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Minimally Invasive Epilepsy Surgery

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Refractory seizures in patients with epilepsy are associated with significant morbidity, cognitive decline, and premature death. For many patients, surgery may be the most promising option for becoming seizure free. As such, both the American Academy of Neurology and the American Association of Neurological Surgeons have released guidelines recommending a comprehensive evaluation for surgery in patients with medically refractory epilepsy.

The potential benefits of surgical intervention in patients with medically refractory epilepsy have been clearly established, particularly for patients with temporal lobe epilepsy. Class I evidence has demonstrated that anterior temporal lobectomy is superior to medical management in obtaining seizure freedom in patients with mesial temporal sclerosis. Multiple studies have supported these findings and have shown that surgical resection in these patients can result in seizure-freedom rates up to 60% to 80% after 2 years, and up to 50% at 10 years following surgery.

Unfortunately, despite the potential benefits offered by surgical intervention in patients with medically refractory epilepsy, surgery is vastly underutilized. There are a number of possible reasons for this. Despite the fact that many studies have documented the relatively low morbidity of epilepsy surgery, it is still largely viewed as an invasive and risky treatment option among epileptologists and neurologists and is often only recommended as a treatment of last resort. Furthermore, particularly in cases of extratemporal lobe epilepsy, the benefits of surgery are still not clearly established. In these cases, surgical intervention may actually require two procedures, one for the placement of intracranial electrodes for proper localization of seizure activity and identification of eloquent cortex and a second for resection of epileptogenic tissue. Hence, in these cases, there is additional risk, without guaranteed benefit.

In this special issue of the *Neurosurgery Clinics of North America*, we have chosen to highlight recent advances in epilepsy surgery that begin to address these outstanding issues and concerns. We have curated a collection of articles from respected leaders of the field presenting their work describing minimally invasive surgical techniques for epilepsy. Although broadly grouped together under this common theme, the articles selected here in fact span minimally invasive open surgical procedures, ablative procedures, shifting trends in

invasive monitoring, and the role of neuromodulation for epilepsy. These approaches represent exciting and novel developments in epilepsy surgery aimed at minimizing the associated morbidities of surgical intervention while capitalizing on surgery's potential benefits for patients with medically refractory epilepsy.

Biographies

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