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Simple blood test identifies persons at highest risk for kidney disease complications

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An infrequently used blood test can effectively identify individuals at increased risk of developing complications associated with chronic kidney disease (CKD), according to a study appearing in an upcoming issue of the *Journal of the American Society Nephrology* (JASN). Use of this simple test might help physicians identify persons with CKD who are at high risk for complications, and identify persons with impaired kidney function at earlier stages of disease.

To assess kidney function, doctors most often measure an individual's level of creatinine in the blood. Creatinine is produced by muscles and filtered by the kidneys. Unfortunately, creatinine tests are inaccurate at detecting mild kidney impairment, and creatinine levels can vary with muscle mass and protein intake. Recently, cystatin C blood measurements have emerged as an alternative test of kidney function. Because the protein is removed from the bloodstream by filtration in the kidneys, cystatin C levels rise in the blood when kidney function declines.

Carmen A. Peralta, MD, MAS, Michael G. Shlipak, MD, MPH (San Francisco Veteran's Affairs Medical Center and University of California, San Francisco) and their colleagues studied the ability of cystatin C levels to identify impaired kidney function. Their study included 11,909 participants from the Multi-Ethnic Study of Atherosclerosis (MESA) and the Cardiovascular Health Study (CHS), two studies designed to investigate various aspects of cardiovascular disease. The investigators defined CKD using both creatinine and

cystatin C and compared their links to higher risks for premature death, cardiovascular events, heart failure, and kidney failure—all of which are known complications of CKD.

In MESA, 9% of individuals had CKD by a creatinine-based equation only, 2% had CKD by a cystatin C-based equation only, and 4% had CKD by both equations. In CHS, these percentages were 12%, 4%, and 13%, respectively. Compared with those without CKD, individuals in MESA with CKD based on creatinine only had similar risk of premature death, while individuals with CKD based on cystatin C only had more than a 3-fold increased risk, and those with CKD based on both had nearly a 2-fold increased risk. In CHS, individuals with CKD based on creatinine only also had a similar risk of premature death compared with those without CKD, while individuals with CKD based on cystatin C only had a 1.78-fold increased risk, and those with CKD based on both had a 1.74-fold increased risk. The pattern was similar for cardiovascular disease, heart failure, and kidney failure.

The authors concluded that among adults diagnosed with CKD using the creatinine-based equation, poor prognosis is limited to patients who also have CKD according to the cystatin C-based equation. Therefore, cystatin C may have an important role in distinguishing the persons suspected of having CKD, based on the current creatinine definition, who have the highest risk for CKD complications. In addition, cystatin C may identify persons with high risk for CKD complications who are currently missed by creatinine.

"Our findings suggest that the creatinine-based CKD definition captures a large number of adults who are actually at low risk for important complications of CKD. Based on our findings, we believe that cystatin C should be a confirmatory test among persons identified as having impaired kidney function based on creatinine levels," said Dr. Peralta. She noted that in doing so, individuals at highest risk may benefit the

most from aggressive treatment and specialty referral. In addition, many other persons whose CKD is not confirmed by cystatin C may be reassured that they have low risk for CKD complications. Future research should investigate the cost-effectiveness of using multiple markers to identify and risk-stratify CKD.

More information: The article, entitled "Cystatin C Identifies Chronic Kidney Disease Patients at Higher Risk for Complications" will appear online on December 16, 2010, doi:10.1681/ASN.2010050483

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