Deep Brain Stimulation Improves Restless Legs Syndrome in Patients with Parkinson's Disease

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Introduction

RLS is highly prevalent in PD. DBS is an effective treatment for dopamine-responsive symptoms of PD. It is reasonable to postulate that because RLS responds well to dopaminergic therapy it would improve with DBS. Literature reports, however, have been inconclusive.

The aim of this study is to evaluate the effect of STN DBS in patients with PD and RLS on their RLS symptoms and RLS-related Quality of Life.

Methods

All patients undergoing STN DBS surgery for PD were asked to complete questionnaires:

- International RLS Study Group rating scale (IRLS)
- RLS Quality of Life (RLS-QoL)

Questionnaires were collected at the following time points:

- pre-operatively
- post-operatively at 6 months,
- post-operatively at 1 year
- post-operatively at 2 years.

Inclusion criteria:

- Moderate to severe RLS at baseline (IRLS sum scores>10)
- Completed questionnairs at at lst one timepoint.

The primary outcome measure:

- IRLS sum score and subscales (severity and impact).

The secondary outcome measures:

- RLS QoL scores
- rate of responders, remitters and complete remitters.

Statistical methods:

Differences among the mean scores over time were analyzed using mixed model regression.

Demographic Characteristic at Baseline (n=22)

Variable	Value (mean/SD)
Age (years)	58.3 (7.4)
Sex (male/female)	9/13
Mean Age at onset (PD)	48.4 (6.8)
Years since symptoms onset (years)	10.2 (4.9)
UPDRS III "ON"	17.25 (14.03)
UPDRS III "OFF"	41.57 (12.40)
IRLS Sum	19.59 (6.95)
IRLS Severity	12.91 (4.33)
IRLS Impact	4.45 (2.72)
RLS QoL	68.30 (20.26)
LE	1203.2 (657.5)

Results:

The overall F tests demonstrated significant differences between pre- and averaged post-operative IRLS scores.

RLS QoL scale demonstrated improvements as well, but did not reach statistical significance.

Rate of responders was 50%,

Rate of remitters was 50%,

Rate of complete remitters was 27%.

There was no significant correlation between improvement in RLS and degree of improvement in PD motor symptoms or reduction in dopaminergic therapy.

Conclusion

STN DBS significantly decreased the symptoms of moderate to severe RLS in patients with PD despite a decrease in dopaminergic treatment.

This improvement was sustained over 2 year period.

This study suggests that DBS has a potential to became a valid treatment options for severe refractory RLS, but further studies are needed.

Mean Scores on the IRLS and RLS QoL scores at baseline, 6-months, 1-year, and 2-year post-DBS (n=22)

Variable	Time	Number of Observations	Mean	Standard Deviation
IRLS sum score	Baseline	22	19.59	6.95
	6 Months	17	14.53	12.27
	1 Year	13	11.74	8.08
	2 Years	10	12.83	11.26
IRLS severity score	Baseline	22	12.91	4.33
	6 Months	17	9.53	7.86
	1 Year	13	7.82	5.39
	2 Years	10	8.12	7.17
IRLS impact score	Baseline	22	4.45	2.72
	6 Months	17	3.41	3.61
	1 Year	13	2.62	2.29
	2 Years	10	3.50	3.47
RLS QoL transformed score	Baseline	22	68.30	20.26
	6 Months	16	72.26	24.17
	1 Year	13	76.15	20.07
	2 Years	10	78.75	22.15

Variable	Time	Number of Observations	Mean	% Reduction
LE	Baseline	22	1203.2	
	6 Months	16	370.8	-69.2
	1 Year	13	499.7	-58.5
	2 Years	10	787.7	-34.5
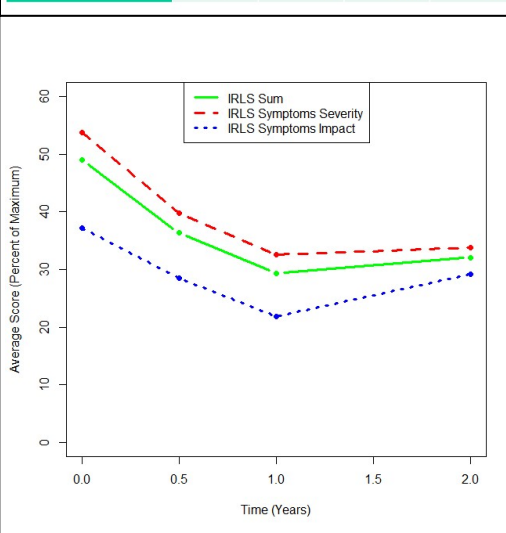
Model estimates of expected scores of IRSL Sum, Severity and Impact
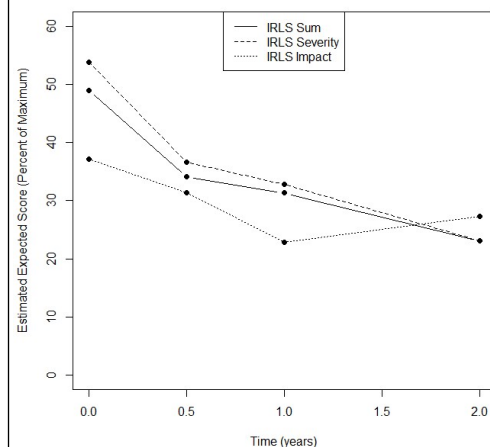
Longitudinal Model Estimated Differences on the IRLS and RLS QoL scores between baseline and 6 months, 1 year, and 2 years post-STN DBS (n=22)

Variable	Contrast	Estimate	Standard Error	p value
IRLS sum score	All Post Operatives vs Baseline			0.0109
	6 Months vs Baseline	-5.97	1.96	0.0059
	1 Year vs Baseline	-7.07	1.88	0.0010
	2 Years vs Baseline	-10.36	3.43	0.0066
	Post Operatives (averaged) vs Baseline	-7.80	2.18	0.0017
IRLS severity score	All Post Operatives vs Baseline			0.0126
	6 Months vs Baseline	-4.12	1.36	0.0066
	1 Year vs Baseline	-5.04	1.32	0.0010
	2 Years vs Baseline	-7.35	2.11	0.0023
	Post Operatives (averaged) vs Baseline	-5.50	1.39	0.0007
IRLS impact score	All Post Operatives vs Baseline			0.0003
	6 Months vs Baseline	-0.70	0.70	0.3276
	1 Year vs Baseline	-1.71	0.55	0.0049
	2 Years vs Baseline	-1.19	1.01	0.2626
	Post Operatives (averaged) vs Baseline	-1.20	0.65	0.0824
RLS QoL transformed score	All Post Operatives vs Baseline			0.3627
	6 Months vs Baseline	3.32	4.86	0.5024
	1 Year vs Baseline	5.11	4.38	0.2569
	2 Years vs Baseline	5.77	6.06	0.3580
	Post Operatives (averaged) vs Baseline	4.73	4.06	0.2579