy.”

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