Abstract

The thesis describes post-surgery cognitive change in patients with Parkinson's disease (PD) treated by subthalamic deep brain stimulation (STN DBS). The aim of the thesis is to select pre-surgery characteristics that would identify patients with a high risk of developing post-surgery cognitive decline. The theoretical part provides a summary of current tools for measuring cognitive functions and a theoretical background linking brain circuit disorders to cognitive dysfunction in PD. In the empirical part, the primary objective is to derive pre-surgery cognitive and magnetic resonance imaging (MRI) profiles predictive of post-surgery cognitive decline. The secondary objective is to characterise STN DBS effects on cognitively demanding instrumental activities of daily living (IADL). The findings indicate that pre-surgery processing speed deficit and clinically silent structural and microstructural abnormalities in MRI are associated with a relatively higher risk of long-term post-surgery cognitive decline. Furthermore, results related to the secondary objective imply that an interplay between STN DBS and post-surgery dopaminergic medication reduction determines short-term post-surgery change in IADL. Overall, the models and data presented in this thesis in conjunction with existing brain circuits theories of cognitive dysfunction in PD lend support to the idea that disease progression is the primary factor leading to cognitive side effects in STN DBS-treated patients with PD.

Keywords: Cognitive Impairment, Deep Brain Stimulation, Instrumental Activities of Daily Living, Parkinson's Disease, Risk Stratification