

Referral Patterns for Medically Refractory Epilepsy

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The surgical treatment of epilepsy is one area of neurosurgery where patients can be conclusively cured and have their lives radically changed. Based on the epidemiology (prevalence of 1%) and natural history (20%-30% intractable) of epilepsy, there are likely at least 600,000 surgical candidates in the US¹. Weibe et al² performed a randomized, controlled study in which patients were randomly assigned to a surgical or non-surgical arm; the one-year seizure free rate was 58% in the surgical group and 8% in the group treated medically. In a related study, in a two-year period, 36 epilepsy surgeries were performed, including 29 temporal lobectomies¹. Among all patients, 30/36 were seizure-free and 5 almost seizure-free; within the temporal lobectomy subgroup, 27/29 were seizure free and 2/29 almost seizure-free.

Epilepsy surgery is standard of care when medications fail. Seizure-free rates following temporal lobectomy are consistently 65% to 70% in adults and 68% to 78% in children³. Extratemporal lobectomies, which are sometimes necessary in pediatric cases, are less successful (62% in children)³. Even where the patient fails to be seizure free, the rate of seizures is usually reduced. Failure of referral to an epilepsy center, occurs too often and commonly results in delays in treatment. On average, there is a mean duration of epilepsy of 18.8 years prior to surgical intervention⁷. Previous investigations have demonstrated that the longer the duration of refractory epilepsy, the greater the deterioration to cognition and overall functional ability, especially in the pediatric population³.

One reason for the delay is the difficulty in identifying refractory patients. This phenomenon is interesting, as there is a generally accepted definition of medically intractable disease, refractory to two drugs, more than two seizures per month over two years. Unfortunately, with 24 FDA approved anti-epileptic drugs (AEDs), the concept of “medical intractability” has little practical meaning. A limited survey of neurologists⁵ found that among respondents who prescribed single drug regimens (not combinations), 52% required failure of three AEDs before declaring the case intractable, and 19% did not give up until all AEDs had been tried. Among neurologists favoring combination therapy, 77% required the patient to fail at least two combination regimens. Typically, neurologists require a six-month wait to declare the patient seizure-free². Kwan and Brodie (2001)⁶ demonstrated in a prospective study that once the patient fails the first appropriate AED trial, the chance of seizure freedom is 14% with a second drug trial, and only 3% with a third drug or with combinations.

Another factor in the delay of referral to epilepsy centers lies in the fact that many neurologists are reluctant to consider epilepsy surgery as a necessary treatment option early in the course of the disease. Among surveyed neurologists⁵, 57% required the epilepsy to last a minimum of two years before referring for surgery. The disease also had to have reached a certain level of severity: 55% required the seizures to occur at least once a month before recommending surgery. Eleven

percent did not even discuss surgery with their patients at all. In one surgical study, the authors reported¹ 14% of patients who had successfully undergone epilepsy surgery were specifically advised by their neurologists not to consider surgery as a treatment option.

A major stumbling block is the dissemination of information. In the aforementioned survey, the authors cited the Kwan and Brodie study, but pointed out that none of the responding neurologists seemed to base their determinations on the published Kwan and Brodie results⁵. Less than half of the neurologists discussed the likelihood of surgical outcomes with their patients, and in that fraction there was a uniform split between optimistic and pessimistic expectations. It should be pointed out that this split may reflect the distribution of patients seen by each neurologist. Also, 47% of the surveyed neurologists who did refer patients to specialized epilepsy centers reported a lack of appropriate clinical feedback from the surgical center, which had an understandable effect on their willingness to collaborate with the center in the future.

However, guidelines have been published on the web by both the American Epilepsy Society and the American Association of Neurologists. According to the American Academy of Neurology Practice Parameter⁴, for “surgical intervention to be considered practical,” before years of uncontrollable seizures cause irreversible psychosocial consequences, “it must be offered before absolute pharmacoresistance is proven in most patients.” More specific published guidelines state that referral to a specialized epilepsy center is appropriate if seizure control is not achieved within 9 months by the general neurologist. The Cochrane Collaboration also has a group dedicated to evidence-based medicine in epilepsy, and the Agency for Healthcare Research and Quality has a public-domain text, Management of Treatment-Resistant Epilepsy. Links to all four of them are in Table 1.

The treatment of medically intractable epilepsy is very complicated. There are many opinions and “recipes” available for success and care has to be individualized to each

Table 1: Online references for epilepsy guidelines and clinical evidence

Agency	Website
American Epilepsy Society	http://www.aesnet.org/go/practice/guidelines
American Association of Neurologists	http://www.aan.com/go/practice/guidelines
Cochrane Epilepsy Group	http://www.epilepsy.cochrane.org/en/index.html
Agency for Healthcare Research and Quality	http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=hserta&part=A115370

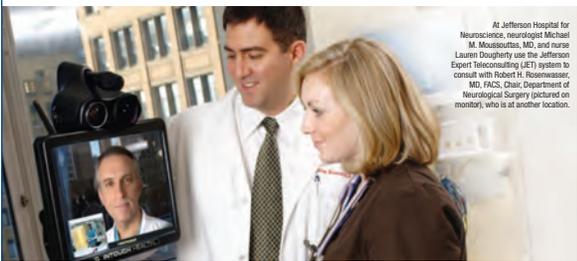
patient and their specific diseases. It does seem prudent to have patients referred to epilepsy centers periodically in order to explore developing treatment options in the future.

