Neuropsychological Effects of GPi Deep Brain Stimulation in Medication Resistant Dystonia

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INTRODUCTION

- The neuropsychological effects of globus pallidus interna (GPi) deep brain stimulation (DBS) in dystonia patients remain unclear despite its efficacy in treating motor symptoms.

OBJECTIVES

- Evaluate the neuropsychological outcomes following bilateral GPi DBS in patients with treatment-resistant dystonia.

METHODS

- Retrospective cohort study of medication-resistant dystonia patients undergoing GPi DBS
- Pre- and post-operative neuropsychological assessments conducted
- Cognitive assessment included attention, working memory, executive function, language, memory, and visuospatial function
- Cognitive scores standardized to z-scores and averaged by domain
- Statistical analysis: paired-sample t-tests comparing pre- vs. post-operative results

RESULTS

- 21 patients (53.5±12.2 years) with disease duration of 8.6±10.3 years
- Post-operative testing conducted at 19.5±14.9 months after surgery
- No significant changes in depression scores (BDI-II: 12.89±6.1 vs. 14.26±9.9, *p*=.610)
- Anxiety remained stable (BAI: 7.33±6.3 vs. 6.33±7.7, *p*=.681)
- Attention showed no changes (-0.34±0.90 vs. -0.50±0.80, *p*=.392)
- Executive function remained stable (-0.20±0.97 vs. -0.49±1.11, *p*=.195)
- Language scores were unchanged (0.09±0.74 vs. -0.09±0.56, *p*=.147)
- Memory showed no significant difference (0.17±0.84 vs. -0.03±1.04, *p*=.216)
- Visuospatial function remained similar (0.28±0.73 vs. 0.33±0.86, *p*=.850)
- Global cognition showed no changes (-0.01±0.63 vs. -0.17±0.67, *p*=.150)

The current study suggests that GPi DBS does not detrimentally affect cognitive functions in patients with treatment-resistant dystonia. These findings provide important information for clinicians and patients weighing the benefits and risks of surgical intervention for dystonia management.

Table 1. Demographic History and Motor Scores

	Medication Resistant Dystonia (n=21)
Age	52.55±12.17
Gender	
Female	15 (71.4%)
Race	
White	21 (100%)
Disease Duration	8.60±10.28
Follow-Up Period	19.5±14.9
Pre-Operative Motor Rating Scale	
BFM Rating Scale	19.33±11.35
TWSTRS	19.71±6.56

BFM, Burk-Fahn-Marsden; TWSTRS, Toronto Western Spasmodic Torticollis Rating Scale

Table 2. Pre- and Post-Operative Neuropsychological Scores

	N	Pre-Operative	N	Post-Operative	p-value
Depression [Mean (SD)]					
BDI-II	20	12.89±6.10	20	14.26±9.85	p=.610
Anxiety [Mean (SD)]					
BAI	8	7.33±6.35	8	6.33±7.71	p=.681
Attention (Z-Score)	21	-0.33±0.90	21	-0.50±0.80	p=.392
Executive Function (Z-Score)	21	-0.20±0.98	21	-0.49±1.11	p=.195
Language (Z-Score)	21	0.09±0.74	21	0.17±0.56	p=.147
Memory (Z-Score)	21	0.17±0.84	21	-0.03±1.04	p=.216
Visuospatial (Z-Score)	17	0.28±0.73	17	0.33±0.86	p=.850
Overall Cognition (Z-Score)	21	-0.01±0.63	21	-0.17±0.67	p=.235