A new treatment eases patient's life-altering seizures

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Joey Mapp

At age 28, Joey Mapp had almost given up hope that his seizures would ever subside.

The half-dozen anti-seizure medications he was prescribed by various doctors only made him feel groggy and depressed. A nerve stimulator implanted near his collarbone was supposed to prevent seizures by sending regular, mild pulses of electrical energy to his brain, but that didn't work either.

The sudden and unpredictable attacks that knocked him unconscious and sent his body into violent convulsions prevailed through every attempt to stop them. "It was happening so often that I couldn't get my job done," Mapp said.

He stepped down from his position as a welcome desk receptionist in November, around the same time his wife, Megan, lost her job. Their son, Grayson, had just turned 1 year old. "The world seemed like a very dark place because of what seemed to be constant bad things happening," Mapp said. "Having the seizures and not being able to take care of my son really brought me down."

The Powhatan resident had been through a revolving door of neurologists since his seizures started when he was 15, but it wasn't until he came to Virginia Commonwealth University Medical Center late last year that his faith was restored in finding a treatment that worked.

At VCU Medical Center, Mapp was referred to Soundarya Gowda, M.D., who is the associate director of the Adult Neurology Residency Program at VCU School of Medicine. She told him about a new device recently approved by the Food and Drug Administration. The implantable monitor called a NeuroPace identifies when a seizure is about to happen and administers an undetectable level of electrical stimulation directly to the brain to stop the seizure before it occurs. The device doesn't stop the seizures completely, but it slows them down.

"I was at the point where I just wanted to get back to my regular life,"

Mapp said. "If this could at least stop some of the seizures, I'd be happy."

On Dec. 18, Mapp became the first Virginia patient to receive NeuroPace since it was approved by the FDA. Mapp's doctors knew the procedure was his best chance at getting his life back, so they worked together to get him the care he needed.

A group effort

Before Mapp met Gowda, doctors had suggested the seizures originated in the back of his brain where a tumor had been removed when he was 9 years old. However, Gowda didn't make any assumptions. She recorded Mapp's brain waves using a painless technique called an EEG, which tracks electrical activity along the scalp. The results indicated his seizures actually originated on his left side, where all of his memory was stored.

"If we had taken it out, we would have significantly affected his memory," Gowda said. Since they couldn't simply remove the part of the brain causing the seizures, they needed another solution.

Mapp's neurologists, neurosurgeons and neuropsychologist met to discuss alternatives.

"We took the time before the surgery to get the use of the NeuroPace implantation approved," said Kathryn Holloway, M.D., professor in the Department of Neurosurgery, VCU School of Medicine. "We knew we had to get it done."

Shock circuit

Sometimes described as a pacemaker for the brain, the NeuroPace helps lessen the frequency and severity of epileptic seizures.

It includes a battery-powered device – about a third of the size of an iPhone – that is implanted into a small pocket in the skull created by surgeons. Two wires with several electrodes that are connected to the device are placed on the part of the brain where doctors believe a patient's seizures originate. When the device detects abnormal electrical activity in the brain, it delivers an imperceptible pulse of electricity to normalize the activity before the patient can sense the oncoming seizure.

"It's like having a shock circuit in the brain," Gowda said. "When you shock the shock circuit, two negatives will cancel each other and it stops the seizure from spreading."

After the surgery, doctors use a programmer to noninvasively adjust the device's settings to customize therapy for each individual. Patients are also given a wand to wave over their head each night. The wand collects data from the brain that is uploaded onto a special laptop doctors can remotely access and monitor.

"The first thing we do after the procedure is gather information about [the patient's] seizures from the device and then craft a way to stimulate the brain to stop it," Holloway said. "It's an iterative process to get the seizures to stop."

About 350 U.S. patients have received the NeuroPace at 53 sites in the country. In a clinical study, 55 percent of patients had their seizure frequency reduced by 50 percent or more over a two-year period.

Providing help

Since he had the surgery in December, Mapp has only had a few small

seizures that were cut short by the NeuroPace device.

"I feel like I'm refueled with confidence," he said, adding that he is starting to look for work.

"If we stop his convulsions, he can easily get a job again," Gowda said. "That's a big deal."

She is in the process of getting another patient scheduled for the surgery and she expects many more to be helped by the NeuroPace at VCU Medical Center.

"This is going to allow us to provide help for patients that previously we couldn't help," Holloway said. "Even patients that we've seen in the past and said, 'Sorry we can't help you,' once we have this approved we'll be looking at them again and saying, 'We might have something to offer you.'"

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