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## DOES DEEP BRAIN STIMULATION IMPROVE LOWER URINARY TRACT SYMPTOMS IN PARKINSON'S DISEASE?

### Hypothesis / aims of study

Lower urinary tract symptoms (LUTS) are the most common autonomic symptoms in Parkinson's disease (PD) (1). Severity of LUTS increases with progression of PD and its management is a challenge (2). Since many years deep brain stimulation (DBS) has successfully been used as a surgical treatment for motor symptoms in advanced PD. A recent large randomized clinical trial (RCT) suggested the subthalamic nucleus (STN), and not the globus pallidus interna (GPi) as the preferred target for improvement of functional outcomes in advanced PD (3). This study is an exploratory post-hoc analysis of data of the RCT mentioned above, investigating whether GPi and/or STN DBS improve LUTS in advanced PD. Second, we studied if improvement of LUTS after DBS is present in both sexes. Third, we reported on Foley-catheter (or indwelling urinary catheter) use.

### Study design, materials and methods

The database of a RCT with 128 patients with advanced PD treated with GPi or STN DBS was used for a exploratory post-hoc analysis. Specific LUTS items were extracted from validated questionnaires, i.e. the Parkinson's disease sleep scale (PDSS) items 8 and 9, the Parkinson's disease quality of life questionnaire (PDQL) item 28, and the unified Parkinson's disease rating scale - activities of daily living (UPDRS-ADL) item 11 (table 1) (3). Data were collected at baseline and at 12 months after surgery. Within-group analyses were performed using Wilcoxon Signed Rank tests (paired, non-parametric test) with statistical significance if  $p \leq 0.05$  (\*). Between-group analyses were performed on change scores using Mann Whitney U tests (unpaired, non-parametric test) with statistical significance if  $p \leq 0.05$  (\*).

### Results

Both GPi and STN DBS demonstrated improvement of urinary incontinence and frequency (PDQL-28) 12 months after surgery, with only the STN DBS group reaching statistical significance ( $p=0.004$ , table 2). The improvements after DBS were significant in both men ( $p=0.01$ ) and women ( $p=0.05$ ). Nocturia (PDSS-8) and urinary incontinence due to movement disorder (PDSS-9) did not improve significantly after any type of DBS, irrespective of sex. At baseline only one patient had a Foley-catheter and at 12 months none (UPDRS-ADL-11). Calculated change scores of PDQL-28 demonstrate that most patients show improvement of urinary incontinence and frequency 12 months after surgery, irrespective of sex and severity of symptoms (figure 1).

### Interpretation of results

Although this study is a post-hoc analysis, the original study has a large sample size of 128 patients with a randomized and an exposure of one year to the tested variables. The questionnaires used in this study were initially developed for the assessment of sleep disorders, nocturnal disability and quality of life in PD. Nevertheless, the selected items are extensively validated and provide good insight in the most important urinary symptoms in PD. Altogether, this is the largest analysis of LUTS items of a RCT comparing GPi and STN DBS in advanced PD.

### Concluding message

Urinary incontinence and frequency significantly improve after STN DBS in both men and women with advanced PD. Nocturia and incontinence due to movement disorder do not improve after DBS, irrespective of sex. STN, DBS in advanced PD is used to improve motor symptoms, but might also improve LUTS. GPi DBS does not appear to improve LUTS.

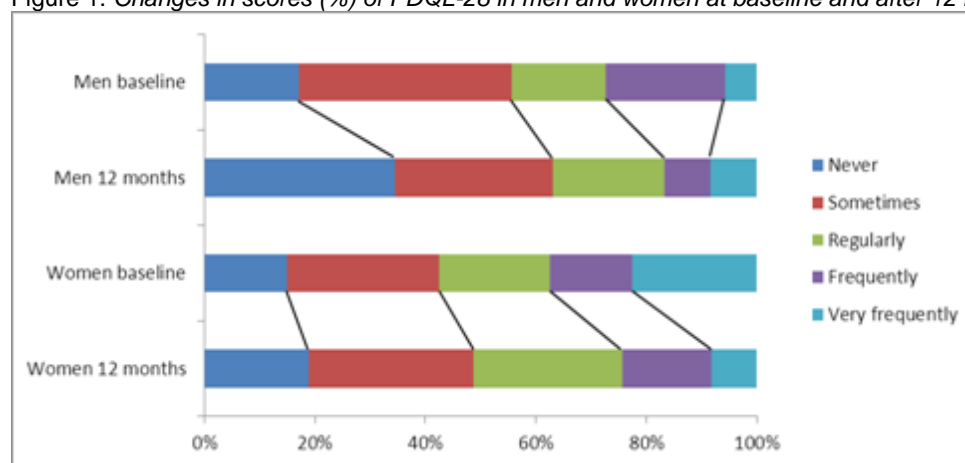
Table 1. LUTS-items: questions, answers and ICS terminology.

Item	Question	Answer	ICS terminology
PDSS-8	'Do you get up at night to urinate?'	Visual analogue scale (always-never)	Nocturia
PDSS-9	'Are you incontinent for urine, because you cannot move because of Parkinsonism?'	Visual analogue scale (always-never)	Other type of incontinence
PDQL-28	'Do you suffer from urinary incontinence and/or frequency?'	1=never, 2=sometimes, 3=regularly, 4=often, 5=very often	Urinary incontinence and frequency
UPDRS-ADL-11	Hygiene	0=normal, 1=somewhat slow, 2= needs help, 3=requires assistance, 4=Foley-catheter, - 1=missing	Catheterization

Table 2. Within- and between-group analyses of the PDSS-8, PDSS-9, and PDQL-28. Data are median with minimum and maximum scores.

	baseline		12 months		p within-group		p between-group
	GPI	STN	GPI	STN	GPI	STN	GPI vs. STN
PDSS-8	1.1 (0.2-9.1)	1.1 (0-8.7)	1.5 (0.2-9.3)	1.2 (0.1-8,6)	0.33	0.47	0.81
PDSS-9	8.1 (0.3-9.4)	8.2 (0-9.2)	7,8 (0.5-9.3)	8.4 (1.0-9.5)	0.59	0.09	0.17
PDQL-28	2 (1-5)	2 (1-5)	2 (1-5)	2 (1-5)	0.09	0.004*	0.35
	baseline		12 months		p within-group		p between-group
	men	women	men	women	men	women	men vs. women
PDSS-8	1.2 (0-9.1)	1.0 (0-8.2)	1.5 (0.1-9.3)	1.1 (0.2-8.5)	0.21	0.74	0.63
PDSS-9	8.1 (0-9.3)	8.3 (0.3-9.4)	8.2 (0.5-9.4)	8.1 (1.0-9.5)	0.28	0.43	0.32
PDQL-28	2 (1-5)	3 (1-5)	2 (1-5)	3 (1-5)	0.01*	0.05*	0.72

Figure 1. Changes in scores (%) of PDQL-28 in men and women at baseline and after 12 months.



#### References

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#### Disclosures

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