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Study shows importance of cause of kidney failure when planning future treatment

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As a new physician in Galway, Ireland, and then as a nephrology fellow at the Stanford University School of Medicine, Michelle O'Shaughnessy, MD, began to wonder whether similar treatment plans for all patients whose kidneys had failed was necessarily the best practice.

"I was struck by my patients, who were often young and on dialysis at the age of 23 or 24," O'Shaughnessy said, referring to patients whose kidneys had failed because of glomerulonephritis, a group of rare disorders that damage the kidney's ability to filter the blood.

"I thought there should be other avenues for them," she added. "They were trying to get a career going, to keep their life together. We should be able to treat them better."

Currently, the standard of care is to follow a similar treatment plan for most kidney-failure patients, whatever the initial cause of their kidney failure. The two leading causes in the United States are hypertension and diabetes, followed by the rarer glomerulonephritis, which is also called glomerular disease.

"The cause of the kidney failure and the side effects of prior treatments are often disregarded," O'Shaughnessy said. "All these patients receive the same kind of generic treatment approach: a transplant or dialysis. The original cause of kidney failure is not usually taken into account."

O'Shaughnessy set out to research whether it might be more beneficial to

tailor treatment plans individually for kidney failure patients. For example, a patient with a high risk for infections may benefit from a certain type of vascular access for dialysis, or a patient at increased risk for cancer may benefit from more regular cancer screening before and after kidney transplantation.

Subtype of disease matters

In a resulting study, published online June 19 in the *Clinical Journal of the American Society of Nephrology*, O'Shaughnessy and colleagues used big data to determine that mortality rates for patients whose kidney failure was attributed to glomerulonephritis vary significantly according to which subtype of the disease they had. These results suggest that treatment plans should vary according to root causes of kidney failure, she said.

"We showed that a patient's cause of kidney failure is strongly associated with their risk of dying after starting dialysis or receiving a kidney transplant," she said. "This suggests that the cause of kidney failure should not be forgotten even after a patient's kidneys fail; instead, treatment should be tailored toward disease-specific risks, and research should be carried out to determine why these survival disparities exist."

Researchers examined data from 84,301 patients who, between 1996 and 2011, suffered end-stage kidney disease attributed to one of the six major glomerular disease subtypes.

"We followed these patients to see what their survival was like," O'Shaughnessy said. "We observed quite significant differences in survival."

Results showed that the specific type of glomerular disease determined how long a patient lived after developing kidney failure. For example,

mortality ranged from 4 percent per year for patients with the subtype IgA nephropathy to 16 percent per year for patients with the subtype vasculitis. After adjusting for various differences among patients—such as their age, whether they had diabetes or had received a kidney transplant—the researchers found that patients with lupus nephritis were almost twice as likely to die as patients with IgA nephropathy.

"When you divide patients according to their glomerular disease subtype, you actually see a whole spectrum of outcomes," O'Shaughnessy said.

Kidney failure in children

Glomerulonephritis is the leading cause of kidney failure in children. It is most commonly an autoimmune disease that is characterized by inflammation of the glomeruli, tiny blood vessels in the kidneys that remove waste and excess fluids from the body. But each of the many glomerular disease subtypes is unique. In certain subtypes, the immune system attacks the kidneys; in others, it damages the blood vessels.

As a result, the various subtypes are treated using different methods before the kidneys begin to fail. The treatments may include steroids or stronger immunosuppressant medications. The resulting side effects can range from severe infections to diabetes to cancer.

"The rest of the body, apart from the kidneys, has had different degrees of damage from the disease itself and the types of treatments it has undergone prior to kidney failure," O'Shaughnessy said. "When the patients get to dialysis or have a kidney transplant, it's still important for us to remember that"—and to treat accordingly.

O'Shaughnessy thought about this when she was making her rounds as a new physician caring for young patients on dialysis.

"It occurred to me that when I saw those patients, they weren't telling me how they're worried about the fact that they've got glomerular disease," she said. "When I saw them at the clinic or at the dialysis center, they were bothered by the fact that they were getting infections or cancer, or developing other side effects from their medications."

It's important to know why one kidney patient does well and another does poorly, she said. If physicians take into consideration what caused the kidneys to fail in the first place and what types of treatments patients received prior to kidney failure, it could possibly improve the patients' quality of life or increase their life span, she added.

Wolfgang Winkelmayer, MD, a former Stanford faculty member who is now professor of nephrology at Baylor College of Medicine, is senior author of the study. Other Stanford authors are Maria Montez-Rath, PhD, research associate, and Richard Lafayette, MD, associate professor of nephrology.

Provided by Stanford University Medical Center

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