NeuroPace RNS® System for Epilepsy

For select patients, UCSF offers a brain stimulator to treat seizures. The NeuroPace RNS® System is an implanted device that continuously monitors brain activity and delivers electrical stimulation to terminate seizures before they cause symptoms.

FAQs about the RNS® System

How does it work?

About one-third of patients with epilepsy have seizures that are poorly controlled with medications alone. UCSF is one of the few centers in the nation offering a new technology for treating some adults with medication-resistant epilepsy. In this new approach, a small, battery-powered device (called a neurostimulator) is surgically implanted in the skull. Wires (or leads) connected to the neurostimulator are placed in the brain at the site(s) where seizures originate. The neurostimulator continuously monitors brain activity and detects abnormal patterns of activity that could result in a seizure. When abnormal activity is detected, the neurostimulator delivers small pulses of electrical current through the leads to help stop seizures in the brain. The system is similar to cardiac pacemakers that detect abnormal rhythms and respond by delivering electrical pulses to the heart.

For certain patients, using an implanted neurostimulator to treat seizures can be highly effective, and, because no brain tissue is removed, there may be less risk than other surgical options. The RNS® System represents an exciting and much-needed therapeutic option for adult patients with seizures arising from brain regions that cannot be safely removed by surgery.

Who is a candidate?

In general, adult patients with medication-resistant epilepsy who have frequent, disabling seizures that arise from one or two brain regions are candidates for the RNS® System. A team of neurologists, neurosurgeons, and other providers with expertise in the diagnosis and management of epilepsy will determine an individual patient's suitability for this treatment.

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What are the advantages over other types of epilepsy surgery?

When seizures arise from more than one brain region, or from a single brain region that serves a critical function like speech or movement, surgical removal of the seizure-producing tissue may not be possible. The RNS® System is a good treatment option because leads can be placed in two different locations to detect and terminate seizures at these sites without removing any brain tissue. The RNS® System is reversible; the implanted device can be removed at any time. The RNS® System continuously monitors brain activity. The stored information can be used by providers to learn about a patient's epilepsy and to optimize treatment over time.

What are the potential risks or side effects?

Although implantation of the RNS® System is less invasive than traditional epilepsy surgery, which requires larger surgical exposure and removal of brain tissue, there are some risks. As with any neurosurgical procedure, there are risks of bleeding, infection, pain, and neurological deficits, though rates of these complications in clinical trials of the RNS® System were very low. There is a chance that the RNS® System will not improve seizure severity or frequency. There is also a very small chance that electrical brain stimulation will cause side effects, though the vast majority of patients do not feel the stimulation. Currently, patients with the RNS® System cannot have MRI scans due to safety considerations in strong magnetic fields.

How long will the procedure take?

The implantation procedure takes place in the operating room and lasts about 2-3 hours. Patients will spend 1-2 nights in the hospital before being discharged home.

What happens after the device is implanted?

The neurostimulator is turned on in the operating room and initially programmed to record brain activity without delivering electrical stimulation. After going home, patients can securely transmit data stored by the device to their providers through an online system. About two weeks after surgery, patients will have an outpatient clinic appointment to check wound healing and to determine whether seizures have been recorded. Device settings will be customized to detect a patient's seizures and the responsive stimulation function will be turned on. Subsequent appointments will be scheduled every 2-3 months as needed to monitor the effect of treatment and to adjust device settings.

Will my seizures be cured?

The NeuroPace RNS® System was approved by the FDA in 2013. In long-term studies, the efficacy of the RNS® System increased over time. After seven years, 72% of patients had at least a 50% reduction in the frequency of their seizures. Relatively few patients became completely seizure-free, but 29% of patients had seizure-free periods of 6 months or more.

How can I schedule an evaluation?

For patients currently being treated at UCSF Epilepsy Center, please speak with your doctor to see if you may be a candidate for treatment with the RNS® System.

If you are not a current patient at UCSF Epilepsy Center but would like to find out if you might be eligible for treatment with the RNS® System at UCSF, contact Patient Navigator Erica Terry at 415-353-2241 or at Erica.Terry@ucsf.edu. An epilepsy specialist may review your medical records to determine whether you are a candidate and if you need further evaluation.

More information about the RNS® System can be found online through the device manufacturer's website: http://www.neuropace.com.