

Cognitive and behavioral effects of deep brain stimulation in patients with Parkinson's disease: results from clinical experience

*Ilaria Cani*¹, G. Giannini^{1,2}, L. Sambati², S.A. Nassetti², C. Ferrari¹, M. De Matteis², P. Cortelli^{1,2}, G. Calandra-Buonaura^{1,2}

¹Department of Biomedical and NeuroMotor Sciences (DIBINEM), Alma Mater Studiorum, University of Bologna, Bologna, Italy

²IRCCS Istituto delle Scienze Neurologiche di Bologna, Bologna, Italy

Introduction: Cognitive and behavioral effects of deep brain stimulation (DBS) in Parkinson's disease (PD) are not clearly defined, although some evidences suggest a negative impact of DBS on non-motor symptoms [1]. Dementia is a welldefined exclusion criterion for surgery, whereas indication for patients with mild cognitive impairment (MCI) are missing [2].

Objective: To investigate the effect of DBS on cognitive-behavioral functions and their predictive features.

Methods: PD patients are prospectively evaluated before and 12-months after subthalamic nucleus (STN)-DBS surgery, by mean of a comprehensive neuropsychological evaluation (NPS) and specific questionnaires.

Results: Twenty-one patients underwent STN-DBS surgery (mean age 57,29±8,34 years; disease duration 11,29±3,87 years). At pre-operative NPS, 18 patients (78%) had a normal cognition (NC) while 3 patients (22%) displayed a multidomain-MCI (md-MCI). Thirteen patients underwent post-operative NPS which recorded stable NC in 8 patients, progression to md-MCI in 2 previous NC patients and development of dementia in the 3 patients with md-MCI at baseline.

Comparison between pre and post-operative NPS scores documented an overall worsening on attentive functions (p=0,005), phonemic verbal fluency (p=0,046) and global cognition (p=0,005). None of clinical or demographic features resulted predictive of cognition worsening after DBS.

Baseline behavioral assessment performed in 15 patients detected: depression in 3 patients (20%), anxiety disorders in 9 (60%) and impulse-control disorder in 4 (27%).

Post-operative evaluation did not show significant differences compared to baseline confirming an overall prevalence of anxiety disorder.

Conclusions: None of the patient with normal cognition developed a dementia after surgery, suggesting that a careful selection of patients eligible for STN-DBS would reduce the incidence of dementia. Conversely, attention must be paid in patients with multidomain-MCI before surgery where an in-deep characterization is advisable. Recommendation for patients with isolated executive dysfunction should be further discussed. DBS effects on behavior are influenced by post-operative changes in dopaminergic treatment, a cautious decrease of dopaminergic drugs would prevent the occurrence of behavior disorders.

References

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[2] Artusi C A, Lopiano L, Morgante F, Deep Brain Stimulation Selection Criteria for Parkinson's Disease: Time to Go beyond CAPSIT-PD. *J Clin Med* 2020; 9: 3931.