Warning signs predict kidney injury after surgery

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Acute kidney injury (AKI) is a common – but preventable -- complication after surgery that can lead to other complications or even death. The use and development of biomarkers will help physicians diagnose and treat acute kidney injury. Three protein measurements indicate who has a high risk of developing kidney injury after heart surgery, according to two studies appearing in an upcoming issue of the *Journal of the American Society of Nephrology*.

"To date, these are the largest studies in adults and children comparing and validating the performance of three of the most frequently studied markers of kidney injury," said author Chirag Parikh, MD, PhD (Yale University School of Medicine).

The studies included more than 1,200 adults and 300 children undergoing heart surgery throughout North America. Frequent urine and blood samples were collected to measure levels of three proteins -- urine interleukin-18 (IL-18) and urine and plasma (blood) neutrophil gelatinase-associated lipocalin (NGAL)—and assess their ability to predict who will develop kidney injury after surgery.

Traditionally, kidney trouble is assessed by measuring the blood protein creatinine, which is not ideal because it has a delayed result—it does not pick up early damage and injury to the kidneys.

"We demonstrated that the three proteins in our study identify kidney injury soon after surgery and 24 to 48 hours earlier than creatinine, and

shows a similar result," according to Parikh.

Risk of kidney injury was especially high—more than six times higher—for adults and children with the highest levels of urine IL-18. Plasma NGAL also predicted kidney injury in adults, whereas urine NGAL was not an accurate predictor in adults once results were adjusted for other factors. Urine IL-18 and urine, but not plasma, NGAL were accurate predictors in children.

Doctors may wish to measure these urine or blood proteins immediately after surgery to predict which patients are at high risk of developing kidney injury. These patients might benefit from kidney protective therapies.

The studies' results could also transform the diagnosis of kidney disease, Parikh believes. "Developing markers of structural kidney damage, before kidney function fails, is a top priority," he said.

The research's main limitation was that the adults enrolled were mainly Caucasian. Future studies should consider whether the results are the same in other races.

More information: -- "Postoperative Biomarkers Predict Acute Kidney Injury and Poor Outcomes after Adult Cardiac Surgery", doi:10.1681/ASN.2010121302
-- "Postoperative Biomarkers Predict Acute Kidney Injury and Poor Outcomes after Pediatric Cardiac Surgery", doi:10.1681/ASN.2010111163

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