Differences in Parkinson's Disease Symptoms by Monotherapy Use: Exploratory Analyses Utilizing a New Daily Diary Instrument

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Background

- Although the motor symptoms associated with Parkinson's disease (PD) are well-known, there are an even wider range of nonmotor symptoms.
- A daily diary approach has been suggested as a way to accurately record both motor and nonmotor PD symptoms, including those symptoms which may fluctuate throughout the day or between days.
- The Scales for Outcomes of Parkinson's disease Diary Card (SCOPA-DC)[1] is the only validated daily diary instrument designed to measure motor symptom severity; however, this instrument does not include nonmotor symptoms.
- The newly developed Revised SCOPA-DC[2], which includes key nonmotor symptoms as well as a number of format changes, provides reliable and valid scores to assess symptom severity among PD subjects.
- Research has not examined whether the Revised SCOPA-DC can detect differences in motor and nonmotor symptom severity in subjects undergoing different PD treatments.

Objective

- To conduct an exploratory, post-hoc analysis to determine if subjects receiving PD monotherapy differ with respect to severity of motor and nonmotor PD symptoms as assessed by the Revised SCOPA-DC.

Methods

Study Design

- Data for this post-hoc analysis came from a larger validation study[2] examining the reliability and validity of the Revised SCOPA-DC.
- Adults from the U.S. age ≥ 30 years with self-reported doctor-confirmed PD were recruited, screened, and consented online from a Knowledge Networks panel[3].
- Inclusion criteria: experienced resting tremors and at least one of the following symptoms due to Parkinson's disease: slowed ability to start and continue movements; rigidity or inability to complete a movement, stiffness; difficulty with balance, instability; stooped, forward-leaning posture; freezing or sudden, brief inability to move feet.
- Exclusion criteria: self reported history of brain surgery to treat PD symptoms; declined consent.
- Baseline characteristics were assessed online, including current PD therapy.
- Subjects were mailed the Revised SCOPA-DC, to be completed 7 times per day for 3 consecutive days.

Measures

- The 10-item Revised SCOPA-DC consists of 3 scales (see Table 1).

Table 1. Domain Specific Items for the Revised SCOPA-DC

Mobility	Psychological Functioning	Physical Functioning
Walking	Difficulty concentrating or remembering	Using your hands
Changing position	Feelings of anxiety or panic	Uncontrollable movements
		Feelings of exhaustion and fatigue
		Unexplained pains
		Frequent or urgent urination
		Sweating too much

Methods (cont'd)

- Results from previous research suggested strong support for a 3-factor model.
- In addition, the three scales showed good to excellent reliability and good convergent validity.

Scoring of the Revised SCOPA-DC

- Item scores were evaluated for the 10 symptom items by summing responses over the 21 time periods (7 times per day for 3 consecutive days).
- This 3-day item sum score was transformed to a 0–100 scale.
- Scale scores for Mobility, Physical Functioning, and Psychological Functioning were created by taking the average of the 3-day item scores for items within the same scale. Higher scale scores reflect greater symptom severity.

Analysis

- Due to the small sample size and distributional properties of the scales, non-parametric analyses[4] were conducted.
  - Kruskal-Wallis tests were used to examine group differences among monotherapy groups for each scale.
  - Wilcoxon Mann-Whitney tests were used for monotherapy group contrasts.
  - P-values were obtained using Monte-Carlo resampling with 10,000 random permutations[5].

Results

Sample Characteristics

- Of the 165 subjects with data at baseline, 101 subjects completed and returned the Revised SCOPA-DC.
- Thirty-three of the completers reported using levodopa/carbidopa/entacapone (63.6%), rasagiline (12.1%), pramipexole (12.1%), or ropinirole (12.1%) as a monotherapy treatment for PD.
- The average age of this subsample (n = 33) was 65.5 years, 48.5% were male, and the average number of years since PD diagnosis was 6.1 years.
- There were no significant differences among the monotherapy groups with respect to age, gender, and years since PD diagnosis.

Differences between Monotherapy Groups

- As seen in Table 2, there were significant differences among the monotherapy groups for the Mobility ($\chi 2$= 9.97, p < 0.01) and Physical Functioning scales ($\chi 2$= 9.87, p < 0.01). There was a marginally significant group difference for the Psychological Functioning scale ($\chi 2$= 6.76, p = 0.07).

Table 2. Revised SCOPA-DC 3-day Scale Scores by Monotherapy Group

Revised SCOPA-DC Scale	Levodopa/carbidopa/ entacapone (*n* = 21)		Rasagiline (*n* = 4)		Pramipexole (*n* = 4)		Ropinirole (*n* = 4)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Mobility	24.7	23.0	0.2	0.0	45.0	45.2	30.4	25.4
Psychological Functioning	13.3	10.3	1.8	0.0	35.3	23.8	24.5	22.9
Physical Functioning	16.7	19.8	5.2	4.2	36.7	33.7	31.4	25.6

Results (cont'd)

- Follow-up group contrasts presented in Table 3 indicate that the rasagiline group reported significantly better mobility as compared with subjects using levodopa/carbidopa/entacapone or ropinirole.
- The comparisons between the rasagiline and pramipexole groups were marginally significant for all three scales (Mobility, Psychological Functioning, and Physical Functioning).

Table 3. Rasagiline Monotherapy Group Contrasts

Monotherapy Comparison	Mobility	Psychological Functioning	Physical Functioning
Rasagiline vs Levodopa/carbidopa/entacapone	$p < .001$	$p = 0.19$	$p = 0.18$
Rasagiline vs Pramipexole	$p = 0.06$	$p = 0.06$	$p = 0.06$
Rasagiline vs Ropinirole	$p = 0.05$	$p = 0.11$	$p = 0.11$

Discussion

- Exploratory, post-hoc analysis utilizing the Revised SCOPA-DC found significant differences in both motor and nonmotor symptom severity by monotherapy treatment.
- PD subjects currently taking rasagiline reported fewer motor and nonmotor symptoms. Since this was not a randomized study, it is possible that subjects taking rasagiline were earlier in their disease progression, thus resulting in less severe symptoms than subjects receiving other monotherapy.
- The results from this analysis support the use of the Revised SCOPA-DC as a valid instrument to assess symptom severity in PD subjects receiving different monotherapies.
- Prospective research is needed to replicate these results in both mono- and adjunctive-therapy subjects.

References

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