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The persistent under-utilization of epilepsy surgery

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Epilepsy surgery; Temporal lobe epilepsy; Trend; Under-utilization

I would like to thank Kaiboriboon and colleagues for their manuscript entitled “Epilepsy Surgery in the United States: Analysis of Data from the National Association of Epilepsy Centers,” recently published in *Epilepsy Research* (Kaiboriboon et al., 2015). The authors utilized data from the National Association of Epilepsy Centers (NAEC) to examine recent trends in epilepsy surgery in the United States. Interestingly, while the number of admissions to Epilepsy Monitoring Units at these centers doubled between 2008 and 2012, the rate of epilepsy surgery actually declined over that time period. The annual rate of anterior temporal lobectomy (ATL) for mesial temporal lobe epilepsy (TLE) decreased by approximately two-thirds between 2008 and 2012, while the number of extra-temporal resections increased during that time. Surprisingly, the number of extra-temporal resections performed at epilepsy centers has actually exceeded that of ATLs in recent years, despite a higher rate of TLE patients with intractable seizures.

A major implication of this study is that epilepsy surgery remains significantly under-utilized, particularly for TLE patients. This is despite two randomized-controlled trials demonstrating the efficacy of resection in individuals with drug-resistant TLE (Engel et al., 2012; Wiebe et al., 2001), joint guidelines recommending referral of patients with intractable seizures for surgical evaluation (Engel et al., 2003; Labiner et al., 2010), and mounting evidence demonstrating significantly lower morbidity, mortality, and cost associated with epilepsy surgery compared to ongoing medically refractory seizures (Begley et al., 2002; Choi et al., 2008; Engel and Wiebe, 2012; Englot and Chang, 2014). Previous studies utilizing the Nationwide Inpatient Sample (NIS), performed by the authors of the present article and by our own group, have demonstrated stagnant rates of epilepsy surgery despite an increasing burden of disease (Englot et al., 2012; Schiltz et al., 2013), and this updated report utilizing NAEC data suggests that the problem persists.

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In TLE, newer generation medications have not substantially altered the proportion of patients who are medically refractory, and thus surgical candidates (Choi et al., 2011; Prunetti and Perucca, 2011). So, an important question is: Where are the temporal lobectomies going? Are these patients receiving vagus nerve stimulation (VNS), or other palliative procedures, instead of resection? While VNS is an important treatment option for patients who are not candidates for resection, the rate of seizure-freedom with VNS (8–10%) remains significantly lower than that with ATL (60–80%) (Engel et al., 2012; Englot et al., 2011, 2013a; Wiebe et al., 2001). Or alternatively, are ATLs being performed at community hospitals with low surgical volume instead of comprehensive epilepsy centers?

In a follow-up investigation to our aforementioned NIS study, we specifically examined epilepsy center trends by center volume, and found that while fewer epilepsy surgeries are indeed being performed at large-volume centers, an increasing number are being done at low-volume community hospitals (Englot et al., 2013b). Since these hospitals would not be included in NAEC data, this tendency may explain the drop in ATLs in Kaiboriboon and colleagues' present study. If this trend is accurate, it poses several problems. First, it is likely that these low-volume centers do not have the resources required to be a level 3 or 4 epilepsy center, including a comprehensive team of neurologists, neurosurgeons, neuropsychologists, and neuroradiologists who are experts in epilepsy care, and the capability for invasive seizure mapping. Next, we have reported that a significantly smaller percentage of epilepsy patients who receive care at low-volume centers actually undergo resection, and when they do have surgery, the complication rates are twice that of high-volume epilepsy centers (Englot et al., 2013b).

It is possible that the landscape of epilepsy surgery will change somewhat in the setting of newer treatment technologies. However, neuromodulation-based treatments with device implantation remain palliative, as complete seizure-freedom rates are low, and while early data regarding laser ablation for mesial TLE appear promising, long-term outcomes are not yet known (Chang et al., 2015). The important message to practitioners and patients has been and still remains that individuals with epilepsy who have failed two or more anti-epileptic drug regimens should be referred to a comprehensive epilepsy center for multidisciplinary evaluation by a team of experts.

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