

Minimally Invasive Epilepsy Surgery

Patient Referral Pathway to Minimally Invasive SEEG



Neurosurgery is often the only available curative option for drug-resistant focal epilepsy, but identifying good surgical candidates remains a challenge. Many patients who could benefit from surgery are missed or never referred for surgical evaluation, while others may see multiple specialists and undergo highly complex evaluations before determining whether surgery is an option.*

What is the patient pathway to brain surgery for epilepsy, and how can a minimally invasive approach utilizing ROSA® for neurosurgery play a role?

Step One: Patient experiences seizures, and sees a neurologist in his/her community. Frequently, the patient is treated with anti-seizure medications.

Step Two: After seizures are difficult to control with medications, the neurologist determines that a patient's epilepsy is resistant to management with anti-seizure medications.

(Utilizing guidelines from the International League Against Epilepsy, this is the failure of sustained seizure control following adequate trial of two appropriate antiepileptic medications).

Step Three: The patient may then be referred to a comprehensive epilepsy center (most often a Level III or Level IV center following AANS guidelines) for evaluation of additional treatment options. The referral decision is impacted by many factors, including the neurologist's risk vs benefit assessment, the proximity of a Level III or Level IV center, and the patient's desire for further evaluation.

Step Four: The patient undergoes further testing and evaluation, often including:

- ~ **Further MRI** imaging (may be a higher resolution than the original MRI, if MRI was previously utilized)
- ~ **Functional MRI (fMRI)**
- ~ **Long-term monitoring** in the Epilepsy Monitoring Unit (EMU) using scalp electrodes
- ~ **WADA testing**
- ~ **Neuropsych** evaluation

Step Five: A multi-disciplinary patient management review is conducted by the neurologist and neurosurgeon, to determine potential treatment options for the patient

Step Six: Based on testing results and patient review, minimally invasive SEEG is performed with ROSA®, to implant depth electrodes for further evaluation of the patient's seizures, and location of seizure foci.

Step Seven: Based on the findings, a plan of action is developed, and may include the following treatment options for the patient:

- ~ **Minimally invasive** ablation of the seizure epileptogenic foci
- ~ **Resection** of the areas of the brain where seizures originate, if appropriate
- ~ **Placement of leads** for RNS in or near the points of seizure origination to disrupt seizure activity
- ~ **Additional SEEG** monitoring

For additional information on the efficacy and safety of ROSA® for neurosurgical procedures, the following publications review ROSA® for SEEG:

González-Martínez J1, Bulacio J, Thompson S, Gale J, Smithason S, Najm I, Bingaman W. Technique, Results, and Complications Related to Robot-Assisted Stereoelectroencephalography. *Neurosurgery*. 2016 Feb;78(2):169-80. doi: 10.1227/NEU.0000000000001034.

Turning to SEEG for Pediatric Patients with Refractory Epilepsy: Growing experience supports procedure's safety and efficacy; *Cleveland Clinic Online Publications*, Mar. 13, 2015; consultqd.clevelandclinic.org/2015/03/turning-to-seeg-for-pediatric-patients-with-refractory-epilepsy/#menu

* Introducing the Epilepsy Surgery Nomogram: An Unprecedented Tool for Individualized Outcomes Prediction, *Cleveland Clinic Online Publications*, Oct 28, 2015