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Waiting with Ablated Breath: Is This the Cure for Ventricular Fibrillation?

Novel procedure developed at UC San Diego Health uses targeted ablation to potentially solve life-threatening cardiac issue for thousands of Americans

Sudden cardiac arrest kills an average of 350,000 Americans per year — more than lung cancer, breast cancer and HIV/AIDS combined, according to the American Heart Association. And a common cause of cardiac arrest is a condition called ventricular fibrillation or VF, in which the heart beats erratically, preventing a steady, healthy pumping of blood.

Patients who suffer from VF live in constant fear of triggering a cardiac event, which can only be treated with an automated external defibrillator and which can become fatal in a matter of seconds. But a new procedure developed at UC San Diego Health is now presenting an alternative: a curative procedure.

David Krummen, MD, cardiac electrophysiologist at UC San Diego Health and professor of medicine at University of California San Diego School of Medicine, first developed the procedure — called Targeted Ventricular Fibrillation Ablation — at UC San Diego and the Veterans Affairs San Diego Healthcare System in 2014. The process, which combines computerized mapping of the heart muscle with targeted, precise ablation of trouble spots, immediately showed promise.

The procedure has since been performed on a handful of patients, all of whom report dramatically fewer or no VF symptoms.

“I am feeling a real level of confidence in this, and believe we have a reasonable chance now of knocking out VF completely in the right patients,” Krummen said. “I don’t think that’s a question anymore. In five years, a great deal of VF will be ablated.”

Targeted ventricular fibrillation ablation is particularly promising for patients suffering from refractory VF, in which a patient can suffer from multiple events within a 24-hour period.

“Ablations are done around the world in the ventricle every day, but VF is so disorganized that until now, no one has been able to see through the chaos and say, ‘OK, burn here,’” Krummen said. “That’s the advance we have made here at UC San Diego.”

In targeted ventricular fibrillation ablation, the patient is put under general anesthesia and the defibrillators which prevent them from going into VF are turned off. Doctors then use an electrocardiogram to make a computerized map of the heart’s own voltage.

A specialized catheter is placed into the heart via an incision in the groin, ventricular fibrillation is induced and the patient’s arrhythmia recorded for 15 seconds. The data is analyzed, providing doctors with a map of specific targets for ablation.

An ablation catheter — a thin, flexible metal tube with an electrode at one end — is used to cauterize sites in the patient’s heart where voltage is the lowest, eliminating abnormal electrical pathways.

“It’s a dramatic procedure, but once you can no longer induce ventricular fibrillation in the patient, it’s so exciting,” Krummen said.

Carrie Delaney, a retired nurse who lives in Texas, is one of those patients. Delaney developed chronic ventricular tachycardia after a severe bout of the flu, and was experiencing cardiac episodes two to three times a week. When those episodes became full-fledged ventricular fibrillation, she turned to Krummen and UC San Diego Health for help.

Delaney is one of the eight patients who have undergone the experimental treatment. She hasn’t experienced a single episode of VF since her treatment. “There has been a vast improvement in the way I feel. I feel like my heart is beating in sync now.”

She is cautiously optimistic that her condition will not return. “I’m hopeful. My situation had devastated me. This was an opportunity to both get help myself and also to advance the body of knowledge (about treating VF).”

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