

This study is supported by the National Parkinson Foundation.

BACKGROUND

- Impulse control disorders (ICD) are increasingly recognized in Parkinson's disease (PD), and are often associated with use of dopamine agonist medications.
- PD patients may experience an increase in impulsivity², or develop compulsive behaviors (CBs) that can be distressing to them and their families.
- ICDs described include pathologic gambling, hypersexuality, binge eating, and compulsive shopping. Craving for sweets may fall into this spectrum as well¹.
- PD patients with younger disease onset, male gender, family/personal history of alcohol use, depression, novelty seeking traits, and impulsive traits have been reported to influence development of ICD in PD³.
- Here we seek to:
 - Characterize the prevalence and types of CBs and craving for sweets in our population of PD patients, and
 - Describe the determinants of CBs in this population.

METHODS

Questionnaires from the existing literature were identified to assess for a variety of compulsive behaviors that may exist in PD patients.

- South Oaks Gambling Screen⁴ (SOGS)
- Yale-Brown Obsessive Compulsive Screen – Shopping Version⁵ (YBOCS-SV)
- YBOCS – Computer Use Version (YBOCS-CUV; modified from the YBOCS-SV)
- Sexual Compulsivity Scale⁶ (SCS)
- YBOCS – Binge Eating⁷ (YBOCS-BE)
- Craving Questionnaire (modified from Alcohol Craving Questionnaire⁸)

Inclusion criteria

- Idiopathic Parkinson's disease (PD patients only)
- Able and willing to complete rating scales
- Written informed consent

Exclusion criteria

- Current participation in another clinical study
- History of unstable psychiatric disease (as determined by the investigator)

Age, duration of PD, current/ past history of psychiatric problems, basic demographic information, PD medications, and UPDRS Part III were obtained on PD patients; age, and current/past history of psychiatric problems were obtained on controls.

All subjects completed all questionnaires. Scales were scored according to published guidelines. Mean scores and prevalence of CBs amongst all PD patients and controls were compared, and in PD patients, according to use of dopamine agonists (DA). Pearson's correlation coefficient was calculated for various factors in relation to scores on each scale.

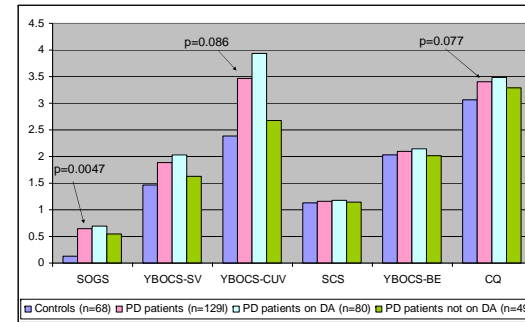
RESULTS

Table 1:
Characteristics of subjects screened for CBs

	PD patients	Controls
<i>N</i>	129	68
<i>Avg age (yrs)</i>	63.7	60.0
<i>Avg age at PD onset</i>	56.2 (± 10.5)	n/a
<i>Avg duration of PD (yrs)</i>	7.6 (± 4.9)	n/a
<i>Avg UPDRS motor (n=94)</i>	20.2 (± 11.4)	n/a
<i>Avg levodopa equiv. (mg)</i>	652.1 (± 466.9)	n/a
<i># taking DA</i>	80 (62.0%)	n/a

DA = dopamine agonist

Table 2: Mean scores on CB and craving questionnaires



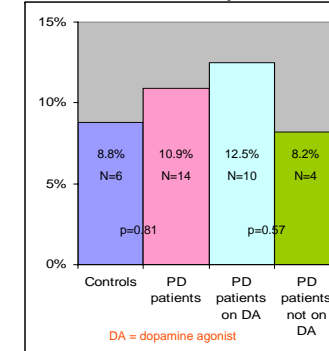
DA = dopamine agonist

Table 3:
Factors influencing scores on CB questionnaires in PD patients*

	SOGS	YBOCS-SV	YBOCS-CUV	SCS	YBOCS-BE	CQ
<i>Age</i>	-0.0821	-0.0668	-0.1604	-0.0760	-0.1619	-0.0927
<i>Sex</i>	-0.0219	-0.0816	0.0470	0.2905 (p=0.001)	0.1167	-0.0453
<i>Duration PD</i>	0.1099	0.2152 (p=0.015)	0.1344	0.3281 (p=0.000)	0.0831	0.2520 (p=0.004)
<i>Age at onset of PD</i>	-0.1250	-0.1601	-0.2025 (p=0.022)	-0.2309 (p=0.009)	-0.1866 (p=0.035)	-0.2123 (p=0.016)
<i>History of depression</i>	0.0921	0.0608	-0.0343	-0.1664	0.1127	0.1750 (p=0.047)
<i>History of anxiety</i>	0.2026 (p=0.021)	0.1926 (p=0.029)	-0.0000	-0.0283	0.1451	0.1521
<i>History of OCD</i>	0.2543 (p=0.004)	0.2151 (p=0.014)	0.1113	0.2115 (p=0.016)	0.1416	0.1720
<i>Levodopa equiv. (mg)</i>	-0.0143	0.1564	0.0534	0.0965	0.0934	0.1857 (p=0.037)
<i>UPDRS motor (n=94)</i>	0.0067	-0.0480	-0.2402 (p=0.020)	-0.0150	0.0690	0.1033

