



Health Related Quality of Life in Essential Tremor Patients Undergoing Deep Brain Stimulation

Christopher Kenney, MD, Alan Diamond, DO, Anthony Davidson, BS

Lina Shinawi, BS, Joseph Jankovic, MD

Parkinson's Disease Center and Movement Disorders Clinic,
Department of Neurology, Baylor College of Medicine, Houston, Texas



OBJECTIVE

To determine the effect of ventral intermedius (VIM) deep brain stimulation (DBS) on health-related quality of life (HRQoL) in essential tremor (ET) patients using disease-specific instruments.

BACKGROUND

Several studies have concluded that DBS improves motor function in medically-refractory ET patients; less emphasis has been placed on HRQoL measures. Generic HRQoL scales are multidimensional questionnaires that cover a wide variety of areas and can be applied to many diseases, but may lack sensitivity in areas important to ET, such as tremor or social embarrassment.

METHODS

ET patients who underwent VIM-DBS were assessed prospectively using several clinical scales at baseline and 6 months after implantation: Tremor Rating Scale (TRS), Quality of Life in Essential Tremor Questionnaire (QUEST), Questions on Life Satisfaction Module (QLSm), Mini-Mental Status Examination (MMSE), and Geriatric Depression Scale (GDS).

RESULTS

At total of 7 patients (4 male), age 67.9 ± 13.9 years, consented to be enrolled in this study. The TRS improved by 65.3% ($p < 0.001$) from baseline to 6 months (Table 1). Three portions of the QLSm improved significantly including QoL in relationship to leisure activities/hobbies, controllability/fluidity of movement, and hand dexterity (Table 2 & 3). The total QUEST score improved from 39.3 ± 6.2 to 13.0 ± 6.4 ($p = 0.004$). On average, patients were "moderately to very satisfied" with several variables related to the neurostimulator: reliability, inconspicuousness, manipulation, and absence of false bodily sensations. Depression improved significantly while MMSE scores did not change appreciably.

TABLE 1: Summary of Clinical Endpoints at Baseline and 6 months after VIM-DBS

	Baseline	6-month follow-up	Statistical significance: Baseline vs. 6 months
Tremor Rating Scale	61.4 ± 3.3	21.3 ± 3.6	P < 0.001
Geriatric Depression Scale	3.6 ± 1.7	2.1 ± 1.7	p = 0.04
Mini-Mental Status Exam	29.5 ± 0.3	29.3 ± 0.5	p = 0.61

CONCLUSIONS

Improvements in motor function for ET patients undergoing VIM-DBS translate into improved QoL using disease-specific clinical scales.

TABLE 2: Summary of QoL Endpoints at Baseline and 6 months after VIM-DBS

	Baseline	6-month follow-up	Statistical significance: Baseline vs. 6 months
General Section: How important/satisfied are you with the following:			
Friends/acquaintances	13.3 ± 0.9	14.3 ± 1.7	p = 0.52
leisure activities/hobbies	4.1 ± 4.2	11.1 ± 3.2	p = 0.05
health	8.0 ± 2.5	10.4 ± 2.0	p = 0.51
income/financial security	8.6 ± 2.1	11.0 ± 2.6	p = 0.37
occupation/work	0.6 ± 3.6	4.6 ± 2.7	p = 0.36
living conditions	13.9 ± 3.1	15.1 ± 1.5	p = 0.70
family life/children	17.4 ± 1.3	18.1 ± 1.2	p = 0.69
relationship with your partner/sex life	6.1 ± 5.2	10.1 ± 3.9	p = 0.40
Health Section: How important/satisfied are you with the following:			
physical condition	4.4 ± 3.0	7.1 ± 2.3	p = 0.50
ability to relax/inner peace	8.6 ± 4.2	10.9 ± 2.9	p = 0.43
energy level/enjoyment of life	7.3 ± 3.9	6.0 ± 2.7	p = 0.72
ability to get around (for example, walking, driving)	12.6 ± 3.4	13.6 ± 2.1	p = 0.83
ability to see and hear	17.4 ± 1.3	17.7 ± 1.5	p = 0.89
being free from anxiety	10.3 ± 4.1	14.6 ± 2.6	p = 0.26
being free from discomfort and pain	8.1 ± 4.6	12.0 ± 3.5	p = 0.42
not needing help/care	12.0 ± 2.0	12.0 ± 3.5	p = 1.00