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CONTEMPORARY NEUROSCIENCE

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At Jefferson Hospital for Neuroscience, neurologist Michael M. Mussoulitis, MD, and nurse Lauren Dougherty use the Jefferson Expert Teleconsulting (JET) system to consult with Robert H. Rosenwasser, MD, FACS, Chair, Department of Neurological Surgery (pictured on monitor), who is at another location.

Pioneering Leading-Edge Treatments

Jefferson Hospital for Neuroscience staff have helped to develop and/or have introduced to the region leading-edge treatments and technologies that reduce the need for open brain surgery for stroke, brain aneurysms and AVMs. Among them:

- Intra-arterial thrombolysis with tPA – pharmacological blood clot-dissolving
- Mechanical thrombectomy devices – e.g., Merci Retrieval System®
- Wingspan stent – FDA-approved mesh tube to open blocked arteries in the brain after clot-dissolving drugs have failed
- Coiling, gluing and stenting of brain aneurysms – reduces need for open brain surgery

Announcing Jefferson's Teleconsulting (JET) Robotic System for Help with Diagnosis and Treatment of Time-Sensitive Neurovascular Diseases

"Time is brain" is the credo among healthcare professionals for diagnosing and treating time-sensitive neurovascular diseases, including arteriovenous malformations (AVMs), brain aneurysms and, especially, stroke. The blood-clot busting medication tissue plasminogen activator (tPA), for example, must be administered to a patient having a stroke within 4.5 hours for best chance of functional recovery. Timely performance of neurosurgical procedures to remove AVMs and aneurysms are similarly urgent. Yet many community hospitals have limited experienced staff and technology to diagnose and treat patients quickly and accurately.

Now, to provide sophisticated care and expertise to patients at hospital emergency rooms in small community hospitals in distant areas of eastern Pennsylvania, south and central New Jersey, and Delaware, Jefferson Hospital for Neuroscience (JHN) in Philadelphia is launching Jefferson Expert Teleconsulting (JET), the region's first university-based high-tech mobile robotic system for neuroscience.

"JET places all of our resources – among them, dual-trained neurosurgeons, advanced technology, and leading-edge clinical trials in which we partner with the National Institutes of Health – at the disposal of patients, their families and physicians in need of a second, expert opinion," says Robert H. Rosenwasser, MD, FACS, Professor and Chair, Department of Neurological Surgery, JHN and Jefferson Medical College of Thomas Jefferson University. "Its greatest value is for timely diagnosis and application of treatment for time-sensitive neurovascular diseases, especially stroke."

Enhancing level of care
"We want to partner with hospitals in other communities to help advance stroke care throughout

the region. As the leading provider of stroke care in the region, we have an obligation to do that," adds Pamela Kolb, Vice President, Neuroscience Service, JHN.

Supported by Thomas Jefferson University, a leading academic center, JHN is the region's only dedicated hospital for neuroscience and leading, most experienced and comprehensive center for diagnosis and treatment of stroke and cerebrovascular disease. JHN's Acute Stroke Center is the largest such facility, with more board-certified neurocritical care physicians than most, in the greater Delaware Valley. It is also a Joint Commission-accredited primary stroke center.

"Stroke is the third-leading cause of death in the United States but the leading cause of disability, by a factor of five over any other disease," Dr. Rosenwasser notes. "Given its prevalence and time-sensitive nature, it is alarming how few people receive treatment in the appropriate amount of time. With JET, even hospitals in remote areas can provide patients with expert consultation and disposition of appropriate care from an experienced neurologist or neurological surgeon immediately in cases where every minute can make a critical difference. It's a very cost-effective approach to providing 24/7 onsite coverage and expertise."

How JET works
Each participating hospital is supplied with a mobile robotic platform, manufactured by InTouch Health® of Santa Barbara, CA, that enables the JHN Network physician to be remotely present. JET's panoramic visualization system and easy-to-use control interface afford physicians, patients and hospital staff a safe and effective interactive experience.

"Should a patient arrive in the ER of a hospital that's located, say, three hours away from Jefferson and either doesn't have a neurologist or neurosurgeon available or has a neurologist who needs to consult with a neurosurgeon," Dr. Rosenwasser, explains, "the attending physician contacts JHN. The JHN Network specialist on call then uses a laptop to connect to the remote hospital via the robot, obtain a medical history by speaking directly with the patient and/or family members, examine the patient and determine what therapy is immediately needed, in real time, without delay. Finally, a decision is made either to admit the patient to the local hospital's Critical Care Unit or transfer him or her to the Jefferson Acute Stroke Center, by JETSTAT, Jefferson's transport service, or the hospital's own service."

"Patients may not need to be transferred – they can stay in their own community and be treated very successfully there, thanks to this program," says Ms. Kolb. "And most patients want to stay close to home. JET enables them to receive sophisticated medical care without having to travel long distances."

"It also serves as an educational program," adds Dr. Rosenwasser. "As a teaching center, JHN will use JET to share our clinical protocols with participating hospitals so that they can enhance stroke care within their communities. On the other hand, should the patient need an advanced neurosurgical procedure [See sidebar], we can arrange for prompt transfer."

JHN continues to set the standard worldwide for state-of-the-art care for time-sensitive neurovascular diseases. For more information about these and other treatments, visit www.JeffersonHospital.org/neuroscience.



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