Kidney Donors

The rates of medical ineligibility were higher at lower levels of household income: 60.1 percent of individuals with an income below $35,000 would be unable to donate, versus 49.3 percent with an income above $100,000.

Financial pressures and immigration status are nonmedical factors that often affect the ability to be a kidney donor. With the addition of income below the poverty line and non–United States citizenship, 68.5 percent of the United States population would be ineligible to donate. The figure rose to 75.8 percent after the exclusion of smokers and of individuals with shorthand of breath when walking up an incline.

There were significant racial and ethnic differences in the distribution of exclusionary medical conditions, with African Americans having the highest rates of obesity, hypertension, diabetes, and microalbuminuria. Overall, 63.9 percent of African Americans would be ineligible to donate, compared with 54.8 percent of whites.

There is a well-recognized shortage of living kidney donors in the United States. The new report is the first population-based study to evaluate the rates of specific medical conditions and social factors that would exclude individuals from living kidney donation.

“It is well known that African Americans and individuals with lower incomes are at an increased risk of kidney failure. Unfortunately, their potential donors—who are very likely to come from the same social groups—are also much less likely to be kidney donors due to comorbid conditions,” said Anthony Bleyer, the senior investigator in the study. “Increasing the number of living donors will require addressing this important issue.”

Increasing obesity and worsening health of the general population decrease the pool of potential donors. “Financial compensation for time lost at work and lost income would likely improve the ability to donate in 36.1 percent of the eligible donor pool that has an adjusted family household income of less than $35,000,” Bleyer said.

Genetic Markers

Continued from page 1

Using GWAS methods, the investigators analyzed data from patients at risk for AKI in the hospital setting—760 adults with AKI and 669 adult controls who underwent surgery or received care in the intensive care unit (ICU)—to determine if any SNPs were associated with the development of AKI. The study population was selected from the surgical ICU (TRIBE-AKI study) and the medical ICU (VALID ICU cohort). AKI was defined as a rise in creatinine of 0.5 mg/dL or 50 percent from baseline for at least two days.

After genotyping a total of 992,895 SNPs, the researchers identified six clusters of three or more SNPs on six different chromosomes (SOX2-OT, IL53, RAB20, and TAOK1) that are proteincoding and not coding for protein synthesis and the remaining 2 are intergenic (involving more than one gene). “All six SNP clusters are protective against AKI, with odds ratios ranging from 0.55 to 0.72,” said Parikh.

Brigham and Women’s Humphreys found the results very intriguing and noted that they could certainly lead to a better understanding of AKI pathophysiology. “Most of the SNP clusters identified appear to protect against AKI,” he said. “Understanding how certain gene variants confer renal protection could lead to new therapeutic strategies as well as new risk prediction tools.”

“AKI is a heterogeneous disease and genetic studies need to be continued to fully capture the host risk,” Dr. Parikh emphasized. “It is recommended that sequencing can be used as a complement to GWAS, to obtain a better map of the genetic variants in GWAS-significant genes or well-established candidate genes.”

Although it was a relatively small study by GWAS standards, the results are promising, Humphreys said. “They clearly call for a much larger analysis to rigorously evaluate the association of these candidate SNPs with risk of AKI.”

Parikh agreed, adding that “further collaborative research is required utilizing larger cohorts to confirm these findings and identify candidate genes that are mechanistically linked to pathogenesis of AKI.”

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Reference