Investigational Device Promising for Uncontrolled Seizures

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SAN DIEGO — The RNS System, an investigational device that delivers responsive stimulation to the brain of patients with uncontrolled seizures, shows promise in clinical trials, but the technical learning curve is currently steep. Dr. Ryder Gwinn said at the annual meeting of the Congress of Neurological Surgeons.

“Programming experience is growing but it’s still not where we need to be,” said Dr. Gwinn, director of surgical epilepsy at the Swedish Neuroscience Institute, Seattle.

“It’s still very complex. I am very frequently changing parameters in order to reach seizure freedom. However, I believe that the system will become much easier to use as a result of the clinical trials currently underway.”

Dr. Ryder disclosed that he is a steering committee member for the devices’ manufacturer, Neuropace Inc., but he has not received consulting fees outside of the study budget. He also has no personal financial interest in the company.

The RNS System is a fully implanted, microprocessor-controlled device that uses up to nine contacts for stimulation. About the size of an iPod, it detects electrographic patterns from intracranial electrodes and delivers up to five separate programmable therapies. It stores up to 12 minutes of electrocorticogram data that can be downloaded to a laptop at any time.

Benefits of the device include focal treatment that leaves functional neuronal circuits intact, Dr. Gwinn said. In addition, a decision to treat “can be made without significant concern for functional consequences, and it doesn’t preclude later alternative treatments.”

Concerns about the use of such technology include the fact that localization of focus could be critical to success. Early seizure detection is important for contingent stimulation, and potentially abnormal or aberrantly organized circuits would be left intact,” he noted.

In a recent feasibility study, Dr. Gwinn and his associates at 11 centers used the RNS System in 65 patients aged 18-67 years who had simple or complex partial seizures. Patients were eligible in the study series, 41 if they had failed treatment with a minimum of two antiepileptic drugs; had a minimum of four seizures per month for 3 months; and had an estimated rate of epileptiform activity. The primary end point was safety and preliminary evidence of efficacy. Response rate was defined as a greater than 50% reduction in seizures. Of the 65 patients implanted with the RNS System, 50 received stimulation, one patient had a device that was never turned on and 14 patients had no stimulation.

The analysis showed a significant link between adherence and the risk of having a serious seizure. Patients who were compliant with their medications and had a MPR of at least 80% were 16% less likely to have a serious seizure compared to patients. Serious seizures were significantly more likely in men, compared with women. And patients who had a change in the type of antiepileptic drug they were prescribed were 2.5-fold more likely to have a serious seizure than those who didn’t switch drugs.

Despite this link between drug switching and increased seizure risk, prescribing a simpler dosing regimen using a newer antiepileptic drug may reduce the risk of serious seizures by increasing adherence, Dr. Ettinger and his associates concluded.

A second study of the impact of adherence on outcomes involved 33,658 patients aged 18 years or older with epilepsy who were treated through Medicaid in Florida, Iowa, and New Jersey during 1997-2006. During this time the patients received medication prescriptions for more than $250,000, and during 26% of these quarters the patients were noncompliant, with a MPR of less than 80%.

After controlling for baseline demographic and clinical differences, nonadherent patients were about threefold more likely to die than adherent patients, reported Ms. Guérin and her associates from the Analysis Group, Inc. in a poster at the meeting. Additional analyses of these data showed that the noncompliant patients were more often age 65 or older, women, nonwhite, and had more comorbidities based on having a higher Charlson comorbidity index. After controlling for baseline demographic and clinical differences, noncompliant patients were more likely to be hospitalized, had more inpatient days, were more likely to require emergency room visits, and had higher health care costs, compared with compliant patients.

The studies by the Analysis Group were also sponsored by GlaxoSmithKline.