New study uses health factors to predict kidney function recovery

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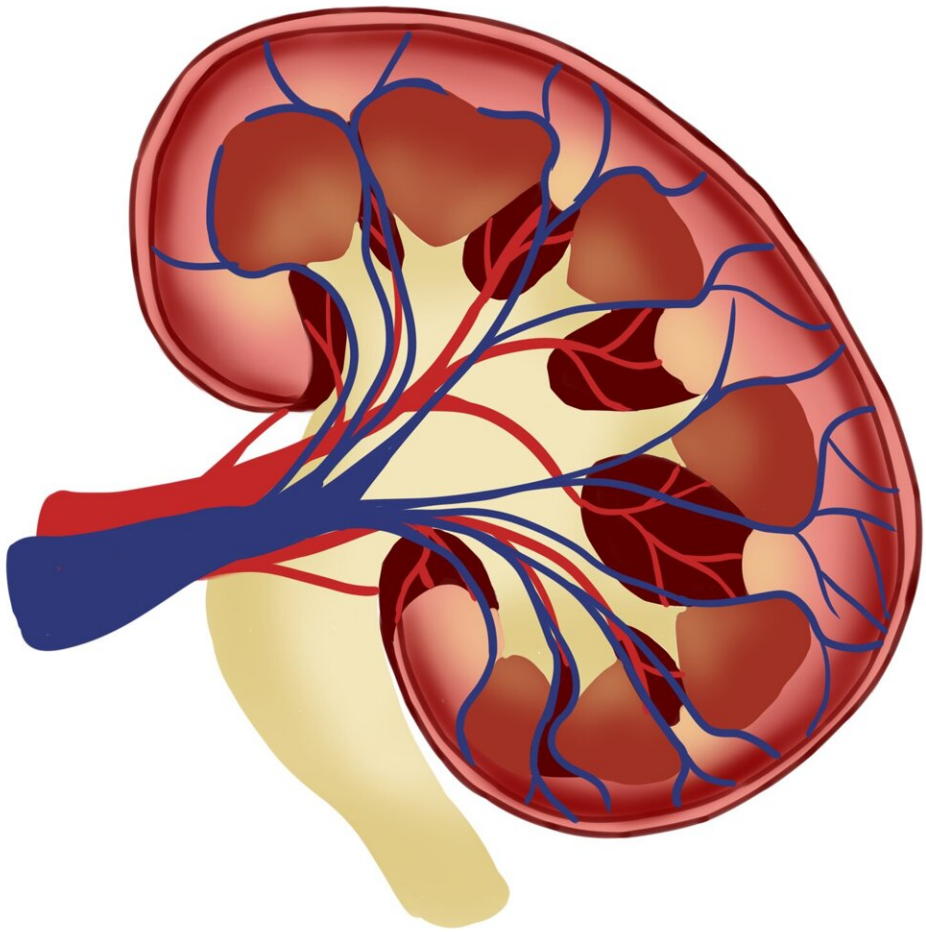

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Researchers at the University of Cincinnati College of Medicine have created a scoring model that uses key health indicators to accurately predict recovery for patients who experience kidney failure due to acute kidney injury (AKI), which occurs when kidneys stop working properly, and can range from minor loss of kidney function to complete failure.

AKI is a major contributor to end-stage kidney disease (ESKD). About a third of patients with ESKD due to AKI recover kidney function.

Their findings, published in the *Clinical Kidney Journal*, predict kidney recovery within 90 days and 12 months after the start of dialysis for kidney failure patients due to AKI. The study looked at the health outcomes of 22,922 patients from the U.S. Renal Data System from 2005 to 2014 to offer predictions.

Lead author Silvi Shah, MD, associate professor in the Division of Nephrology at UC, explains that researchers examined several factors used in logistic regression models to analyze the effect of various covariates on a patient's health outcome and found that 24% and 34% of patients with kidney failure due to AKI recovered kidney function within 90 days and 12 months, respectively.

Patient factors such as age, race or ethnicity, body mass index, congestive heart failure, cancer, amputation, functional status, hemoglobin and prior nephrology care are used in the regression model.

"One of the significant comorbidities was a history of heart failure," Shah says. "If you had heart failure, you were at a lower chance of recovering as well. If you had a lower body mass index, you had a lower chance of recovery; if you had amputation or poor functional status, you had a low chance of recovery. These were some of the significant predictors of the score."

Shah notes that younger people got more points in her prediction model because older age was also associated with a likelihood of lower recovery for kidney failure patients due to AKI.

The scoring model was developed as a way to help staff providing clinical care in a dialysis unit quickly triage patients based on characteristics that would be easily available in their medical history, explains Charuhas Thakar, MD, a senior author in the study, professor at Queen's University Belfast in the United Kingdom and former division chief of nephrology at the University of Cincinnati.

"Patients who develop dialysis dependent AKI typically receive care in dialysis facilities among other patients with end stage kidney disease," says Thakar. "Our goal was to quickly triage and determine who has the higher, medium or low prospect of recovery based on clinical characteristics the patient had in their medical history."

"That was our broad approach. If your score is high, you have the best chance of recovery," says Thakar. "Patients who are more likely to recover can be monitored closely for that prospect and we can focus our energies on preserving renal function. At the same time, those who are unlikely to recover should be allowed to undergo long term planning including transplantation. In summary, our study paves the way to individualize care as well as facilitate efficient use of treatment and resources."

Shah says it's important to understand that patients who have kidney failure due to AKI can recover.

"Around one-fourth of those patients will recover in 90 days, and around one-third of those patients will recover in 12 months," says Shah. "There are several factors which can predict the recovery rate. If you have lower body mass index, if you are Black, have congestive heart failure or a

history of amputation, you have lower chances of recovery.

"It helps us to do a risk prediction score and at the same time helps us to tell patients and health care providers what is the percentage recovery that may be expected," adds Shah. "If you fall in the high score category, they have a 57% chance of recovery in 90 days. This is very encouraging for both patients and physicians."

She emphasizes that researchers included the largest data in the U.S.—the United States Renal Data System—and captures all patients on dialysis in the country, including information for women, men and different races and ethnicities.

"One of the biggest strengths of the paper was that it was inclusive, and the score was individualized," Shah says. "It can help in counseling and risk prediction and tailoring treatment specifically for patients that have dialysis-dependent AKI, and based on the score, we can tell patients what's the chance of their recovery."

Other co-authors of the research at the University of Cincinnati are Department of Environmental and Public Health Sciences professors Anthony Leonard, Ph.D.; Karthikeyan Meganathan, Ph.D.; and Annette Christianson; along with Kathleen Harrison from the Division of Nephrology. Jia Ng, MD, assistant professor of medicine at Hofstra University, is also a co-author of the study.

More information: Silvi Shah et al, A clinical score to predict recovery in end-stage kidney disease due to acute kidney injury, *Clinical Kidney Journal* (2024). DOI: 10.1093/ckj/sfae085

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