Movement Disorders
CLINICAL PRACTICE

Novel Deep Brain Stimulation Technologies for Parkinson's Disease: More Expectations, More Frustrations?

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The four–contact lead connected to the Activa system (Medtronic Inc., Minneapolis, MN) is commonly used for DBS in the treatment of Parkinson's disease (PD)[1] and has generally been found to meet patients' expectations.[2] Newer DBS systems, such as the Vercise system by Boston Scientific (Marlborough, MA) or Infinity system by Abbott (Chicago, IL), have been shown to provide additional versatility (e.g., directionality, multiple frequency, and short pulse width).[3,4] There has been no formal comparison between these systems, particularly with respect to patients' experience/expectations.

In order to assess the subjective experience/expectations of PD patients who had undergone DBS, we administered a four-question Visual Analogue Scale (VAS)-based questionnaire to a total of 20 consecutive PD patients, 10 on either an "established" (Medtronic) or "newer" system (Boston Scientific). The inclusion criteria were: bilateral targeting of the STN or globus pallidus pars interna (GPi); absence of uncontrolled psychiatric disorders; and follow-up duration of 6 to 24 months postsurgery. Depending on data distribution, statistical analysis was performed using an independent *t* test and Mann–Whitney U test using SPSS software (SPSS, Inc., Chicago, IL).

There was no significant between-group difference in demographic and clinical variables with the exception of disease duration, which was significantly shorter in patients receiving the newer system (Table 1). One patient in each group was unable to identify the brand of their system. There was no significant between-group difference when asked about satisfaction level of current state of programming and if enough attention was given to programming (Table 1). However, there was significant higher confidence that further programming could lead to clinical improvement in patients carrying newer systems (8.7 ± 1.8 vs. 6.2 ± 2.6; $P = 0.027$; Table 1).

In this small-sample, cross-sectional, questionnaire-based study, we found that patients treated with an established DBS system (Medtronic) were less inclined to think that additional programming would lead to further improvement. This finding, along with the lack of significant clinical difference between groups, might imply that patients' expectations are higher in patients receiving newer, more complex DBS systems. On one hand, this is in line with the fact that the additional (potentially useful) features of these systems may lead to a more satisfying effect through additional programming meeting physicians' and patients' expectations. On the other hand, the additional features of newer devices may complicate the DBS programming of patients, increasing the number of visits necessary to convince patients that stimulation is optimized, and thus possibly increasing physicians' and patients' frustrations.

Our study was not designed as a head-to-head trial comparing two devices, but it was rather investigating the impact of new technology on patients' expectations. No overt differences of outcome were detected, but it should be acknowledged that there was no pre-DBS randomization and that simply looking at the total UPDRS motor score might overlook a specific difference (e.g., occurrence of stimulation-induced side effects). Further studies are required to confirm the superiority—if any—and the clinical long-term efficacy and practical aspects (costs, number of visits, battery consumption, etc.) of newer DBS systems.

Author Roles

(1) Research Project: A. Conception, B. Organization, C. Execution; (2) Statistical Analysis: A. Design, B. Execution,

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TABLE 1 *Demographic and clinical features at baseline and results of the four-question questionnaire*

	Established (n = 10)	Newer (n = 10)	*P* Value
Age (years)	62.0 ± 4.4	65.4 ± 4.5	0.055
Sex (male)	6	5	0.653
Target	STN: 9; GPi: 1	STN: 8; GPi: 1	1.00
Disease duration (years)	12.8 ± 2.2	8.9 ± 2.5	0.002
Stimulation duration (months)	14.3 ± 6.5	11.4 ± 7.2	0.431
N of programming sessions	8.7 ± 3.4	9.6 ± 4.4	0.823
MDS-UPDRS Part III	30.4 ± 12.9	29.8 ± 15.7	0.857
Q1. *"Do you know the brand of your DBS device?"* (yes/no)	9/10	9/10	1.00
Q2. *"Are you satisfied with the current state of programming?"*[1]	6.6 ± 1.1	6.1 ± 2.1	0.520
Q3. *"Do you think that enough attention has been given to the programming of your DBS?"*[1]	8.75 ± 1.20	7.4 ± 3.3	0.780
Q4. *"How confident are you that more programming would lead to a relevant improvement?"*[1]	6.2 ± 2.6	8.7 ± 1.8	0.027

Continues variables are shown as mean ± SD.
[1] Based on a 0 to 10 visual analog scale.

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D.S.: 1B, 1C, 2A, 2B, 3A, 3B

T.t.B.: 1B, 2C, 3B

A.L.: 2C, 3B

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Disclosures

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