PARKINSON XƏSTƏLİYİ PARKINSON'S DISEASES ПАРКИНСОНИЗМ И VƏ HƏRƏKƏT AND MOVEMENT ДВИГАТЕЛЬНЫЕ POZULMALARI DISORDERS НАРУШЕНИЯ

AN UPDATE ON SURGICAL TREATMENT OF PARKINSON DISEASE

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Over the last several decades, surgery became an integral part of comprehensive treatment of advanced Parkinson disease (PD). Better understanding of disease mechanisms and advancement of technological innovations resulted in universal acceptance of deep brain stimulation (DBS) as an important part of the PD treatment algorithm. Based on experience with thousands of operated patients, the criteria for patient selection, preoperative evaluation, procedural details, and nuances of post-operative management are now well established. As a matter of fact, surgery in general and DBS in particular are now included in every guideline of PD management making it an option to consider when disease progresses and medical side effects occur.

There are several important advances in surgery for PD that would be of interest to practicing neurologists; they are related to the choice of surgical target, to the patient selection and appropriate disease stage at the time of surgery, and the new developments in surgical interventions that make procedures more precise and less invasive.

In regard to target selection, DBS for PD is now focusing on the subthalamic nucleus (STN) and the internal part of globus pallidus (GPi). Recent prospective randomized controlled studies showed significant benefit of STN DBS compared to the best medical treatment, as well as substantial equivalency between STN and GPi DBS outcomes. New surgical targets are now investigated; these include pedunculo-pontine nucleus (PPN), zona incerta (ZI) and other deep cerebral structures.

The common paradigm in patient selection is gradually shifting from advanced and disabling

stages of PD being the common surgical indication to the early stages of the disease. Earlier this year, a multi-center prospective study showed both safety and efficacy of STN DBS in early stages of PD. In addition to therapeutic benefit, this study suggests a certain neuroprotective effect of DBS that may translate into slower disease progression.

In a continuous quest for perfect surgical solution, worldwide research has focused on alternatives to DBS in PD treatment. In addition to various chemical and genetic treatment modalities, the two new approaches to surgery include precise targeting with frameless asleep DBS procedures based on Clearpoint™ technology, and less invasive destructive intervention that are based on magnetic-resonance guided focused ultrasound (MRgFUS). Both of these approaches revolutionized the way we approach surgery for PD by reducing the patient's discomfort (when surgery is done under general anesthesia) or completely eliminating the need in mechanical penetration of the brain and drilling holes in one's skull (when MRgFUS is used for thalamotomy or pallidotomy).

Finally, the new developments in our understanding of underlying physiology of PD allow us to change the pattern of brain stimulation from currently used simple high-frequency signals to on-demand close-loop stimulation process. This pioneering research from our lab will be combined with other technological developments, such as constant current stimulation, independent current delivery and field shaping, as well as micro-fabricated probe design, in making surgery for PD even more effective and individually tailored in the future.

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НОВЫЕ ПОДХОДЫ К ХИРУРГИЧЕСКОМУ ЛЕЧЕНИЮ БОЛЕЗНИ ПАРКИНСОНА

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