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Reduction of primacy effect as marker for cognitive decline in Parkinson's disease

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Introduction: From a neuropsychological standpoint, a dysexecutive syndrome is a feature of early Parkinson's disease (PD), while in patients who develop dementia associated to PD (PDD) also a declarative memory disorder may occur. The serial position effect (SPE) reflects the tendency of cognitively normal subjects to recall more words from the beginning (primacy effect) and the end of a list (recency effect) as compared to words in the middle. Alteration of SPE was found in patients with declarative memory disorder: a reduced primacy effect characterized Alzheimer's disease and a lower primacy effect predicted the conversion to dementia in mild cognitive impairment (MCI) patients. SPE was scarcely explored in PD and there are no data regarding PDD patients.

Objective: Aim of the study was to investigate SPE in PD patients with different degree of cognitive impairment and to determine if SPE can be useful in identifying PDD patients.

Methods: Three matched groups of PD patients were selected based on neuropsychological diagnosis: cognitively normal PD patients (PD-CN), PD patients with MCI (PD-MCI) and PDD patients. The groups were matched based on gender, age at disease onset and education and 27 patients belonged to each group. Declarative memory was evaluated with the Rey's auditory verbal learning test and SPE was estimated using the regional scoring method. Within-group, between-group and a ROC analysis were performed.

Results: PDD patients showed the worse performance in learning and delayed recall. In PDD patients the primacy effect disappeared, while it was still observable, even if decreased, in PD-MCI. PD-CN patients showed no alteration of SPE. The accuracy of the primacy effect in distinguishing PDD from PD-MCI and PD-CN patients was of 91% and the best cut-off was 0.4 (sensitivity 85.2% and specificity 88.9%).

Conclusions: The absence of the primacy effect was a marker of PDD patients. Longitudinal studies are necessary to ascertain if SPE could be a potential predictive factor for cognitive decline in PD.