

Deep Brain Stimulation Reduces Tic Severity in Intractable Tourette Syndrome

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October 30, 2009 — Deep brain stimulation (DBS) may provide some relief to patients with intractable Tourette syndrome (TS).

Twenty-four-month results from a prospective cohort study of 15 patients who underwent bilateral thalamic DBS showed a marked reduction in tic severity as well as improvement in obsessive-compulsive symptoms, anxiety, and depression without a substantial effect on cognitive function.

"All responded well to DBS, although to different degrees," the researchers, with corresponding author Andrea Cavanna, MD, from the University of Birmingham, in the United Kingdom, conclude. "Further controlled studies on larger cohorts with blinded protocols are needed to verify the overall efficacy and safety of this procedure."

The report was published in the October 27 issue of *Neurology*.

Approved Therapy

DBS is already approved by the US Food and Drug Administration for the treatment of essential tremor, Parkinson's disease, and dystonia and is being investigated for the treatment of depression and obsessive-compulsive disorder.

TS affects an estimated 1% of individuals worldwide, the authors write. TS is a neuropsychiatric disorder characterized by multiple motor tics and 1 or more phonic/vocal tics lasting more than a year. Onset is often in childhood, and approximately 90% of TS patients have other comorbid disorders including attention-deficit/hyperactivity disorder, obsessive-compulsive disorder and obsessive-compulsive behaviors, depression, anxiety, self-injurious behaviors, and nonobscene socially inappropriate behaviors.

"It has been demonstrated that TS bears a detrimental impact on the affected individual's quality of life," Dr. Cavanna and colleagues write. "Thus, it is imperative to include neuropsychiatric and [quality of life] measures when conducting treatment trials."

In this analysis, follow-up data are reported from 15 of 18 patients with severe and refractory TS who underwent bilateral DBS in the centromedian-parafascicular and ventral oralis complex of the thalamus. Two of the 18 patients had withdrawn from the study because they no longer wished to have the pulse generator, the authors note, and 1 patient was excluded because he needed subsequent intervention with DBS targeting the internal pallidum.

Patients were evaluated before and after surgery using a standardized protocol including both neuropsychiatric and neuropsychological assessments, the authors note. At 24 months, the researchers found significant improvements among the 15 patients for whom data were available in tic severity, as well as neuropsychiatric symptoms.

Neuropsychiatric and Neuropsychological Assessments Before DBS and After 24 Months

Score	Mean (SD) Score at Baseline	Mean (SD) Score at 24 Months	P
Yale Global Tic Severity Scale	76.5 (15.1)	36.6 (10.8)	.001
Yale-Brown Obsessive-Compulsive Scale	20.9 (9.8)	14.4 (8.5)	.009
Beck Depression Inventory	30.7 (9.7)	22.7 (7.1)	.001
Spielberger State-Trait Anxiety Inventory	44.2 (13.9)	29.5 (9.0)	.001
Subjective Social Impairment-Visual Analog Scale	8.4 (1.5)	5.8 (1.8)	.002

SD = standard deviation.

There were no substantial differences before and after surgery in measures of cognition, with the exception of some improvement in attentional skills, the authors note, "reflecting the lack of deleterious effect of DBS on cognitive status."

"These data add substantially to our information on the questions of efficacy and safety of thalamic DBS in TS, but they do not allow a definitive conclusion that this procedure is either effective or safe, because of the intrinsic limitations of the study," the authors conclude.

"Despite having only 15 patients in this study, it is the largest to date on the effectiveness of [DBS] as a treatment for [TS]," Dr. Cavanna said in a statement from the American Academy of Neurology.

"The results showed that all 15 people who were assessed after 2 years' treatment experienced improvements in disabling tics and neurological problems, which is encouraging. Unfortunately 3 patients from the original group of 18 were no longer part of the study at follow up and this limits the ability to generalize our findings. More research needs to be done to confirm that [DBS] is a safe and effective treatment for [TS]."

The study was supported by the National Hospital Research Development Fund and by Tourettes Action-UK. Dr. Cavanna reports she has received funding for travel and speaker honoraria from the Tourette Association. Disclosures for coauthors appear in the paper.