Poor kidney response to hormone may increase risks for kidney disease patients

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The kidneys' response to a particular hormone may affect kidney disease patients' heart health and longevity, according to a study appearing in an upcoming issue of the *Journal of the American Society of Nephrology* (*JASN*). The findings may help doctors as they monitor and treat patients with kidney disease.

In patients with chronic kidney disease (CKD), blood levels of a hormone called fibroblast growth factor-23 (FGF-23) rise in parallel with declining kidney function, causing excess excretion of phosphorus in the urine. Also, FGF-23 has been consistently and strongly linked with heart disease and premature death, but the mechanisms behind these links are unclear.

Julie Dominguez, MD, Joachim Ix, MD (University of California San Diego, and Veterans Affairs San Diego Healthcare System) and their colleagues wondered whether the kidneys' response to the hormonal actions of FGF-23 may play a role. To investigate, they measured blood levels of FGF-23 and urine levels of phosphorus in 872 patients with CKD and cardiovascular disease.

Among the major findings:

- During an average 7.5 years of follow-up, there were 337 deaths and 199 cardiovascular events, such as heart attacks and strokes.
- Urinary phosphorus excretion significantly modified FGF-23's links with premature death and heart disease. Patients who had above-average FGF-23 but below-average urinary phosphorus had the highest risks of both premature death and cardiovascular events.

The findings reveal that associations of FGF-23 with premature death and cardiovascular events are stronger in people with lower urinary phosphorus independent of kidney function. In these individuals, the kidney's response to FGF-23 may be suboptimal.

"The relative resistance to the hormonal actions of FGF-23 in the kidney may identify novel aspects of kidney dysfunction, which may hold prognostic information for adverse health," said Dr. Ix. "Future studies are needed to determine the mechanisms of relative kidney resistance, and to determine their prognostic implications for other outcomes such as progression of kidney disease."

In an accompanying editorial, Ishir Bhan, MD, and Ravi Thadhani, MD (Massachusetts General Hospital) noted that the study prompts new questions to guide future studies into FGF-23 biology. "Perhaps the most important role of this study is to begin to shed some light on potential underlying mechanisms that might be at play in the complex relationship of FGF-23 and clinical effects, but many more questions are raised that this study is unable to answer," they wrote.

More information: The article, entitled "Fractional Excretion of Phosphorus Modifies the Association Between FGF23 and Outcomes," will appear online on March 21, 2013, doi: 10.1681/2012090894.

The editorial, entitled "Fibroblast Growth Factor-23 and Outcomes: New Answers, New Questions," will appear online on March 21, 2013, doi: 10.1681/ASN.2013020169

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