Association between Laterality of Onset and Degree of Speech Impairment in Parkinson's Disease

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BACKGROUND

Audible quality of speech is distinctly impaired relatively early in Parkinson's disease (PD). The neural circuitry between the basal ganglia (BG) and the motor cortex is implicated in its pathogenesis. Research supports a probable dominance of left circuitry. However, the relative contribution of disease involving the left versus the right basal ganglia circuitry in causing speech deterioration in Parkinson's disease remains to be fully clarified.

OBJECTIVE

In PD, using the laterality (right or left) of the motor disease emergence, as a clinical indicator of the relatively early contralateral basal ganglia involvement, this project explores the dominant BG circuitry with respect to speech, by studying the relationship between the side of asymmetric onset and the degree of speech impairment.

METHODS

Using a standardized chart review approach, medical records of a cohort of consecutively evaluated PD patients, followed at Houston PADRECC were reviewed. The selected patient records contained evidence of asymmetric onset and an assessment of parkinsonism using the Unified Parkinson's Disease Rating Scale (UPDRS) at baseline visit. Based on the laterality of motor disease emergence, patients were grouped as: a) Left Onset or b) Right Onset.

Difference in speech scores between the two groups was analyzed using Chi-square analysis with continuity correction.

RESULTS

Comparison of UPDRS Speech Scores for the Left Onset (LO) and Right Onset (RO) PD Groups

UPDRS Speech Score	Left onset (LO)	Right onset (RO)
Scores 0-1 combined	60 (71.4%)	96 (57.5%)
Scores 2-4 combined	24 (28.6%)	71 (42.5%)
Total	84 (100%)	167 (100%)

Table 1

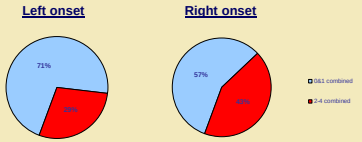

Figure A

RESULTS

Comparison of Relative Severity of Left and Right Disease between the L onset and R onset groups

UPDRS Motor sub-score	Left onset (LO)	Right onset (RO)
Left side worse	67 (79.8%)	34 (20.4%)
Right side worse	6 (7.1%)	115 (68.9%)
Both sides equal	11 (13.1%)	18 (10.8%)
Total	84 (100%)	167 (100%)

Table 2

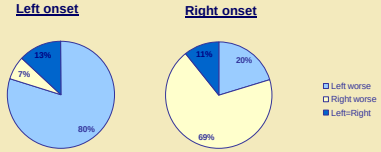

Figure B

Demographics	ALL	Left onset (LO)	Right onset (RO)
Gender			
Men	248 (98.8%)	82 (97.6%)	166 (99.4%)
Women	3 (03 %)	2 (2.4%)	1 (0.06%)
Total	251 (100 %)	84 (100%)	167 (100%)
Ethnicity			
White	204 (81.3%)	69 (82.1%)	135 (80.8%)
Black	28 (11.2%)	7 (8.3%)	21 (12.6%)
Hispanic	16 (6.4%)	7 (8.3%)	9 (5.4%)
Other	3 (1.2%)	1 (1.2%)	2 (1.2%)
Age (at initial visit)	70.7 (32.4 - 91.4)	70.3 (43.8 – 89.8)	70.8 (32.41 – 91.4)
Handedness			
Left	22 (8.8%)	14 (16.7%)	8 (4.8%)
Right	223 (88.8%)	69 (82.1%)	154 (92.2%)
Ambidextrous	2 (0.8%)	0 (0%)	2 (1.2%)
Unknown	4 (1.6%)	1 (1.2%)	3 (1.8%)

Table 3

RESULTS

- A total of 321 PD patient records were reviewed. 251 (78%) had an asymmetric onset of disease. Right onset (RO) was seen in 167 (66.5%) and Left onset (LO) in 84 (33.5%) of the patients. Table 3
- In both RO and LO groups, significantly higher proportion of patients had worse disease on the corresponding side as compared to the contralateral side at baseline. Table 2, Figure B
- Moderate to severe speech impairment (UPDRS Scores 2-4) was noted in 71 patients (42.5%) in the RO and 24 (28.6%) in the LO groups. ($p < 0.05$). Table 1 , Fig A

CONCLUSION

- Parkinson's Disease with right asymmetric onset is associated with significantly greater speech impairment at baseline than left asymmetric onset.
- Our data supports previous research suggesting a probable dominance of left basal ganglia circuitry in motor speech production.

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