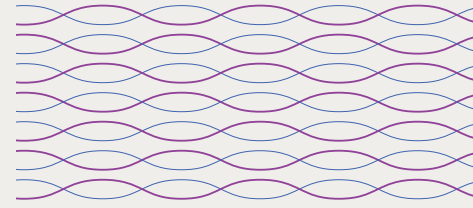


Pediatric Neurosurgery Patient with Intractable Focal Epilepsy



The patient is a 16-year-old male with no known seizure risk factors who was diagnosed with focal epilepsy at age 13. He had an average of 10 focal aware seizures per day, but sometimes as many as 50. His seizures quickly became intractable, and he failed treatment with levetiracetam, oxcarbazepine, lacosamide, and perampanel, and thus was referred to Jorge González-Martínez, MD, PhD, FAANS, for a surgical evaluation.

DIAGNOSTIC TESTING

Interictal EEG: Frequent polyspikes and sharp waves left frontotemporal

Ictal EEG: 7 seizures recorded with onset in the left frontotemporal region

MRI: Normal

MEG: Tightly clustered dipoles over the left anterior peri-Sylvian region (pars triangularis and pars orbitalis) and anterior insula

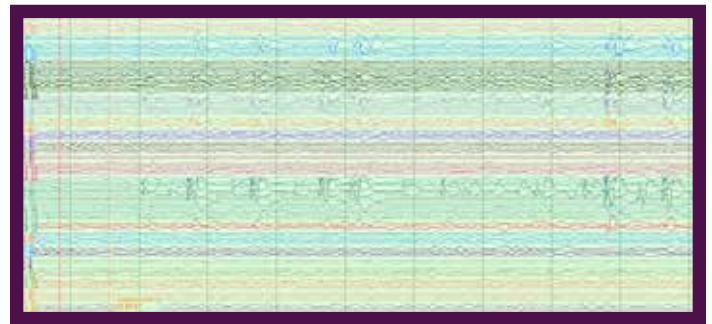
PET, ictal SPECT, fMRI, and neuropsychological testing: Performed without significant findings.

SURGERY: SEEG

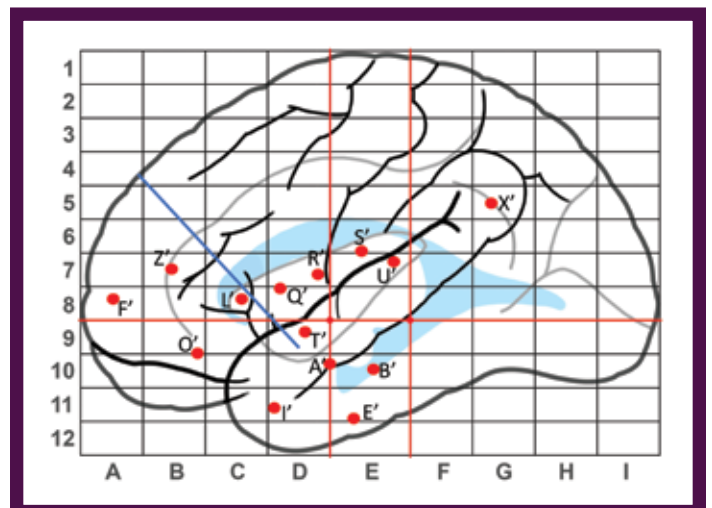
The patient's case was presented at the multidisciplinary patient management conference, and the group concluded that he had intractable focal epilepsy with the epileptogenic zone likely in the left frontotemporal region. He underwent SEEG. 15 electrodes were implanted into the left frontotemporal region targeting the anterior peri-Sylvian region, anterior insula, frontal and temporal poles, mesial temporal structures, and cingulate.

Interictal: Frequent spike and wave discharges seen at contacts Y' 3-5 (anterior insula) with close spread to L'2-3 (anterior insula).

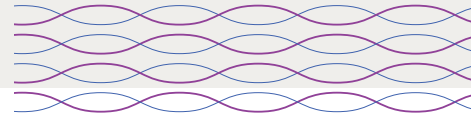
Ictal: Numerous electrographic and electroclinical seizures were captured with a frequency of up to 1-4 per hour. Electrographic onset began with a burst of high amplitude spike and wave at Y'3-5 (anterior insula) followed by a brief voltage attenuation and then rhythmic evolution in frequency and amplitude of spike and wave at those contacts and closely involving L'1-6 (anterior insula) and to a lesser extent O'7-12 (pars orbitalis).



EEG showing seizure onset.



SEEG implantation scheme.



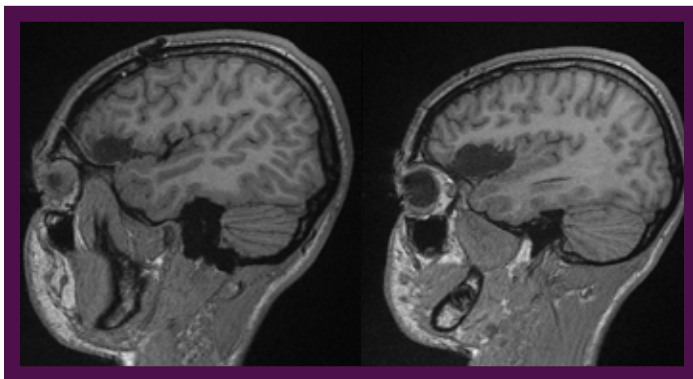
SURGERY: CRANIOTOMY

The patient management conference met again to review the SEEG results. The group concluded that the epileptogenic zone included the anterior insula and frontal operculum (pars orbitalis and pars triangularis). Dr. González-Martínez and his surgical team performed a craniotomy for resection of this region. Intra-operative electrocorticography (ECOG) was performed, and prior to the resection, it showed nearly continuous spikes and polyspikes in the anterior insula and pars orbitalis.

Following the initial resection of pars orbitalis, pars triangularis, and the anterior insula, this epileptiform activity decreased but still persisted. The resection of the insula was extended more posteriorly, and the post-resection ECOG showed normal physiologic activity without epileptiform discharges.

OUTCOME

As of this printing, the patient has been seizure free since his surgery in May 2021 (Engel Class 1). He has gradually weaned off his antiepileptic medication, and a 24-hour ambulatory EEG did not capture any seizures or epileptiform discharges.



Sagittal T1 MRI showing the resection of the frontal operculum (left) and anterior insula (right).

MEET THE EXPERT



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PATIENT REFERRALS

For referral information, call **412-647-3685**.