Bilateral subthalamic nucleus stimulation improves health-related quality of life in PD

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advise on prognosis and subsequent symptomatic therapy.

Our case shows that in a case of intermittent exercise-induced focal cramps, the possibility of an atypical presentation of PD should be kept in mind. In the absence of the cardinal physical signs of PD, detection of dopaminergic neurodegeneration by dopamine transporter SPECT would provide support for dopamine replacement therapy.

References

Bilateral subthalamic nucleus stimulation improves health-related quality of life in PD

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Abstract—In order to assess the impact of bilateral subthalamic nucleus (STN) stimulation in PD on quality of life, the PD Quality of Life questionnaire was assessed in 60 consecutive patients with PD before surgery and 12 months after surgery. All aspects of quality of life, including motor (+48%), systemic (+34%), emotional (+29%), and social (+63%) dimensions, significantly improved with long-term STN stimulation.

Bilateral subthalamic nucleus (STN) stimulation is a neurosurgical treatment for patients with advanced PD complicated by levodopa-induced motor fluctuations and dyskinesias. STN stimulation improves the motor symptoms of the disease in the “off” drug condition as well as activities of daily living as assessed by either part II of the Unified Parkinson’s Disease Rating Scale (UPDRS) or the Schwab and England scale in “off” drug condition. Moreover, levodopa-induced dyskinesias are improved in the “on” drug condition.1,2 This motor improvement, however, may not reflect the therapeutic impact of the procedure as the scales used to assess the motor functioning hardly take into consideration the social and emotional dimensions of the disease. Social isolation, depression, and cognitive impairment may have a greater impact on quality of life in PD than the motor symptoms.3,4 Moreover, surgical side effects1 or cognitive,5,6 psychiatric, and behavioral side effects7,6 related to surgery, STN stimulation, or changes in medication could mitigate the positive effects measured by scales based mainly on motor symptoms. Therefore, the objective of the present study was to evaluate the benefit of bilateral STN stimulation on quality of life using a health-specific scale, the PD Quality of Life (PDQL) scale,8 taking into account not only the physical aspects but also the patient’s own perception and self-evaluation regarding the disease’s effects and consequences on social and emotional functioning, over a period of 3 months.

Materials and methods. Sixty consecutive patients with PD (18 women and 42 men) with a mean age of 56 (±10 SD) years at the time of surgery and a mean duration of disease of 14 (±8 SD) years were bilaterally stimulated.
in the STN as previously described.1 The Ethics Committee of the University Hospital of Grenoble approved the study protocol and all patients gave their informed consent. Patient characteristics including the scores on the UPDRS, a dyskinesia scale evaluating dyskinesias in seven parts of the body,1 the Beck Depression Inventory (BDI), and antiparkinsonian drugs (dopaminergic treatment expressed as levodopa equivalent dosage2) are shown in the table.1 The PDQL questionnaire was given to patients before surgery and 12 months later. The PDQL consists of four subscales: parkinsonian motor symptoms (14 items), systemic symptoms (7 items), emotional functioning (9 items), and social functioning (7 items). Each item is scored from 0 to 5, a higher score reflecting better quality of life. The total score from 0 to 3, with a maximal total score of 63. The BDI scale was used to evaluate patients’ mood in the pre- and postoperative state. BDI is a 21-item scale; each item scores from 0 to 5, with a maximal total score of 63. The higher the score, the more severe the depression.

Results. At 12-month follow-up, bilateral STN stimulation greatly improved motor symptoms (UPDRS III - 55%), activities of daily living (UPDRS II −45%, Schwab and England Scale +142%) in the “off” drug condition, and dyskinesias in the “on” drug condition (−40%). Dopaminergic treatment was decreased by 50%. On average, patients were mildly depressed before surgery (BDI 10.4 ± 6.6) and there was a small but significant improvement of mood after surgery (BDI 8.5 ± 4.1, p < 0.002). No significant differences were found in “on” medication condition for the motor score, activities of daily living, or “mentation and behavior” as assessed by UPDRS I (see the table). In this series of 60 patients, five neurosurgical complications occurred (two hematomas and three focal cerebral contusions), but only one patient had a residual permanent deficit consisting of mild aphasia. There were five transient psychiatric complications (one mania, one delusion, and three depressions, including two with suicide attempts).

The PDQL total score (figure) improved from 90.3 (12.6) to 129 (27) (+43%, p < 0.001); parkinsonian symptoms from 33.2 (5.3) to 49.1 (11.1) (+48%, p < 0.001); systemic symptoms from 17.3 (3) to 23.1 (5.7) (+34%, p < 0.001); emotional functioning from 24.2 (4.2) to 31.2 (7.2) (+29%,
p < 0.001); and social functioning from 15.7 (3.4) to 25.6 (3.5) (+63%, p < 0.001). Some items were dramatically improved such as “doing hobbies” (100%), during “off” periods (90%), whereas others were not, such as “shuffling” or “exhaustion.”

The improvement in the score of the UPDRS III was correlated with the improvement in the total PDQ-L score (r = 0.7, p < 0.001), but not with the improvement in the BDI (r = −1.5, p = 0.34).

Discussion. We found an improvement of health-related quality of life after 12 months of bilateral STN stimulation, confirming two recent studies in smaller series.9,10 The present study shows that bilateral STN stimulation improves all aspects of health-related quality of life in PD, including emotional and social functioning. In this consecutive series of patients with advanced PD and severe “off” period disability, the quality of life improved to the level of a large population of patients with mild PD.8 This finding is not surprising as bilateral STN stimulation greatly but incompletely improves the motor symptoms in “off” drug condition, whereas “on” period symptoms show little or no improvement.

The current study shows that quality of life is correlated with motor improvement in “off” drug condition, and more particularly with social functioning. A better social life can be explained by both improvement in “off” drug motor symptoms and dyskinesias, as they interfere with social functioning, not only by their functional disability but also by the stigma of these symptoms. Some social items such as “doing hobbies” increased in 100% of patients. Decrease of the social isolation of patients with PD is the real success of STN stimulation.

In a general population of patients with PD, depression is a significant predictor of variability in quality of life.3,4 In our study, BDI scores were mildly improved, but this improvement did not correlate with changes in quality of life. Thus, in our population of selected, highly levodopa-sensitive patients, having motor complications of dopaminergic treatment, and without severe depression, the motor complications seem to be the main determinant of quality of life. Side effects related to surgery, stimulation, or changes in medication are likely to influence quality of life. In this group of 60 patients, four had transient and one had permanent neurologic deficits related to surgery. Five patients had severe but reversible psychiatric complications. At an individual level, however, quality of life may worsen in a patient having a severe side effect.9 For this reason, perhaps surgery should be restricted to patients who are severely disabled from motor fluctuations or levodopa-induced dyskinesias. Moreover, as evaluation of quality of life is based on subjective appreciation by the patient, placebo effects cannot be excluded. However, the overall study tends to confirm that the motor benefit from surgery largely outweighs the impact of side effects on quality of life and that it is worth taking the relatively small risk and operating on patients before they have reached a too-low level in quality of life. Future studies should also address the impact of the therapy on caregivers.

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References
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