New equation provides more accurate estimates of kidney function

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A newly developed equation produces more accurate estimates of the glomerular filtration rate (GFR)—a key indicator of kidney function in patients with chronic kidney disease (CKD), according to research being presented at the American Society of Nephrology's 41st Annual Meeting and Scientific Exposition in Philadelphia, Pennsylvania.

"Equations to estimate GFR are routinely used to assess kidney function and to detect, evaluate, and manage CKD," comments Andrew S. Levey, MD, of Tufts Medical Center in Boston, Massachusetts, on behalf of the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI). "Our new estimating equation, developed from pooled databases, is more accurate than the widely used Modification of Diet in Renal Disease (MDRD) Study equation."

The MDRD and similar equations use information on age, race sex, and the level of creatinine—a waste product normally removed from the blood by kidneys—to estimate the GFR. (Although there is a test to measure the actual GFR, it is time consuming and impractical for routine use.)

However, the MDRD equation has some important limitations: it is relatively imprecise and tends to underestimate GFR, especially at higher (closer to normal) levels. The MDRD was developed using data on about 1,600 patients from a single study.

In an attempt to improve on the MDRD, the CKD-EPI researchers

developed a new equation based on pooled databases. Initial development used data on more than 8,000 patients from 10 studies; the equation was then validated (confirmed) using data on nearly 4,000 patients from 16 studies.

Compared to actual GFR measurements, the resulting CKD-EPI equation was more accurate than the MDRD equation. The CKD-EPI equation was more accurate at all levels of kidney function, although the difference was greatest at higher GFR levels. When the two equations were applied to a nationally representative sample of 16,000 Americans, the estimated prevalence of CKD in the population was 12.2 % with the CKD-EPI equation, compared to 13.3 % with the MDRD equation.

The National Kidney Foundation estimates that 26 million U.S. adults have CKD, while another 20 million are at increased risk. Early detection and treatment are needed to reduce the risk of worsening kidney disease. Estimating equations like the MDRD equation play an important role in CKD diagnosis and treatment.

The CKD-EPI equation, developed in pooled databases including thousands of patients, appears to offer some important advantages over the MDRD equation. "The CKD-EPI equation has lower bias, especially at higher estimated GFR," says Dr. Levey. "Although its precision remains limited, the CKD-EPI equation could replace the MDRD equation for routine clinical use."

The researchers emphasize that a single equation may not be accurate in all populations of patients with CKD. The CKD-EPI equation was developed from pooled databases, not a representative population. As with the MDRD equation, the CKD-EPI estimates of GFR are not as accurate as actual GFR measurements.

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The study abstract, "A New Equation to Estimate GFR from Serum Creatinine: Improved Accuracy and Updated Estimates of Prevalence of Chronic Kidney Disease in the United States," (F-FC160) will be presented as part of a Free Communications session on the topic of "Effects of Traditional and Nontraditional Risk Factors on Cardiovascular Risk in Chronic Kidney Disease and End Stage Renal Disease" on Friday, November 7.

Source: American Society of Nephrology