New kidney protein speeds/improves the diagnosis of failing kidneys

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Walk into any emergency department complaining of chest pain and you are likely to have blood drawn. Within hours it should be clear whether you've had a heart attack, based on enzyme levels in your blood and whether those levels reveal the tissue damage normally associated with a heart attack or other major cardiac event.

Walk into any emergency department with life-threatening kidney damage and the story is not quite the same. First, no test can reveal kidney damage in an efficient and timely way. Since the current check for kidney damage, a blood test for creatinine, can take longer than one or two days to accumulate in clinically significant levels, irreversible damage might already have set in during the time between injury and diagnosis.

Second, today's standard creatinine test does not indicate the cause of the damage: Could an elevated serum creatinine be acute kidney failure from an emergent medication reaction or an underlying infection, or could it be kidney disease that was previously active, but now dormant?

To tackle the gap between injury, diagnosis and treatment, a unique team of basic scientists, physicians, medical and college students is focusing on a small protein found in the urine at the time of sudden kidney failure. The protein detects kidney injury one to two days sooner than the creatinine test for renal failure. A simple urine test for the protein NGAL (neutrophil gelatinase-associated lipocalin) can help emergency department physicians more accurately and rapidly diagnose kidney

failure, which can result in intensive care admission, dialysis, or even death. This fast and precise test will allow physicians to make evidence-based and potentially lifesaving treatment decisions.

The team, led by Jonathan Barasch, M.D., Ph.D., associate professor of medicine, and Thomas Nickolas, M.D. M.S., assistant professor of clinical medicine at Columbia University Medical Center, will publish the results of its study, conducted in the emergency department of NewYork-Presbyterian Hospital/Columbia University Medical Center, in the June 3 issue of the *Annals of Internal Medicine*.

If testing for NGAL is broadly implemented in emergency departments, doctors may be able to better distinguish between acute kidney injury that needs to be treated aggressively and chronic disease, which may not require an emergent treatment and is more common in many chronic illnesses, such as diabetes. Not adequately diagnosing a more severe problem can be life-threatening: Approximately 65 percent of patients with NGAL protein in the urine will require care by a nephrologist, another 32 percent will need dialysis, and 29 percent will require care in the intensive care unit, the study's authors have found.

"NGAL was diagnostic in a single test, whereas a single serum creatinine test can't discriminate acute kidney failure from chronic kidney disease," says Dr. Barasch, who found a connection between NGAL and the kidneys several years ago. "By showing that NGAL distinguishes acute kidney injury from other types of problems, this trial is a first step toward applying this protein to everyday clinical practice."

In their trial with more than 600 patients who came to the emergency department at NYP/Columbia, researchers found NGAL levels in patients later diagnosed with acute kidney failure were 30 times higher than patients who did not have renal injury.

"This level of accuracy is encouraging," said Pietro Canetta, M.D., a resident at NYP/Columbia who helped run the study at the emergency department. "Getting this quality of information so early in a patient's course, from just a single drop of urine, could be very helpful to clinicians. It provides concrete data in a clinical situation which is often dominated by guesswork and uncertainty."

Source: Columbia University