

Cognitive and Neuropsychiatric Correlates of Impulse Control Disorder Symptom Severity in Parkinson's Disease

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BACKGROUND

- Parkinson's Disease (PD) is a common neurodegenerative disorder that attacks the basal ganglia and contributes to a range of motor, cognitive, and autonomic impairments.
- Impulse control disorders (ICD) are behaviors characterized by a failure to resist an impulse or drive to perform an action despite negative effects, including gambling, hypersexuality, binge-eating, and compulsive shopping.
- ICDs are an increasingly recognized complication in PD and affects up to 6-14% of PD patients.¹
- ICDs have traditionally been examined as a dichotomous construct; however, the development of the Questionnaire for Impulsive-Compulsive Disorders in Parkinson's disease Rating Scale (QUIP-RS), allows for measurement of symptom severity.
- Recent meta-analysis examining the cognitive profiles of PD patients with ICDs demonstrated patients with ICD showed reduced executive functioning and visuospatial abilities compared to those without ICD.²
- Only two out of 36 studies analyzed utilized the QUIP-RS when investigating the role of cognition on development of ICDs. No studies examined the relationship of ICD symptom severity to cognitive dysfunction.

OBJECTIVE

The present study sought to investigate the cognitive and psychiatric correlates of ICD symptom severity in PD patients.

METHODS

- Patients recruited from BCM's Parkinson's disease Center and Movement Disorders Clinic.
- 50 patients with idiopathic PD who presented for a pre-surgical evaluation to undergo Deep Brain Stimulation (DBS) were enrolled in the study.
- All patients underwent a comprehensive neuropsychological evaluation (measures listed below) including measures of impulsivity, affective symptoms, and informant reports.
- Patients were diagnosed with an ICD based on their responses to the QUIP-RS using published cut-scores. Neuropsychological measures were transformed into composite scores based on the cognitive domain assessed.

	ICD+	ICD-	U or χ^2	p
Age (years)	58.2 ± 7.9	61.4 ± 10.9	208	0.11
Gender (% Male)	77.8%	68.8%	0.47	0.74
Race/Ethnicity (% Caucasian)	88.9%	81.3%	2.67	0.26
Education (years)	14.1 ± 3.17	16.4 ± 2.31	162	< 0.01
Est. FSIQ (TOPF Std. Score)	95.1 ± 19.7	102 ± 11.8	189	0.18
Levodopa Equivalent Dose (LED)	1196 ± 475	1452 ± 629	240	0.33
UPDRS On	22.9 ± 12.5	25.4 ± 12.0	249	0.43
UPDRS Off	40.0 ± 12.3	43.3 ± 12.9	244	0.37

MEASURES

NEUROPSYCHOLOGICAL MEASURES:

Cognitive Screener:

- Montreal Cognitive Assessment (MoCA)

Attention/Processing Speed:

- WAIS-IV Digit Span (DS)
- Symbol Digit Modalities Test (SDMT)
- Trail Making Test A (TMT-A)

Executive Functions:

- Trail Making Test B (TMT-B)
- Wisconsin Card Sorting Task-64 (WCST-64)
- Stroop Interference Test, Golden Version (Stroop)
- Phonemic Fluency (FAS)

Verbal Memory:

- Rey Auditory Verbal Learning Task (RAVLT)
- WMS-IV Logical Memory I & II (LM)

Visual Memory:

- Brief Visual Memory Test, Revised (BVMT-R)

Language:

- Semantic Fluency (Animals)
- NAB Naming

Visuospatial:

- Clock Drawing Test
- Judgement of Line Orientation (JLO)

IMPULSIVITY MEASURES:

- Questionnaire for Impulsive-Compulsive Disorders in Parkinson's Disease, Rating Scale (QUIP-RS)
- Barratt Impulsiveness Scale (BIS)
- Jay Modified Minnesota Impulsive Disorders Interview (mMIDI)

