

Neuropsychological outcomes after subthalamic nucleus deep brain stimulation

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This multi-centre study, from a number of authoritative US deep brain stimulation (DBS) centres (1), further adds to the literature suggesting that subthalamic nucleus (STN) DBS does not result in neuropsychological disturbance compared to a non-DBS control group, other than for potential effects on some aspects of verbal performance. For example, depression scores were improved in the DBS group over a 12-month follow-up period. Although verbal symptoms resulted in communication dissatisfaction in the DBS group, there was no overall reduction in quality of life. A strength of this study is the detailed neuropsychological assessment protocol used, suggesting that the results are likely to be robust.

This study reinforces the findings of studies such as the EARLYSTIM study (2) and others (3-5) indicating that STN DBS is not associated with cognitive dysfunction compared to medical therapy without DBS (it is noted the EARLYSTIM study found that a higher incidence of depressive symptoms occurred with DBS, although by the end of this trial there was overall mood improvement with DBS).

Nonetheless, despite satisfactory outcomes for the overall DBS patient group, clinical experience indicates that there are some patients who after STN DBS demonstrate significant neuropsychological change. The current study however, despite a large battery of assessment tasks, was unable to identify any pre-operative cognitive screening measures able to predict those patients at risk.

This study's findings with regard to fluency and other

aspects of speech are consistent with clinical experience and other literature (6,7). Speech disturbance following STN DBS is not unusual, but as noted in this study is generally not marked at 12 months post DBS, and with gains in other domains does not prevent DBS from resulting in an overall improved quality of life. As DBS moves towards adaptive (sense and respond) DBS (8), it is possible this issue of impaired verbal fluency can be minimized.

A further aspect of this study is that the stimulation mode used was constant current rather than the constant voltage stimulation which is largely the modality utilised in the literature to date. Constant current therapy has potential theoretical advantages compared to constant voltage, such as not being affected by impedance changes which may occur in relation to the presence of the DBS electrode in the brain parenchyma, although whether this is clinically important has not been established. Nonetheless, this study, by reporting results consistent with previous literature, suggests that constant current stimulation seems no less safe than constant voltage stimulation in terms of neuropsychological outcome.

As a final comment, this study further demonstrates that DBS is a complex, advanced therapy, and reinforces the notion that optimal patient outcomes are achieved with multidisciplinary DBS teams. Expert surgeons, neurologists, and neuropsychiatrists/neuropsychologists, supported by nursing and allied health personnel, are all necessary for patients to benefit from this powerful but challenging treatment modality.

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None.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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