

DEEP BRAIN STIMULATION FOR NEURODEGENERATIVE DISEASES

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Introduction. Neurodegenerative diseases (ND) with movement and cognitive disorders are very complicated diseases to treat. Sometimes medical treatment is not successful or results in unpleasant complications. Nowadays neurosurgical treatment as deep brain stimulation (DBS) became possible in clinical medicine.

Methods. We revised available literature in PubMed regarding DBS for ND as Parkinson's disease (PD), Alzheimer's disease (AD), progressive supranuclear palsy (PSP), multiple system atrophy (MSA) and Huntington's disease (HD).

In addition, we analyzed our experience of treating PD using DBS procedure.

130 patients with movement disorders were operated on in the National center for neurosurgery in the period 2013-2015 including 117 PD patients, 10 dystonia, 1 Tourette syndrome, 1 essential tremor and 1 neuropathic pain. There were 58 male and 72 female. The average age of the patients was 51 y.o. STN was a target in 116 cases, GPi in 12, VIM – 1 and VPLN in 1 case. Follow up of the 73 patients was more than 1 year.

We used international selection criteria for DBS for PD using UPDRS. The average duration of disease was 10 years. Severe fluctuations and dyskinesia were present in 75% of cases.

Results. DBS for PD is most frequent and evidence based method of treatment of most signs of this disease.

In our series, excellent improvement of motor functions (more than 50% by UPDRS) in PD patients increased from 65% in 2013 and 71% in 2014 to 92% in 2015. We decreased the dosage of dopaminergic drugs for 30-50% and thereafter the drug induced dyskinesia regressed in all cases. Reviewed papers support this data.

DBS for AD is well researching field in functional neurosurgery. A phase I trial was conducted using forniceal DBS in six patients with mild-to-moderate Alzheimer's-type dementia. Initial results have proved encouraging. After 1 month of stimulation, PET showed a striking reversal of the typical AD associated hypometabolism of glucose in the temporal and parietal cortex. These metabolic changes were maintained for 1 year. Mini-Mental Status Exam (MMSE) scores improved in two patients.

DBS for PSP is less researched but has good perspectives to find more success treating for gait disorders.

DBS for MSA is less effective and STN-DBS is not recommended for treatment.

DBS for HD was researched on small group of patients but with 3-year follow-up. It was significant improvement on pharmacologically resistant chorea.

Conclusion. Deep brain stimulation is a safe and effective surgical treatment for several movement disorders. The right patient selection is the key for good results in this procedure. Now some new research projects are investigating possibility of DBS for more number of ND. The neuromodulation for ND has a bright future.