UW Health, UW-Madison School of Medicine and Public Health: Innovative clinical trial targets recurrent BK infection in kidney transplant recipients

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MADISON, Wis. – Kidney transplant patients like Tessa Adolph, from Rockford, Illinois, face an age-old problem to protect their new kidney and bodies after transplant surgery: how to prevent infections while also safeguarding their new kidney from damage or rejection.

In Adolph's case, the risk came from the BK virus.

At 19, she was diagnosed with Henoch-Schönlein purpura, a rare condition that causes small blood vessels in the body organs, including kidneys, to become inflamed and bleed. This transitioned into a condition called IgA nephropathy, or Berger's disease, that over time can cause kidney scarring and eventual kidney failure, she said.

People with IgA nephropathy produce too much of an antibody that the body uses to protect itself from disease-causing pathogens. In most cases, the condition develops over decades, but Adolph's condition was extremely aggressive and after two years her kidney function was down to about 7%. She had to undergo kidney dialysis for seven months while she waited for a kidney transplant.

"We tried many things to treat it, even chemotherapy and I lost all my hair, but in the end, I needed a transplant," she said.

Her mom donated a kidney and through a process called paired kidney exchange, Adolph was able to get a new kidney. Then, a new problem arose, or more precisely, reawakened – the BK virus.

The BK virus causes symptoms similar to a common cold, and most people are infected with this virus at a young age. The human immune system typically fights it off, but the virus continues to linger quietly in the body. The immune system usually keeps it in check, but during transplantation, medications are used to suppress the activity of the immune system to keep the body from rejecting the transplanted kidney.

While immunosuppression is necessary to protect the new organ, it comes with a tradeoff: dormant viruses like BK can start to proliferate, according to Dr. Sandesh Parajuli, transplant physician, UW Health, and associate professor of medicine, UW School of Medicine and Public Health.

“We walk this balance between preventing infection and causing damage to the kidney or outright rejection,” he said. “But there just haven’t been many good options for treating BK reinfection.”

Traditionally, no antiviral drugs have been effective for fighting BK reinfection, and some are even harmful to new kidneys, without much benefit, so Parajuli felt there had to be a better option, he said.

One solution was made possible by the Program for Advanced Cell Therapy, or PACT, at UW Health and the UW School of Medicine and Public Health. The program conducts clinical trials examining cytomegalovirus reinfection in bone marrow transplant patients and other cell therapy trials. Parajuli thought a similar path could be tried with BK.

Earlier this year, he collaborated with PACT to launch a first-of-its-kind phase 1 trial using T-cells – a type of immune system cell – donated from a close relative of Adolph to treat the infection. T-cells used for this procedure are collected from donor blood, and those that target BK specifically are purified for transfusion at PACT’s manufacturing laboratory at University Hospital.

It takes six hours to prepare the T-cells. Once they are ready, they are infused into the patient to treat the infection.

Adolph's care team had struggled to contain her BK infection despite multiple treatments, and she eventually had to go back on antiviral drugs, she said. So, in March, Adolph decided to become the first person to enroll in the trial, using cells donated by her father.

"I was like, 'yeah, I'm down,'" she said. "At that point, I was just tired of dealing with these things."

Like other PACT cell therapies, a significant advantage of these approaches is a very low risk of side effects other than possible injection site irritation because the treatments use the body's own immune system to fight off the virus, according to Parajuli.

During the five-minute injection, Adolph felt a little dizzy, but experienced no lasting side effects, she said.

The goal of a phase 1 trial is to determine what dose is safe for patients to take. Establishing how well a drug or device works comes in later trial phases, Parajuli said.

In Adolph's case, the drug had an initial impact but did not effectively fight off the BK infection. However, phase 1 data are critical for future studies, and she is still glad she participated, Adolph said.

"I'm hoping my participation helps someone else down the road," she said.

Parajuli hopes to enroll 20 patients. Given the hundreds of kidney transplant patients UW Health cares for in a year, there will be no short supply of potential participants, he said.

The trial is free for participants, however, the cost of undertaking the trial is significant, he said.

"These are incredibly expensive trials, and we are looking for assistance in the form of private donations, biotech industry support and the like, but the potential of this treatment will keep us working to make this a reality," Parajuli said. "Kidney transplant patients deserve to have another option to treat BK reinfection."

A recorded interview with Parajuli is available, and he and Adolph are available for a limited number of interviews today.