Int J Clin Exp Physiol. 2024;11(2):86-87.
https://www.ijcep.org

Deep Brain Stimulation for Parkinson's Disease: A Potential Game-Changer?

Retash Shan*

Senior Resident Academic, Division of Clinical and Interventional Physiology, AIIMS, Patna, Bihar, INDIA.

NEWS

Parkinson's Disease (PD) is a neurological disorder characterised by tremor, rigidity, akinesia and postural instability. Parkinson's disease care has relied on levodopa for 50 years. Motor problems persist for years after therapy begins for most people. A major 20th century innovation is Deep Brain Stimulation (DBS). The FDA approved Deep Brain Stimulation (DBS) as an adjuvant neuromodulatory therapy for movement problems in medically refractory Parkinson's disease. The standard DBS method uses a stereotactically placed four-contact stimulating electrode and a subcutaneous wire to connect it to an Implanted Pulse Generator (IPG) on the chest wall beneath the clavicle. Electrodes are usually placed in the Subthalamic Nucleus (STN) or Globus Pallidus internus (GPi) in Parkinson's disease.[1] A physician remotely modifies IPG stimulation parameters to improve symptom relief and minimise side effects using a portable device. Deep brain stimulation of the STN or GPi improves Parkinson's patients' quality of life.[2,3] Precision lead location and stimulation programming make DBS surgery effective. Thus, it is best performed by a skilled team of neurosurgeons, neurologists, neurophysiologists and treatment-focused support staff. DBS is effective in PD because it's reversible and flexible. Due to its efficacy, it is regularly studied in various disorders and the FDA-approved indications may grow shortly.

Of late, treatment strategies for Parkinson's disease have undergone a paradigm change thanks to adaptive Deep Brain Stimulation (aDBS).[4] In contrast to its predecessor, conventional DBS (open loop), aDBS (closed loop) tracks brain activity in real time using sophisticated artificial intelligence algorithms. Given this constant observation, the system may modify stimulation settings in response to the patient's current requirements, therefore establishing a customised, round-the-clock treatment plan that could establish a game-changer frontier in PD treatment.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

REFERENCES

1. Deuschl, G., Schade-Brittinger, C. S., Krack, P., Volkmann, J., Schäfer, H., Bötzel, K., Daniels, C., Deutschländer, A., Dillmann, U., Eisner, W., Gruber, D., Hamel, W., Herzog, J., Hilker, R., Klebe, S., Kloss, M., Koy, J., Krause, M., Kupsch, A., German Parkinson Study Group, Neurostimulation Section. (2006). A randomized trial of deep-brain stimulation for Parkinson's disease. The New England Journal of Medicine, 355(9), 896–908. https://doi.org/10.1056/NEJMoa060281
2. Little, S., & Brown, P. (2013). The functional role of beta oscillations in Parkinson's disease. Current Opinion in Neurobiology, 21(5) Suppl. 1, 626–632.
3. Perlmutter, J. S., & Mink, J. W. (2006). Deep brain stimulation. Annual Review of Neuroscience, 29, 229–257. https://doi.org/10.1146/annurev.neuro.29.051605.112824
4. Weaver, F. M., Follett, K., Stern, M., Hur, K., Harris, C., Marks, Jr., W. J., Rothlind, J., Sagher, O., Reda, D., Moy, C. S., Pahwa, R., Burchiel, K., Hogarth, P., Lai, E. C., Duda, J. E., Holloway, K., Samii, A., Horn, S., Bronstein, J., CSP 468 Study Group. (2009). Bilateral deep brain stimulation vs best medical therapy for patients with advanced Parkinson disease: A randomized controlled trial. JAMA, 301(1), 63–73. https://doi.org/10.1001/jama.2008.929

DOI: 10.5530/ijcep.2024.11.2.15

Publishing Partner : EManuscript Tech. [www.emanuscript.in]

VIEWS

The future of Parkinson's treatment: Precision and personalised medicine

Parkinson's disease affects millions of people worldwide and has long been a major medical concern. However, new developments in medical technology, especially in the field of Deep Brain Stimulation (DBS), are giving both patients and medical professionals fresh hope. With the potential to revolutionise Parkinson's disease treatment, adaptive Deep Brain Stimulation (aDBS) is leading this breakthrough. Parkinson's disease management can be transformed with aDBS. This technology is new and allows patients more personalised and responsive therapeutic options than standard DBS. Benefits of this adaptable method exist. aDBS may reduce the risks of continual stimulation by stimulating just when needed. Furthermore, the system's ability to react to daily symptom changes may improve symptom management and patient quality of life.

Our contemporary definition of Parkinson's Disease (PD) is a multi-neurotransmitter dysfunction-related condition with central and peripheral nervous system involvement. The clinical manifestation is a mix of motor and 'hidden' non-motor symptoms. Reassessing PD treatment options is necessary due to its complex neuropathology. Dopamine replacement strategy or brain dopaminergic pathway surgery are usually used to treat PD. Many non-dopaminergic non-motor and some motor symptoms, which affect quality of life, remain untreated. Individualised medicine should be considered in PD, as in rheumatology. Personalised PD medicine involves more than genetics, including pharmacogenetic, pharmacological, socio-demographic and lifestyle concerns. These 'enablers' of tailored medicine allow us to treat Parkinson's patients individually. Personalised and precision medicine should guide PD treatment.

The future of DBS in PD treatment is promising, with ongoing research focused on expanding its application and refining its efficacy. Investigations into DBS's role in atypical Parkinsonian disorders and even early-stage PD are underway, potentially broadening its use landscape.

In summary, DBS represents an evolving frontier in PD management, with a mixed landscape of success stories and challenges. As technology advances and our understanding of PD deepens, DBS could become an even more integral tool in the battle against this neurodegenerative disease.

***Correspondence:**
Dr. Retash Shan
Senior Resident (Academic), Division of Clinical and Interventional Physiology, AIIMS, Patna-801507, Bihar, INDIA.
Email: authorphysiologist@gmail.com

Received: 27-03-2024;
Revised: 12-05-2024;
Accepted: 30-05-2024.