

Neuromodulatory role of subthalamic nucleus deep brain stimulation (STN-DBS) in Parkinson's disease (PD) patients

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Background: STN-DBS has been claimed to change progression symptoms in animal models of PD, but there are lacking information about the possible neuromodulatory role of STN-DBS in humans. Objective: The aim of study was to evaluate the impact of STN-DBS on the motor disabilities and cognitive alterations in PD patients in comparison to Medical-Therapy-only (MED) and Post-Operative-Patient (POP) groups. Methods: DBS-group consisted of 20 PD patients (7F, 13M) who underwent bilateral STN-DBS. POP-group consisted of 15 post-DBS PD patients (6F, 9M) in median 24 month-time after surgery. Control group (MED-group) consisted of 24 patients (13F, 11M). UPDRS III scale and RS (reflexive saccades) parameters (latency, amplitude, duration, peak of velocity) were measured during 3 visits in 9±3months periods (V1, V2, V3) in total OFF phase. Cognitive assessment was performed during each visit in ON phase. Results: The comparable UPDRS III OFF gain in V3/V2/V1 visits ($p<0.05$) in both MED-group and POP-group was observed. UPDRS III OFF results in DBS-group revealed significant UPDRS III OFF worsening in V2/V1 DBS-group visits ($p<0.05$) with no UPDRS III OFF change in V3/V2 DBS-group visit. Similar general relations were observed in the increase of RS latencies in V2 compared to V1 DBS-group ($p<0.05$), but no change in the latency was observed in V3/V2 DBS-group and V3/V2/V1 visits in MED-group and POP-group. Cognitive assessment revealed significant V3/V1 changes between DBS-group and MED-group in verbal fluency tests ($p<0.05$). Conclusions: The impact of STN-DBS on UPDRS III OFF, RS latency and cognitive changes can suggest its neuromodulative role, mainly during first 6-12 months after surgery.