* Pearson's correlation coefficient, r

Table 4: Prevalence of any CB or craving



DA = dopamine agonist

Table 5: Prevalence of specific CB*

	PD patients (N=129)	Controls (N=68)
<i>Gambling</i>	3.1% (N=4)	0
<i>Shopping</i>	0	0
<i>Computer use</i>	1.6% (N=2)	0
<i>Sexuality</i>	3.1% (N=4)	4.3% (N=3)
<i>Binge eating</i>	3.1% (N=4)	2.9% (N=2)
<i>Sweet craving</i>	4.7% (N=6)	4.3% (N=3)

* 6 patients and 1 control with >1 CB

Table 6: Characteristics of PD patients with CB

	At least 1 CB (n=14)	No CB (n=115)	p value
<i>PD duration (yrs)</i>	10.36	7.23	0.024
<i>UPDRS score (n=94)</i>	16.25 (n=8)	20.57 (n=86)	0.31
<i>Age (yrs)</i>	61.4	64.0	0.35
<i>Age at onset PD</i>	50.9	56.8	0.048
<i>Levodopa equiv. (mg)</i>	833.8	631.2	0.139
<i>SOGS</i>	3.07	0.339	0.031
<i>YBOCS-SV</i>	6.43	1.32	0.014
<i>YBOCS-CUV</i>	9.79	2.69	0.003
<i>SCS</i>	1.82	1.08	0.006
<i>YBOCS-BE</i>	7.71	1.42	0.017
<i>CQ</i>	5.15	3.20	<0.001

CONCLUSIONS

In this study, the presence of a CB including craving for sweets is defined by an elevated score on CB questionnaires. CBs occur with similar frequency among PD patients and controls (10.9% and 8.8% respectively).

- Patients with PD score significantly higher on the SOGS than controls. Scores for computer use and craving for sweets almost approached a significant difference.
- PD patients may experience greater urges or desires for risky/reward-seeking behaviors than controls.

CBs including craving are more common amongst PD patients taking a DA (12.5%) than those who are not (8.2%), though this was not statistically significant.

- Scores on individual scales were not significantly different according to DA use.
- The prevalence of any CB or craving in PD patients not on a DA is similar to that of the control population.

Amongst all PD patients, duration of PD correlated positively and significantly with scores on different scales, while age at onset of PD correlated negatively. History of anxiety and OCD were positively associated with several scales.

- Levodopa equivalents and UPDRS motor scores (when available) did not contribute significantly to CB or differentiate PD patients with CB.

Patients with PD who experience CBs are characterized by younger age at onset of PD and longer PD duration.

The presence of >1 type of CB is common (6 of 14), and complaints of 1 CB should warrant investigation into the presence of other CBs.

- PD patients with CB in general score significantly higher on all CB scales
- This may reflect a general greater propensity for reward-seeking behaviors of any type in PD patients
- In this context, the reasons a PD patient might develop greater problems with one type of behavior over another remain unknown.

Pathologic gambling is less common in our group of PD patients than reported in other studies (6-7%^{9,10}). Craving for sweets was the most common CB in this group.

Greater numbers of PD patients and controls must be screened to identify the true prevalence and determinants of CB. This study is currently ongoing.

REFERENCES

- Shahed J, Davidson T, Jankovic J. Craving sweets in Parkinson's disease. *Mov Disord* 2006;21:SS99.
- Ordo WG and Lai D. Predictors of impulsivity and reward-seeking behavior with dopamine agonists. *Park Rel Disord* 2008;14:28-32.
- Voon V, Fox SH. Medication-related impulse control and repetitive behaviors in Parkinson disease. *Arch Neurol* 2007;64:1089-96.
- Lesieur HR, Blume SB. The South Oaks Gambling Screen (SOGS): a new instrument for the identification of pathological gamblers. *Am J Psychiatry* 1987;144:1184-8.
- Koran LM, Chung HW, Bullock KD, Smith SC. Citalopram for compulsive shopping disorder: an open-label study followed by double-blind discontinuation. *J Clin Psychiatry* 2003;64:793-8.
- Kalichman SC, Romps D. The Sexual Compulsivity Scale: further development and use with HIV-positive persons. *J Pers Assess* 2001;76:379-95.
- McEroy SL, Arnold LM, Shapiro NA, Keck PE Jr, Rosenthal NR, Karim MR, Kamin M, Hudson JI. Topiramate in the treatment of binge eating disorder associated with obesity: a randomized, placebo-controlled trial. *Am J Psychiatry* 2003;160:255-61.
- Singston E, G, Tiffany, S. T., & Henningfield, J. E. (2003). The Alcohol Craving Questionnaire (ACQ-Now). In J. P. Allen & V. B. Wilson (Eds.), *Assessing Alcohol Problems: A Guide for Clinicians and Researchers* (2nd ed., pp. 271-281). NIH Publication No. 03-3745. Bethesda, MD: NIAAA.
- Avanzi M, Baratti M, Cabrini S, Ueber E, Brighetti G, Boni A, F. Prevalence of pathological gambling in patients with Parkinson's disease. *Mov. Disord* 2006;21:2068-72.
- Voon V, Hassan K, Zurovski M, de Souza M, Thomsen T, Fox S, Lang AE, Myasaki J. Prevalence of repetitive and reward-seeking behaviors in Parkinson disease. *Neurology* 2006;67:1254-7.