

Redefining and Treating Refractory Epilepsy

New approaches to quelling the storms



Even one seizure a month keeps patients at higher risk for injury and sudden death – and impacts social and emotional well being. Patients who continue to have seizures after **two** failed medication attempts should be considered drug-resistant or refractory cases. To reduce risk and improve quality of life, patients should be referred to a specialized epilepsy clinic.

New Methods for Treating Refractory Epilepsy

Specialists in the Sutter Health network offer research guided surgical techniques that help refractory epilepsy patients reach the appropriate goal: zero seizures.

High-Density EEG “Maps” and Monitors Brain Activity

Sutter network epileptologists were the first to use novel neuroimaging techniques such as a high-density electroencephalogram (EEG). This technology can locate precisely where seizures originate in the patient’s brain.

HOW IT WORKS:

- *The brain’s electrical activity is recorded from 250+ electrodes.*
- *Recordings are combined with a high-res MRI to localize the focus.*
- *Precision images are used to remove the section causing the seizures.*



Epilepsy care should aim for **ZERO seizures**

“If we pinpoint that abnormal area, we can remove a smaller portion of the abnormal brain tissue and therefore decrease the risk of serious complications from the surgery,” says Kenneth Laxer, M.D., a neuroimaging specialist and researcher in the Sutter Pacific Medical Foundation Epilepsy Program at Sutter’s California Pacific Medical Center (CPMC).

Neuromodulation to Prevent Seizures

Neuromodulation is a technique that stimulates the brain or nerves with electrical pulses. The approach may be used as an alternative to traditional epilepsy surgical techniques or can be used with them. The three different types of neuromodulation all work by stimulating seizure-related brain circuits to prevent or halt seizures.

TYPES OF NEUROMODULATION:

- *Deep brain stimulation (DBS)*
- *Responsive neurostimulation (RNS)*
- *Vagal nerve stimulation (VNS)*

Peter Weber, M.D., Director, Surgical Epilepsy Program at CPMC, was instrumental in FDA approval of the Responsive Neurostimulation System® (RNS) developed by NeuroPace. Similar to a pacemaker that monitors and responds to heart rhythms, the RNS® System is a medical device implanted in the skull that monitors and responds to brain activity to help prevent seizures.



50-70%
of patients
who undergo
focal resection
may become
seizure free.

“We see patients remain seizure free for extended periods of time after implantation and many see a 70-80% reduction in seizure frequency,” says Peter Weber, M.D., Director, Surgical Epilepsy Program at CPMC. The RNS® System plus medication-based treatment is usually superior to standard medical management alone.



Anticonvulsants That Target the Epicenter

To understand the nuances of a seizure, researchers study the brain cells (neurons) that misfire and cause the underlying electrical storm. Antiepileptic drugs (AEDs) are designed to modify the way neurons “fire” and how they communicate with each other and the brain’s network, thereby stopping or preventing seizures.

Sutter network researchers participate in a number of clinical trials testing new AEDs. For example, our researchers at Sutter are currently testing a new anticonvulsant that acts on potassium-gated channels so that the neuron becomes “hyperpolarized” and less susceptible to rapid firing. Our California Pacific Medical Center’s epilepsy program is the only center in Northern California evaluating this new anticonvulsant.

Advances in Laser Ablation Surgery

Laser ablation is an advanced surgical technique developed to treat the brain areas of seizure onset. Less invasive than traditional surgery, laser ablation typically allows for quick recovery times, involves little pain and causes minor tissue disruption and unintended side effects.

“We’re one of the few networks nationwide that performs this surgery for both pediatric and adult patients,” says Michael Chez, M.D., a pediatric neurologist and epileptologist and the Sacramento Regional Director of Pediatric Epilepsy and Research at the Sutter Neuroscience Institute.



110+
**laser
ablation
surgeries**

performed at Sutter
Medical Center,
Sacramento.

About Sutter Health Epilepsy Services

The Sutter Health network offers comprehensive epilepsy centers and highly-trained epileptologists participating in new research that guides and informs the care they provide. Multidisciplinary epilepsy care and research is complemented by expertise from Sutter Health network neuropsychologists and other specialists.

To refer a patient, call (855) 421-2904.



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