

The effect of subthalamic nucleus deep brain stimulation on lower urinary tract symptoms in patients with Parkinson's disease

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Hypothesis/aims of study

The subthalamic nucleus deep brain stimulation (STN-DBS) are standard therapy for advanced stage of Parkinson's (PD) with motor complication such as wearing-off and dyskinesia. STN-DBS dramatically alleviate motor complication in PD patients. In addition to motor symptoms, several non-motor symptoms such as dementia, neuropsychiatric symptoms and autonomic symptoms are usually found in advanced stage of PD. Among autonomic symptoms, lower urinary tract symptoms (LUTS) are prevalent and severe in PD patients. However, the effect of STN-DBS on LUTS in PD patients remains to be unknown.

We aimed to clarify the effect of STN-DBS on LUTS in PD patients. We also aimed to examine the relationship between LUTS and motor functions and health related quality of life (HRQOL).

Results

Sixteen patients completed preoperative LUTS questionnaire. Of the 21 patients, twelve completed postoperative LUTS questionnaire after three months, fourteen patients completed after one year and thirteen patients completed after three years.

The mean OABSS were 5.23 ± 0.64 at baseline, 4.50 ± 0.71 after three months and 4.10 ± 2.5 after one year 5.30 ± 0.77 after three years without statistical significance. The mean IPSS were 5.90 ± 0.87 at baseline, 6.41 ± 1.45 after three months, 5.92 ± 1.24 after one year and 7.25 ± 1.53 after three years without statistical significance

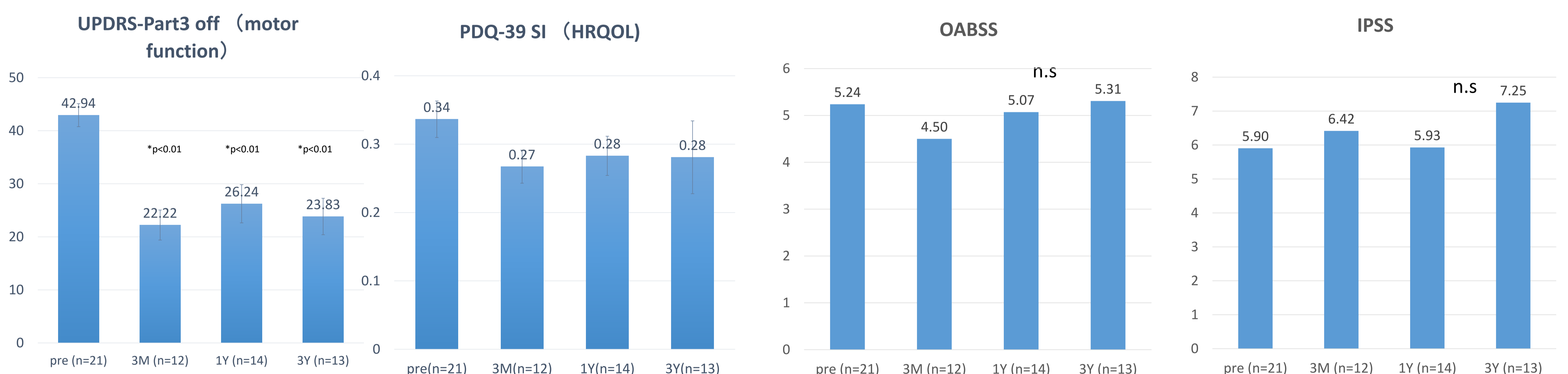
The motor functions as evaluated by UPDRS-Part 3 were significantly improved after STN-DBS at each follow-up periods. HRQOL as evaluated by PDQ-39 tended to improve after surgery without statistical significance.

With regard to correlational coefficients between LUTS and motor and HRQOL, OABSS and IPSS showed positive significant correlation with HRQOL three months after surgery. LUTS and motor functions did not show significant correlation before and after surgery.

Study design, materials and methods

We performed overactive bladder symptom score (OABSS) and International Prostate Symptom Score (IPSS) to assess the LUTS in PD patients (mean age 66.7 ± 6.5 years, mean disease duration 12.08 ± 3.9 years) who underwent STN-DBS. We performed OABSS and IPSS before and after STN-DBS. Postoperative evaluation was performed at three months, one year, and three years after surgery. We examined the temporal change in LUTS after STN-DBS in PD patients. Motor functions were assessed by the Unified Parkinson's Disease Rating Scale (UPDRS) Part 3 and HRQOL was assessed by the Parkinson's Disease Questionnaire-39 summary index (PDQ-39 SI). We calculated the correlational coefficients between LUTS (OABSS and IPSS) and motor functions (UPDRS-part 3) and HRQOL (PDQ-39 SI)

Medications for LUTS
 Pre DBS : none = 12, anti-cholinergics: n=3, alpha blocker = 1
 Pre DBS: none → After :DBS: none n=9, Pre DBS: none → After DBS:β3agonist n=3,
 Pre DBS anti-cholinergics → After DBS anti-cholinergics n=3, Pre DBS alpha blocker → After DBS:β3agonist n=1



Discussion

The present study revealed that STN DBS did not significantly improve LUTS in PD patients. However, OABSS and IPSS showed positive significant correlations with HRQOL as assessed by PDQ-39 three months after surgery. Because, the higher PDQ-39 score indicate the worse HRQOL, the significant positive correlations between LUTS (OABSS and IPSS) and PDQ-39 suggested that the severity of LUTS might partially contribute to the HRQOL three months after surgery. The previous study reported that STN-DBS ameliorated urinary storage dysfunction [1]. PET (positron emission tomography) study showed that STN-DBS improved sensory gating of urinary bladder afferents [2]. Our previous experimental study using normal cats reported that electrical stimulation of STN inhibit bladder contraction, suggesting that STN-DBS might improve storage dysfunction [3]. Although, OABSS tended to decrease after surgery, the changes were not statistically significant. We do not know the exact reason why OABSS did not significantly decrease after surgery, small number of patients in this study might contribute to the negative results. These points should be examined with larger number of patients using urodynamic study in the future.

References
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Conclusion

STN-DBS did not significantly improve LUTS in PD patients. LUTS might partially contribute to the HRQOL three months after surgery.

		PART3 off pre	PART3 off 3M	PART3 off 1Y	PART3 off 3Y
OABSS	r	-.181	.439	-.152	.241
	p	.431	.237	.620	.475
IPSS	r	.076	.380	-.250	.012
	p	.743	.313	.409	.973

		PDQ-39SI pre	PDQ-39 SI 3M	PDQ-39 SI 1Y	PDQ-39 SI 3Y
OABSS	r	-.199	.837**	.204	-.025
	p	.413	.010	.526	.954
IPSS	r	-.148	.928**	.074	.096
	p	.545	.001	.819	.820

Disclosures
 Funding: none Clinical Trial: Yes Public Registry: No RCT: No Subjects: HUMAN Ethics Committee: Chiba University institutional review committees Helsinki: Yes Informed Consent: Yes