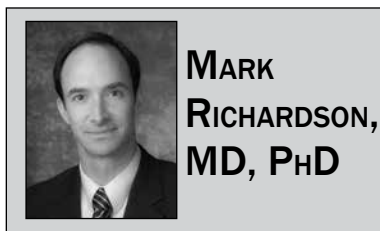


Functional neurosurgery for improving quality of life

Functional neurosurgery describes a field of elective procedures whose goal is to improve a patient's quality of life. Two primary specialties within functional neurosurgery are surgery for epilepsy and surgery for movement disorders. Because these surgeries are not considered life saving, they unfortunately often are thought of as last resorts, only to be used after years, and sometimes decades, of exhaustive medical therapy. This outdated way of thinking likely is a barrier for many patients to learn about the potential role of brain surgery in the treatment of their epilepsy, Parkinson's disease (PD), essential tremor or dystonia.

Surgery for epilepsy is the only potential cure for cases that are refractory to medication. This process encompasses both the implantation of recording electrodes to map the seizure focus (when this cannot be determined noninvasively) and the resection of the seizure focus, in patients who are not adequately treated by medication and who meet other qualifying criteria. It has been over a decade since a landmark randomized controlled trial demonstrated the superiority of surgery for drug-resistant temporal lobe epilepsy over the continuation of medical treatment alone. At that time, it was estimated that although approximately 200,000 patients in the United States with temporal lobe epilepsy could benefit from surgery, only 1,500 surgeries



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were performed each year. Since then, the preponderance of evidence has continued to support the Class I data published in 2001: Freedom from significant seizures occurs in approximately 66 percent of drug-resistant temporal lobe epilepsy. Yet, a recent review of data from a national hospital database showed no significant change in the percentage of temporal lobe epilepsy patients receiving temporal lobectomy over time, between 2001 and 2008, despite an increase in the number of hospital admissions for this disease.

While approximately 15 percent of patients with epilepsy may benefit from a diagnostic or therapeutic surgical intervention, patients continue to be referred for surgical treatment an average of two decades after onset of seizures, which is much too late to avoid many irreversible disabilities. In fact, greater and more permanent benefits are obtained the earlier surgery occurs in the disease course. The underutilization of surgical treatment is alarming, especially given that seizure surgery is safe: Significant morbidity following surgery occurs in only 3

percent of patients, while most patients experience improvement in their quality of life and overall IQ scores. Because surgery is the only potential cure for medically refractory epilepsy, both the American Academy of Neurology and the International League Against Epilepsy recommend that patients with epilepsy who have failed to achieve seizure freedom after adequate trials of two tolerated, appropriately used antiepileptic medications should be referred to an epilepsy surgery center.

Surgery for movement disorders primarily involves the implantation of deep brain stimulating (DBS) electrodes in patients who are not adequately treated by medication and who meet other qualifying criteria. Randomized, double-blinded studies have provided Class 1 evidence that DBS is better than most medical management for patients with both advanced Parkinson's disease (PD) and in Parkinson's disease with early motor complications. Nonetheless, many patients with PD have never heard of DBS, despite the fact that symptoms can improve in appropriately selected patients by 40 to 60 percent and that the risk of permanent neurological deficit from DBS surgery is only 1 percent. DBS is even more efficacious in the treatment of essential tremor, to the degree that no double-blinded, randomized trial will ever occur because appropriate

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candidates who pursue DBS would never agree to be randomized to the medical arm. With regard to dystonia, multicenter, double-blinded studies also have shown that DBS produces an average improvement in symptoms of >50 percent in generalized dystonia, with smaller studies demonstrating efficacy in focal and segmental dystonias. Yet dystonia patients often undergo many years of unsatisfactory response to medication and botulinum toxin without ever having heard of DBS.

How can these discrepancies between surgical efficacy and utilization be explained? Several factors play prominent roles in prohibiting patients from accessing neurosurgical consultation. First is the concept of whether symptoms of these neurological diseases are “controlled.” Technical definitions aside, it is most important to listen to the patient. The extent to which a patient can maintain a normal quality of life is the best indicator of whether medications are adequately controlling symptoms. If one seizure a year pre-

vents a patient from leading the life she wants to live, then her epilepsy is not well controlled. If a movement disorder patient stops attending social functions because of his tremor, then his symptoms are not well controlled, regardless of exam findings in clinic. A second set of factors includes misunderstanding surgical risks and the appropriate time for referral.

In academic centers, the risks for functional neurosurgical procedures are quite low; in fact, this is a fundamental tenant of the subspecialty. Identifying the appropriate time to refer patients is best addressed by assessing quality of life. When disease symptoms or medication side effects prevent these patients from doing the things in life they most enjoy, it’s time to consider neurosurgical consultation. A third factor is the notion that anyone referred to a neurosurgeon is going to have an operation. Surgery for epilepsy and movement disorders is an interdisciplinary process, involving not just the surgeon but also neurologists, neuropsychologists and the patient’s

general practitioner. Since the decisions for these surgeries often are made by a multidisciplinary board, the most important role the surgeon plays initially is to provide the patient with as much objective information as possible about the role that surgery potentially may play in their treatment. Empowering patients with this information is an important way to allow them to regain a sense of control over their disease process. In this way, functional neurosurgical procedures may be used as they were intended, to improve quality of life when it counts most, and not as last resorts.

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The opinion expressed in this column is that of the writer and does not necessarily reflect the opinion of the Editorial Board, the *Bulletin*, or the Allegheny County Medical Society.

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