

# New findings on old kidneys could enhance transplants, study shows

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The older the kidney, the worse it works — though exactly how much worse isn't known. But with a mean wait time of over three years for a kidney transplant, even old kidneys are in demand. The challenge for doctors is to determine a kidney's prospects prior to the operation.

Research in this month's issue of the *Journal of the American Society of Nephrology* begins to establish a method for projecting future kidney function, which could be a boon to the more than 82,000 people in the United States awaiting kidney transplants.

Jane Tan, MD, PhD, assistant professor of nephrology at the Stanford University School of Medicine, has quantified the function of older kidneys that have been transplanted into patients compared with younger ones. The results are a significant step toward developing precise methods to assess the quality of a kidney before it's transplanted into a patient. "The goal," she said, "is to find good criteria for predicting which are the better older kidneys, and how long they will last in transplant patients."

Kidneys are draped in an outer cortex of tissue filled with clusters of blood vessels, called glomeruli, which filter waste products from the bloodstream. The health of a kidney is determined by how quickly the glomeruli do their job. After injecting a chemical into the bloodstream and analyzing urine samples for traces of this substance, scientists plug the information into formulas to see whether the glomeruli are working hard enough. Typically doctors use creatinine, which provides a quick,

but crude, estimate of kidney function. However, a few centers are equipped to use iothalamate — a more accurate marker for kidney function, though it's more time-consuming and costly.

Using this "gold-standard" technique, Tan and colleagues tested kidney performance in patients three months after transplantation and found the kidneys from donors over the age of 55 performed only 70 percent as well as those from donors younger than 40. Based in part on samples they took at the time of transplantation, they also found that older kidneys contained less than half the normal number of functioning glomeruli, which were actually swollen by 24 percent compared with their younger counterparts. The surviving glomeruli had become enlarged, a sign of overwork.

"It's as if the remaining glomeruli are working harder. The problem is that over time this will lead to scarring and a loss of function," Tan said.

Tan plans to follow up with the same patients in a few years to check how the older organs are doing. She predicts that the kidneys with fewer glomeruli at the time of transplantation will underperform those with more glomeruli. If this prediction pans out, the procedure could be the basis of a pre-transplant kidney test: Physicians could take blood and tissue samples from older donor kidneys before transplantation to predict how long they will survive in patients.

This work could be of particular benefit to older people, who make up nearly 80 percent of the national waiting list, based on January 2009 data from the Organ Procurement and Transplantation Network. Because of advances in transplantation techniques, the elderly have benefited by becoming increasingly eligible for this procedure. While kidney transplants have decreased slightly for younger adults, there has been a more than three-fold increase in kidney transplants for older adults since 1988. Every year, thousands of people die while waiting for kidney

transplants, and the elderly recipients in particular are unwilling to wait for young, healthier kidneys. Elderly transplant candidates are more likely to join a separate waiting list for expanded-criteria donor kidneys — kidneys from older, higher-risk donors — with the hopes of receiving a kidney sooner.

"When I first came to Stanford, I noticed that our transplant recipients and donors were getting older and older, yet there were very few careful studies on the aging kidney. It was quite clear that studying the aging kidney would have a direct clinical impact in our field," said Tan.

Due to the high demand for kidneys, the use of older kidneys for transplants is necessary, said Tan, adding that this had led to a greater need for a better way to evaluate these kidneys. Tan hopes that her research will lead to "the best selection of donors and recipients, and a better quality of life for transplantation patients, especially the elderly."

Source: Stanford University

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