Patient Referral for Device-Aided Therapies in Parkinson's Disease is Suboptimal

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Patient Referral for Device-Aided Therapies in Parkinson's Disease is Suboptimal; A Dutch Survey

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Patients with Parkinson's disease (PD) suffering from response fluctuations and/or troublesome dyskinesias insufficiently responding to optimized oral/transdermal therapy may benefit from device-aided therapy (DAT).[1] The term DAT refers to deep brain stimulation (DBS), subcutaneous infusion of apomorphine and continuous infusion of levodopa/carbidopa intestinal gel with or without entacapone.[2]

However, timely referral for DAT remains challenging. Not all eligible patients are referred to a specialized center in time, while others may be referred too early, both attributable to a lack of clear and objective referral criteria.[3] The knowledge and attitudes of referring neurologists may be part of this issue.[4] Identification of relevant factors is necessary to effectively address the clinical need identified.

In 2017–2018, we conducted a survey among general neurologists from 13 non-university hospitals in the northern part of the Netherlands to investigate their knowledge of DAT. Questions and agree/disagree statements on various aspects of DAT in PD were part of the anonymous paper-based questionnaire. We compared the agree/disagree statements between neurologists who had experience with DAT and those who had no experience. The main findings are discussed below, while the Appendix S1 provides a more detailed description of the methods and results.

In total, 36 questionnaires were returned (response rate 59%; Fig. A1). Respondents had worked as neurologists for a mean of 12.5 years. Neurologists with DAT experience cared for a larger population of PD patients than neurologists without DAT experience (median: 100 vs. 30 PD patients per neurologist).

Less than half of respondents (44%) considered the eligibility criteria for DAT to be clear (Table 1). A similar minority of respondents (47%) felt they had sufficient expertise to determine whether a patient would be eligible for *any* DAT. Experienced neurologists were more likely than neurologists without DAT experience to report having the necessary expertise to assess eligibility for DAT (81 vs. 18%, $P < 0.001$). The three clinical symptoms that respondents considered most important in assessing DAT eligibility were response fluctuations (78%), cognitive impairment (53%), and treatment-resistant tremor (50%).

The results of this survey confirm that management of patients with advanced PD is perceived as difficult, especially by general neurologists who lack professional experience with DAT.[4] Moreover, respondents ranked two factors particularly relevant to DBS (treatment-resistant tremor and cognitive impairment) in the top three most important selection criteria for *any* DAT. This may have a negative impact on referrals for DATs in general, as the exclusion criteria for pump therapies are less stringent than for DBS.[3]

Our study revealed a lack of competence among general neurologists in identifying PD patients possibly eligible for DAT. This knowledge gap partly explains the suboptimal referral practices, with evidence of both under- and over-referral (Table A4). Under-referral implies a missed opportunity to improve motor symptoms and quality of life in appropriate patients,[1,3] whereas over-referral may lead to false patient expectations and potentially overburden the referral network. Implementation of a user-friendly and validated screening tool is key to achieving timely referral for DAT without over-referral.[5]

Author Roles

(1) Research project: A. Conception, B. Organization, C. Execution; (2) Statistical Analysis: A. Design, B. Execution, C. Review and Critique; (3) Manuscript Preparation: A. Writing of the first draft, B. Review and Critique.

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TABLE 1 *Summary of survey results, including respondent demographics, agreement with statements about device-assisted therapies (DATs), and characteristics considered relevant for assessing DAT-eligibility*

Survey item	All (N = 36)[a]	Missing	Experience with DAT[b]		P-value[c]
			DAT = 0 (N = 19)	DAT ≥1 (N = 16)	
Gender (male)	20 (56%)	0	7 (37%)	12 (75%)	
Work experience as a neurologist (years)	12.5 (7.0–23.5)	0	10.0 (1.5–18.0)	18.5 (28.8)	
PD population in own practice					
Number of PD patients	50 (20–106)	2	30 (13–55)	100 (39–200)	
Number of PD patients treated with DAT	0 (0–5)	1	0 (0–0)	6 (2–18)	
Agreement with statement about DAT[d]					
1. The selection criteria for DAT are clear.	16 (44%)	2	6 (35%)	10 (63%)	0.17
2. I have sufficient expertise to ascertain whether a patient is eligible for DAT.	17 (47%)	2	3 (18%)	13 (81%)	<0.001
3. I feel competent being the treating neurologist of a PD patient who is treated with DAT.	9 (25%)	0	1 (5%)	7 (44%)	0.01
Clinical characteristics relevant to assess DAT-eligibility[e]					
• Response fluctuations	28 (78%)	0			
• Cognitive impairment	19 (53%)	0			
• Treatment-resistant tremor	18 (50%)	0			
• Quality of life	14 (39%)	0			
• Dyskinesia	12 (33%)	0			
• Drug intakes per day	10 (28%)	0			
• Age	4 (11%)	0			
• Impulse control disorder	1 (3%)	0			
• Disease duration	1 (3%)	0			
• Having a partner	0 (0%)	0			

Note: Variables are expressed as number (percentage) or median (IQR).

Abbreviations: DAT, device-aided therapy; PD, Parkinson's disease.

[a]N = 36 if no missing values. All percentages are calculated with N = 36 in the denominator.

[b]N = 35 due to one missing value.

[c]P-values for comparisons between neurologists without experience with DAT (DAT = 0) and neurologists with experience treating at least one patient with DAT (DAT ≥1) based on two-sided Fisher's exact test.

[d]For brevity, this table only includes the statement discussed in the text. See Appendix S2 for the complete tables.

[e]Respondents were allowed to choose three characteristics that they consider most important in assessing eligibility for DAT. Characteristics are here ordered by frequency (high-low), whereas on the questionnaire they were ordered alphabetically.

Disclosures

Ethical Compliance Statement: Medical Ethical Committee of the University Medical Center Groningen waived the need for ethical approval of the study protocol. Informed patient consent was not necessary for this work. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

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Supporting Information

Supporting information may be found in the online version of this article.

Appendix S1. Description of methods and results.

Appendix S2. English translation of the questionnaire used in this study (originally in Dutch).