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Kidney failure impacts survival of sepsis patients

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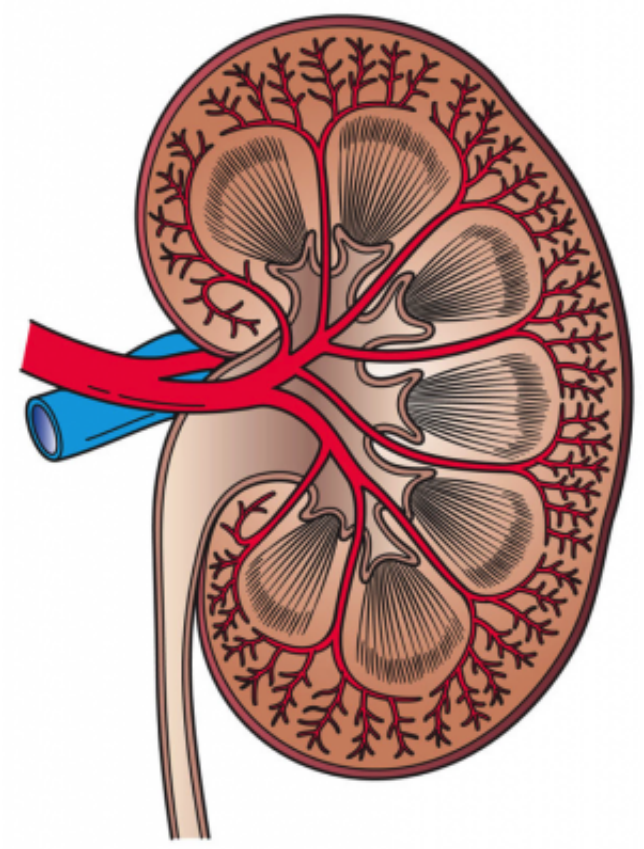

This image shows a cross section of a kidney. Credit: Holly Fischer/Wikipedia

Researchers at Duke Medicine have determined that kidney function plays a critical role in the fate of patients being treated for sepsis, a potentially life-threatening complication of an infection.

In a study published May 20, 2015, in the journal *Kidney International*, Duke researchers and their colleagues identified physiological changes at the molecular level that might be affected by acute kidney injury. The findings could help physicians improve hemodialysis practices, increasing patient survival rates after kidney failure.

Acute kidney injury is a serious and common health complication, occurring in up to 20 percent of all hospitalized patients and more than 45 percent of patients in a critical-care setting, according to the National Institutes of Health.

"There are a lot of things that we assume to be true about the impact of acute kidney injury on patients," said lead author Ephraim Tsalik, M.D., Ph.D., assistant professor at Duke University School of Medicine. "This study is the first to comprehensively characterize what is happening at the patient level, potentially as a cause and a consequence of acute kidney injury that we see in the setting of critical illness."

Sepsis, which is defined as systemic inflammation resulting from an infection, often results in an abrupt decrease in the kidney's ability to effectively filter the blood.

The Community Acquired Pneumonia and Sepsis Outcome Diagnostic (CAPSOD) study, led by Stephen Kingsmore, M.B, D.Sc., of Children's Mercy Hospitals and Clinic, was initially created as a repository for patients visiting the emergency department with suspected sepsis. The researchers used clinical and molecular information generated in the CAPSOD study to correlate patient-level data with changes in molecular markers in the blood.

They found that kidney function was a major determinant of how a patient responded to treatment for sepsis.

"We have over 2,000 patients enrolled in the CAPSOD repository," Tsalik said. "We are trying to use new tools to ask why is it that some patients show up and get sicker, despite getting all the right treatment, and why some patients show up, get the right treatment, and quickly get better."

Using an "'omics-based" approach, the researchers looked at variations in metabolite level, protein production, and gene expression in the blood in 150 patients with critical illness. The study design also allowed the researchers to investigate what impact hemodialysis, a medical treatment for kidney failure that filters toxins from the blood, was having on a variety of molecular markers.

"Rather than setting out to prove existing hypotheses, this study was designed to identify new questions or associations we were not previously aware of," Tsalik said. "There were a number of things that we expected to see and did, such as the accumulation of molecules normally cleared by the kidney among patients with kidney dysfunction."

Those known molecules are usually filtered out when a patient is receiving hemodialysis; however, the researchers also identified other chemicals and metabolites that were not previously shown to be abnormal in patients on hemodialysis.

"It may be that these newly implicated metabolites are not clinically relevant, but by identifying them, we've opened up opportunities for researchers to see if they cause toxicity to the patient," Tsalik said. "We want to understand how to improve the care of patients with acute kidney injury and those requiring hemodialysis."

Provided by Duke University Medical Center