Does chronic subthalamic nucleus stimulation in advanced Parkinson's disease cause invalidating cognitive and behavioural dysfunctions?

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Parkinson's disease

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Cognitive and behavioural dysfunctions in patients with Parkinson's disease

Chronic deep brain stimulation (DBS) of the subthalamic nucleus (STN) accomplishes favourable long-term improvements of motor symptoms in selected patients with advanced Parkinson's disease.[1] However, disagreement exists about the occurrence of cognitive and behavioural sequelae and their clinical significance. In a large cohort study with 3 years follow-up, Funkiewiez *et al*[2] concluded that STN stimulation did not lead to global cognitive deteriorations. Rodriguez-Oroz *et al*,[1] on the other hand, reported cognitive and behavioural dysfunction in 15 of 49 (30%) patients 3–4 years after surgery. In 11 patients, the dysfunctions were moderate to severe. However, they remarked that the severity of the adverse events did not warrant suspension of DBS in any case.[1] Saint-Cyr *et al*[3] advised a comprehensive neuropsychological test battery to measure the influences of STN DBS on cognitive and behavioural functioning. Woods *et al*[4] discussed the methodological shortcomings of existing studies and gave recommendations for future research, like larger study samples, incorporation of a repeated measure design to directly compare surgical and control groups, preventing heterogeneity in sample characteristics and long-term follow-up.

Two new reports deal with some of these recommendations, one in this issue of the *Journal of Neurology, Neurosurgery and Psychiatry*[5] (***see page 248***) and a second in *Neurology*.[6]

Contarino *et al*[5] report cognitive outcome 5 years after bilateral STN DBS in 11 patients with advanced Parkinson's disease, high Unified Parkinson's Disease Rating Scale motor score in the off phase and a favourable levodopa effect. They used a brief neuropsychological test battery. After 5 years, 6 of the 11 patients showed a decline in oral fluency. Contarino *et al* conclude that STN DBS might be associated with low cognitive and behavioural morbidity over 5-years of follow-up. This study consisted of patients with early onset of disease, advanced disease and a very good outcome for motor symptoms relating to Parkinson's disease. However, cognitive and behavioural deteriorations might be obscured owing to the lack of a control group.

Smeding *et al*[6] used an extensive neuropsychological test battery with a 6-month follow-up in 103 consecutive patients with advanced Parkinson's disease and 39 controls. Alternative and parallel forms of the tests were used, if available, in the follow-up to reduce retest effects. They found a considerable decline in oral fluency, selective attention and oral recall compared with the control group. A low levodopa test at baseline seemed to be related to cognitive decline at follow-up. The relatives of the patients with STN reported a considerable increase in cognitive complaints and irritability or lability. Seven patients showed permanent psychiatric events and two reported transient psychosis. However, the STN group as a whole showed a considerable increase in the quality of life.

These two new studies still do not resolve the controversies on the safety of the procedure. On the whole, however, the mean changes of the groups on cognitive tests and mood or behaviour ratings are of minor importance compared with the evident improvement in motor functioning. Yet, there is a minority of patients who experience moderate to severe cognitive deficits or psychiatric problems after surgery. The problem is how to distinguish these patients before surgery. Therefore, we now need to conduct much larger studies and uniform reporting of data, which will allow us to look for cognitive and psychiatric adverse events, and to search for predictors of cognitive decline and psychiatric sequelae caused by STN DBS.

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