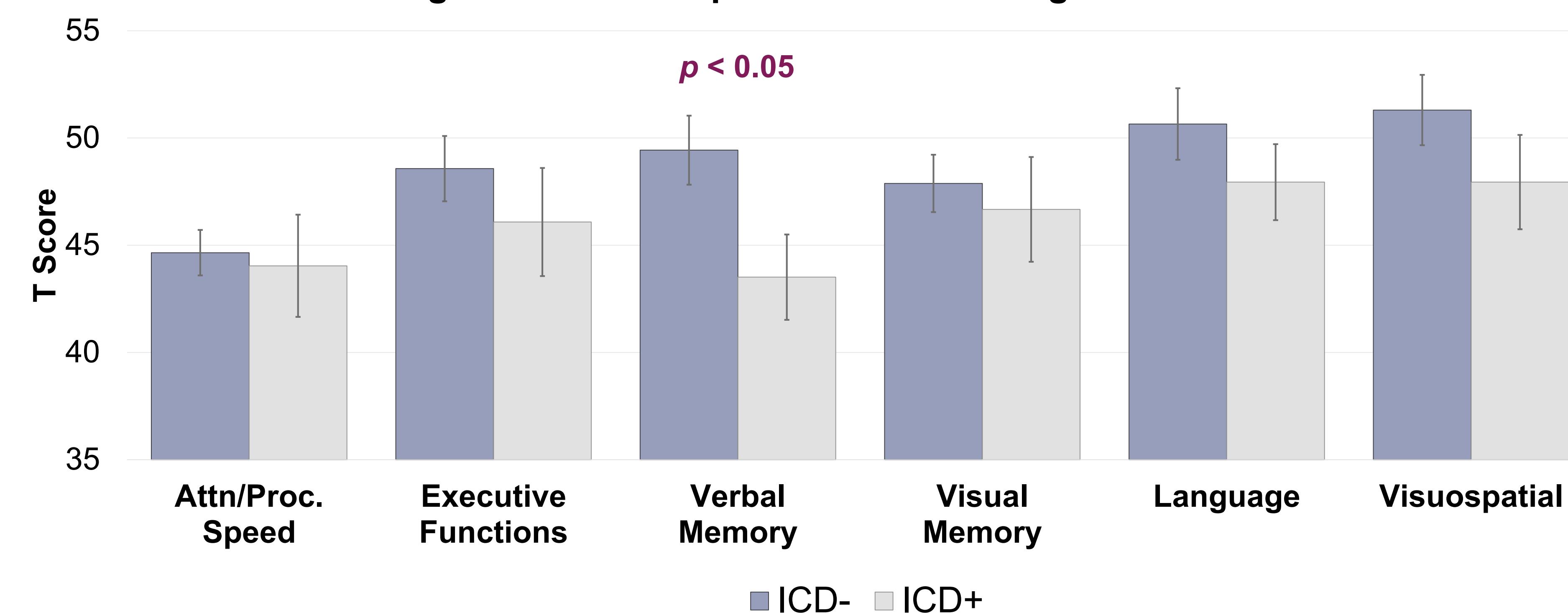
ADDITIONAL MEASURES:

- Beck Depression Inventory, 2nd Edition (BDI-II)
- Generalized Anxiety Disorders, 7 item (GAD-7)
- Columbia-Suicide Severity Rating Scale (C-SSRS)
- Informant Report: Lawton PSMS and iADLs

RESULTS

- 36% of PD patients met criteria for an ICD, of which 50% were prescribed a dopamine agonist.
- ICD+ had significantly lower education levels ($p < 0.01$), were more depressed (BDI-II; $p = 0.01$), anxious (GAD-7; $p = 0.04$), and impulsive (BIS; $p < 0.01$) than ICD-.
- ICD+ performed worse than ICD- on verbal memory measures (see Fig. 1).

Figure 1. ICD Group Differences on Cognitive Domains



- Greater ICD symptom severity was related to lower education, greater depressive symptoms, worse anxiety, greater impulsivity, worse verbal memory, more neurobehavioral problems, and more familial distress (see correlation tables).

	QUIP-RS	
	Pearson's r	p
Age	-0.23	0.11
Education	-0.51	< 0.001
Premorbid IQ	-0.18	0.23
UPDRS Off	-0.08	0.58
MoCA	-0.25	0.08
BDI-II	0.46	0.001
GAD-7	0.38	0.01
BIS	0.45	0.002

	QUIP-RS	
	Pearson's r	p
Attn/Proc. Speed	-0.09	0.52
Exec. Functions	-0.16	0.28
Verbal Memory	-0.32	0.02
Visual Memory	-0.15	0.32
Language	-0.17	0.23
Neurobehavioral Symptom Severity	0.51	0.001
Familial Distress	0.48	0.002

Pearson's r effect sizes: Small = 0.10, Moderate = 0.30, Large = 0.50

DISCUSSION

- The present study found higher rates of ICDs than have been reported previously suggesting the rate of ICD may inherently be higher in samples undergoing DBS.
- Higher ICD prevalence may be a consequence of greater disease severity in DBS populations as disease severity has been shown to relate to higher incidence of ICD.³ It is also possible that patients who are predisposed to developing ICDS (e.g., poor response to dopamine agonists) may be more likely to be referred for DBS.
- Impulse control symptom severity was related to poorer cognitive functioning, more affective distress, more behavioral problems, and increased caregiver burden.
- Although research has focused on ICD group differences, the present study demonstrated the utility of treating the condition as a spectrum to uncover potential relationships that may be otherwise masked.

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