TABLE 3: Summary of QoL Endpoints at Baseline and 6 months after VIM-DBS

	Baseline	6-month follow-up	Statistical significance: Baseline vs. 6 months
DBS Section: How important/satisfied are you with the following:			
controllability/fluidity of movement	-5.1 ± 4.2	13.3 ± 2.6	p = 0.02
absence of dizziness/steadiness when standing and walking	7.4 ± 3.5	13.0 ± 3.3	p = 0.28
hand dexterity throughout the day (e.g. when eating and writing).	-7.7 ± 2.8	13.9 ± 2.4	p = 0.01
articulation/fluency of speech	14.3 ± 1.7	9.4 ± 3.5	p = 0.14
ability to swallow	16.3 ± 1.5	10.0 ± 4.1	p = 0.14
absence of false bodily sensations	8.7 ± 4.0	12.3 ± 1.9	p = 0.37
bladder/intestinal function	10.4 ± 4.1	10.7 ± 3.4	p = 0.90
sexual excitability	5.6 ± 3.8	3.7 ± 4.5	p = 0.46
undisturbed sleep	6.4 ± 4.2	9.7 ± 4.2	p = 0.44
memory/clear thinking	12.3 ± 1.4	14.1 ± 3.0	p = 0.53
independence from help (e.g. when dressing and getting washed)	15.0 ± 1.9	15.6 ± 1.3	p = 0.67
inconspicuousness of illness	5.2 ± 5.6	9.5 ± 3.0	p = 0.63
Health Section: How satisfied are you with the following:			
reliability of the neurostimulator	NA	±	NA
inconspicuousness of the neurostimulator (casing, cable, scars)	NA	±	NA
independent handling/manipulation of the neurostimulator	NA	±	NA
doctoral care (quality, availability)	NA	±	NA
absence of bodily symptoms / side effects of the neurostimulation	NA	±	NA

References

1. Diamond A, Jankovic J. The effect of deep brain stimulation on quality of life in movement disorders. J Neurosurg Psychiatry 2005;76:1188-1193.
2. Busenbark KL, Nash J, Nash S, Hubble JP, Koller WC. Is essential tremor benign? Neurology 1991;41:1982-1983.
3. George MS, Lydiard RB. Social phobia secondary to physical disability. A review of benign essential tremor (BET) and stuttering. Psychosomatics 1994;35:520-523.
4. Fields JA, Troster AI, Woods SP, et al. Neuropsychological and quality of life outcomes 12 months after unilateral thalamic stimulation for essential tremor. J Neurosurg Psychiatry 2003;74:305-311.
5. Troster AI, Fields JA, Pahwa R, et al. Neuropsychological and quality of life outcome after thalamic stimulation for essential tremor. Neurology 1999;53:1774-1780.
6. Troster AI, Pahwa R, Fields JA, Tanner CM, Lyons KE. Quality of life in Essential Tremor Questionnaire (QUEST): development and initial validation. Parkinsonism Relat Disord 2005;11:367-373.
7. Bryant JA, De Salles A, Cabatan C, Frysinger R, Behrke E, Bronstein J. The impact of thalamic stimulation on activities of daily living for essential tremor. Surg Neurol 2003;59:479-484; discussion 484-475.
8. Hariz GM, Lindberg M, Bergenheim AT. Impact of thalamic deep brain stimulation on disability and health-related quality of life in patients with essential tremor. J Neurosurg Psychiatry 2002;72:47-52.
9. Lambert D, Waters CH. Essential Tremor. Curr Treat Options Neurol 1999;1:6-13.
10. Bain PG. Tremor assessment and quality of life measurements. Neurology 2000;54:S26-29.
11. Kuehler A, Henrich G, Schroeder U, Conrad B, Herschbach P, Ceballos-Baumann A. A novel quality of life instrument for deep brain stimulation in movement disorders. J Neurosurg Psychiatry 2003;74:1023-1030.
12. Lyons KE, Pahwa R, Busenbark KL, Troster AI, Wilkinson S, Koller WC. Improvements in daily functioning after deep brain stimulation of the thalamus for intractable tremor. Mov Disord 1998;13:690-692.