Genes, not race, determine donor kidney survival

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A new study by researchers at Wake Forest Baptist Medical Center sheds light on what causes certain kidneys to do better than others after being transplanted, providing doctors with an easy way to screen for donor kidneys that have the best chance of survival.

"It's been long observed that kidneys taken from some black donors just don't last as long as those taken from non-black donors, and the reason for that has not been known," said Barry I. Freedman, M.D., John H. Felts III Professor and senior investigator. "This study reveals that the genetic profile of the donor has a marked affect on graft survival after transplantation. We now know that these organs aren't failing because they came from black donors, but rather because they came from individuals with two copies of a specific recessive gene."

The study appears in the May issue of the American Journal of Transplantation.

Freedman and co-researchers at Wake Forest Baptist examined 12 years' worth of medical records dating back to 1998, looking for all patients who received a kidney transplant from a black deceased donor whose genetic information had been recorded. The search yielded 106 black donors - from whom one or both kidneys were transplanted - for a total of 136 donated kidneys.

The researchers identified that kidneys from donors who had specific coding changes in a gene called apolipoprotein L1 (APOL1) did not last as long after transplant as those from donors without these changes. These coding changes in the APOL1 gene that affect kidney transplant function are found in about 10 to 12 percent of black individuals. Recent studies, led by Freedman and his colleagues, have shown that these genetic changes are associated with an increased risk of kidney disease, which prompted researchers to investigate the role of these changes in transplant success.

"In looking at the records and follow-up of the recipients of these organs, we accounted for all the usual factors that are known to contribute to more rapid loss of kidney function after transplant," said Freedman, chief of the section on nephrology. "What we found was that the kidney disease-causing risk variants in APOL1 were the strongest predictor of graft loss after transplant. The effect of having two copies of this gene was stronger than the impact of genetic matching between donor and recipient, the amount of time the organ was out of the body, and the antibody levels. APOL1 dwarfed all these other factors known to affect survival."

If the finding is confirmed by other researchers, it has the potential to dramatically improve outcomes for both the individuals undergoing kidney transplantation and those considering kidney donation, Freedman said. It could revolutionize donor selection criteria, allowing transplant physicians the ability to identify kidneys that are likely to function for shorter periods of time. In addition, this screening tool has the potential to help doctors protect potential donors who may be at risk of developing kidney disease down the road.

"It is exciting to see that research done at Wake Forest Baptist could impact kidney transplantation throughout the world," Freedman said. "We have shown for the first time that genetic risk variants in kidney donors are associated with markedly different outcomes after kidney transplantation. This finding could dramatically change the way we practice."

Provided by Wake Forest Baptist Medical Center