Movement Disorder Treatment

Deep brain stimulation (DBS) surgery for the treatment of movement disorders usually employs stimulation at a single site in one or both hemispheres. However, research has demonstrated that multi-target DBS shows some benefits over single target DBS [1) 2) 3)].

History

The first surgical procedures for abnormal movement disorders began in the 1930s, when surgeons first proposed ablative techniques of the caudate nucleus or transection of motor (pyramidal) pathways to reduce involuntary movements in patients with Parkinson's related tremor. During the 50-year interval between 1945 and 1995, the development of precise intracranial guiding devices, brain maps, and advanced imaging led to the refinement of appropriate deep brain targets affecting extrapyramidal pathways. Lesional surgery and subsequent neuroaugmentation using deep brain stimulation extended the role of deep brain surgery for a wider group of patients with tremor, rigidity, dyskinesia, and other involuntary movement disorders. Stereotactic radiosurgery has had wide application for tremor. The history of movement disorder surgery reads like a who's who of brilliant and resourceful surgeons who pushed the frontiers of neurosurgery. Even today, practitioners of functional brain surgery are among the most innovative practicing neurosurgeons [4)].

Stereotactic Radiofrequency Ablation for Movement Disorder

Stereotactic Radiofrequency Ablation for Movement Disorder.

Case series

Walker et al., reviewed 384 electrode implants for movement disorders, characterized the presence or absence of stimulus amplitude thresholds for dose-limiting DBS side effects during surgery, and measured their predictive value for side effects during device activation in clinic with odds ratios ±95% confidence intervals. They also estimated associations between voltage thresholds for side effects within participants. Intraoperative clinical response to macrostimulation led to adjustments in DBS electrode position during surgery in 37.5% of cases (31.0% adjustment of lead depth, 18.2% new trajectory, or 11.7% both). Within and across targets and disease states, dose-limiting stimulation side effects from the final electrode position in surgery predict postoperative side effects, and side effect thresholds in clinic occur at lower stimulus amplitudes versus those encountered in surgery. In conclusion, awake clinical testing during DBS targeting impacts surgical decision-making and predicts dose-limiting side effects during subsequent device activation [5)].

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