Study finds a better method for diagnosing kidney disease

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Assessing glomerular filtration rate (GFR) using kidney filtration markers in blood is the standard means for determining kidney function, diagnosing kidney disease and measuring its progression. A higher filtration rate indicates healthy kidney function, while a lower rate points to various stages of kidney disease. A new study led by researchers at the Johns Hopkins Bloomberg School of Public Health found that the new CKD-EPI equation for calculating GFR is a better predicator of risk for kidney disease and death compared to the most widely used method. The findings suggest that switching to the CKD-EPI equation for calculating GFR could focus efforts more efficiently, and improve assessment of patient future risk and treatment of kidney disease. The study is published in the May 9 edition of *JAMA*.

GFR is calculated using a patient's age, sex, race and serum creatinine level, which is a measure of a molecular waste product in blood. More than 92 percent of labs in the U.S., use the MDRD Study equation developed in 1999 to estimate GFR. The test is conducted more than 300 million times per year. The CKD-EPI equation uses the same data as the MDRD Study equation to estimate GFR.

For the study, GFR estimates were broken into six categories, which correspond with various stages of kidney disease. A GFR of 90 or greater indicates healthy kidney function, while a GFR of 15 and lower indicates kidney failure and initiation of dialysis for many patients. The researchers compared GFR estimates using both calculation methods from data covering a diverse study population of more than 1 million

participants.

"We found that the newer CKD-EPI equation for estimating kidney function consistently classified future risk better than the older MDRD Study equation. This was true for both mortality and need for dialysis, and across a wide range of studies and subgroups" said Kunihiro Matsushita, MD, PhD, lead author of the study and assistant scientist with the Bloomberg School's Department of Epidemiology.

According to the study, about one-third of patients with mild to moderate kidney disease (GFR of 30-89) were found to have a higher GFR category when the CKD-EPI equation was used compared to the MDRD Study equation. The same group also had a 1.3- to 2-fold lower risk of dying or developing end stage renal disease—even after adjusting for other factors that can affect kidney disease risk. A very small percentage of participants—less than 0.7 percent—moved to a lower GFR category using the CKD-EPI equation.

"The CKD-EPI equation took nearly a decade to develop based on as much of the world's data on measured kidney function as we could gather. It is gratifying to see that since its publication in 2009, several studies have confirmed that it estimates kidney function better than the MDRD Study equation and now we have conclusive evidence that this translates to better risk prediction" said Andrew Levey, MD, senior author of the study and Chief of Nephrology at Tufts Medical Center.

The article, "Comparison of Risk Prediction Using the CKD-EPI Equation and the MDRD Study Equation for Estimated Glomerular Filtration Rate" was written by the Chronic Kidney Disease Prognosis Consortium, which includes more than 200 collaborators and data from 40 countries.

Josef Coresh, MD, PhD, MHS, the consortium principal investigator and

professor in the Bloomberg School's Department of Epidemiology observed that "it is impressive how consistent that data are across such a wide range of studies including so many outstanding cohorts. Strong conclusions based on a comprehensive study are important in this area since a decisive transition to the new equation would minimize the time during which different labs report different equations." As of 2011, 4 percent of U.S. labs have switched to the new equation for estimating kidney function but these include two of the largest labs in the U.S. and these data should accelerate the trend.

More information: *JAMA*. 2012;307[18]:1941-1951. *JAMA*. 2012;307[18]:1976-1977.

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