

Toward Broadening Access to Deep Brain Stimulation in Parkinson's Disease: Are Comorbidities an Absolute Contraindication?

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Introduction

The efficacy of deep brain stimulation (DBS) for Parkinson's disease (PD) has been well demonstrated; however, there remain barriers to accessing DBS therapy for certain populations, including those with multiple medical comorbidities. Patients with multiple comorbidities have been excluded from the hallmark trials of DBS for PD. Here we seek to analyze whether these patients respond to DBS and whether they are more at risk for complications than those with few or no comorbidities.

Methods

One hundred fivty patients were retrospectively reviewed and divided into three groups based on number of comorbidities at the time of DBS: zero, one to two, or three or more. Data were assessed using analysis of variance (ANOVA) and paired ttest. Treatment outcomes were evaluated using the unified Parkinson's disease rating scale (UPDRSIII), number of doses of anti-PD medications daily, total number of anti-PD medications, and levodopa equivalence daily doses (LEDD).

Results

Sixty three patients (41.72%) had no medical comorbidities, 75 (49.66%) had 1-2, and 13 (8.60%) had 3 or more. Patients without comorbidities were significantly younger at time of surgery. No significant difference was seen between groups for changes in all variables after surgery except a significant reduction in number of doses of anti-PD meds (p=0.04838) and a trend toward reduction of LEDD (p=0.0982). While all patients experienced significant improvement in UPDRS-III scores, only the groups with comorbidities experienced improvements in LEDD (p=0.006172 and p=0.01629). Four patients across all groups experienced infection that required removal of implants; three had 2 comorbidities (4%) and one had 3 (7.69 %).

Demographic analysis Demographics

Demographic analysis				
	0 group n=63	1or 2 group n= 75	-⇒3 group n=13	p_value
Gender				
M	77.78%	68 %	69.23%	0.4078
F	22.22%	32 %	30.77%	
BMI	28.85	29.635	26.16	0.1802
HY stage	n=12	n-51	n=77	
1	11.86 %	5.88%	0%	
1.5	11.86 %	7.35%	30.77%	
2	38.98%	50 %	30.77%	
2.5	0%	1.47%	0%	0.2805
3	30.51%	22.06 %	23.08 %	
4	6.78%	10.29%	15.38%	
5	0%	2.94%	0%	
Electrode configuration				
Monopolar	67.21%	71.43 %	61.54%	0.7350
Bipolar	32.79%	28.57%	38.46%	
PD subtype				
Tremor type	58.73%	72 %	69.23%	0.2412
Rigid type	41.27%	28%	30,77%	



All groups showed significant reduction UPDRS-III

Direct comparison of pre-operative to post-operative LEDD



Only the groups with comorbidities showed a significant improvment in LEDD

Conclusions

Our experience at a single center demonstrates that DBS is efficacious in patients with multiple medical comorbidities. Though these patients may be more prone to infection, these patients may benefit from DBS when performed at experienced centers. Further study is needed to assess optimal candidacy for DBS.

Learning Objectives

DBS is effective in patients with high comorbidities with careful selection.

References

1. Capelle HH, Simpson RK Jr, Kornenbuerger M., Michaelsen L, Tronnier V, Krauss JK. Long-term deep brain stimulation in elderly patients with cardiac pacemarker. Neurosurg. 102 (1): 53-59; 2005 2. DeLong M, Huang K, Gallis J, Lokhnygina Y, Parente B, Hickey P, Turner D, Lad S et al. Effeect of advancing age on outcomes of deep brain stimulation for Parkinson disease. JAMA Neurol. 71 (10):1290-5;2014 3. Derost PP, Ouchchane L, Morand D. Is DBS-STN approriate to treat sever parkinson disease in an elderly population? Neurology. 68

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