

## **Motor outcomes and possible predictive factors for directional deep brain stimulation**

Leonardo Rigon<sup>1</sup>, F. Bove<sup>1</sup>, D. Genovese<sup>1</sup>, P. Sanginario<sup>1</sup>, A.R. Bentivoglio<sup>1,2</sup>, P. Calabresi<sup>1,2</sup>, C. Piano<sup>1</sup>

<sup>1</sup>Neurology Unit, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

<sup>2</sup>Department of Neuroscience, Università Cattolica del Sacro Cuore, Rome, Italy

*Background:* Deep Brain Stimulation (DBS) is a well-established therapeutic approach for patients with advanced Parkinson's disease [1-2]. Directional stimulation (DS) extended the therapeutic window by increasing the side effects threshold and minimizing the impact of suboptimal lead placement as compared to conventional stimulation (CS) [3], although its superiority in motor outcomes is still debated.

*Objective:* We aimed to assess possible predictive factors for DS use and its motor outcomes as compared to CS.

*Methods:* Patients with DBS implant compatible with DS with at least six-months follow-up were included. Subjects were divided into two subgroups (DS vs CS), according to the stimulation settings at the latest follow-up. Motor outcomes were compared between the two groups. Predictive factors for the use of DS were evaluated.

*Results:* A total of 42 patients were included. At the latest follow-up, DS and CS subgroups showed the same population (21 subjects each). DS seemed to achieve better, although not significantly superior, motor outcomes, in particular in the stimulation-induced improvement of the Unified Parkinson's Disease Rating Scale (UPDRS) III in off-medication state (DS 31% vs CS 24%,  $p=0,9$ ) and in the reduction of the Levodopa Equivalent Daily Dose (LEDD) (DS 47% vs CS 40%,  $p=0,6$ ). Among those considered at baseline (demographic variables, disease duration, motor phenotype, Hoehn & Yahr stage, LEDD, motor impairment, axial symptoms, improvement after levodopa challenge), no clear predictive factor for DS use was highlighted.

*Conclusions:* In our study DS seemed to achieve better motor outcomes as compared to CS, although such trend resulted not statistically significant, possibly due to the limited sample size and short follow-up period. Similarly, no clinical feature at baseline correlated with DS use. Larger study samples and longer follow-up periods are needed to elucidate whether DS, along with the renowned milder side effects<sup>3,4</sup>, achieves better motor outcomes as compared to CS.

### **References:**

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