EDITORIAL

When in doubt, should we still cut it out?

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“WHEN in doubt, cut it out.” You probably heard this mantra many times prior to finishing medical school, if not intern year. While this may be best applied to tumor surgery, and/or a copywriter's rough draft, whether or not it applies to epilepsy surgery has yet to be seen. Five years ago, the question was posed, “Why is there still doubt to cut it out?”² Despite the American Academy of Neurology recommending epilepsy surgery evaluations for patients with drug-resistant epilepsy (DRE), with superior outcomes, only a minority of patients were being referred. Among the potential barriers preventing DRE patients from being referred to epilepsy surgery centers, they uncovered a persistent fear surrounding the safety and efficacy of epilepsy surgery. Over the past decade, novel therapies have revolutionized epilepsy surgery. We can now pinpoint epileptogenic foci with increasing accuracy using minimally invasive intracranial EEG recordings (stereo-EEG or SEEG), often with robotic guidance. In parallel, magnetic resonance–guided laser interstitial therapy (MRgLITT) was developed as a minimally invasive technique to target and ablate epileptogenic foci. Coupled together, these technologies synergistically provide hope for patients with DRE who previously were not considered surgical candidates due to the inability to localize their epilepsy, risks associated with the surgical treatment of a deep and/or eloquent location of the epileptogenic focus, or the fact that they and/or their patients and families would not consider surgical treatment because of the possible morbidity. In this way, these technologies are closing the treatment gap in children with DRE. This now raises the question, when in doubt, should we be cutting it out—or ablating it?

The Visualase (Medtronic) thermal ablation system was approved by the FDA in 2007, followed by the NeuroBlate (Monteris Medical) MRI-guided laser ablation system in 2013. Using proprietary software, both systems aid the surgeon in creating a surgical plan to ablate a de-

sired target and epileptogenic zone, in conjunction with live feedback of the tissue ablation and monitoring of the surrounding tissue. In 2012, Dr. Daniel Curry published the first case series of MRgLITT in pediatric epilepsy, treating 2 hypothalamic hamartoma patients, and 3 patient with focal cortical dysplasia, mesial temporal sclerosis, and cingulate tuber due to tuberous sclerosis (1 case of each), with encouraging albeit early results.¹ Miami Children's Hospital followed with their results for MRgLITT in 2015, treating primarily focal cortical dysplasia (12 of 21 lesions), but including 5 patients with tubers associated with tuberous sclerosis.⁴ They demonstrated a 47% rate of Engel class I/II outcomes. As MRgLITT was proving to be a safe and effective treatment option, the applications expanded, including corpus callosotomy.³ Dr. Tovar-Spinoza published the first series of pediatric brain tumors treated with MRgLITT in 2016.^{5,6}

Previously, patients with multiple epileptogenic foci (e.g., in tuberous sclerosis) had been excluded from epilepsy surgery, even when they had DRE. Although over 80% of patients with tuberous sclerosis have DRE, only about one-third of these patients become surgical candidates. In this case series, Dr. Tovar-Spinoza demonstrates the potential of MRgLITT to treat cortical tubers in single or staged approaches for children with DRE.⁷ Lesionectomy and tubectomy, including ablation of the perituberal area, achieved seizure freedom in over 50% of patients with a mean follow-up of 19 months. Furthermore, MRgLITT offers the possibility of surgical treatment as early as the epileptogenic focus or tubers are identified without excluding the option for further MRgLITT if other tubers become active in the future. The major benefit of minimally invasive procedures is the reduction in the morbidity associated with open surgery, as this specific case series reported no complications. Unfortunately, there is little data on complications in children treated with MRgLITT.³

These promising results ensure a place for MRgLITT in the armamentarium of every pediatric neurosurgeon. As we go forward, prospective multicenter studies are critically needed to define the optimal candidates for MRgLITT and timing of the procedure(s), analyze the durability of short and long-term outcomes, and better define potential complications. Only then will we know which patients and lesions may be best suited for open surgery versus ablation.

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Disclosures

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