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Does cognitive dual-task performance relate to disease severity in Parkinson's disease?

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Keywords

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Abstract

Parkinson disease (PD) is a progressive neurodegenerative disease associated with motor and cognitive impairments. People with PD commonly have more difficulty performing two tasks simultaneously (dual-task performance) than healthy people. The purpose of this study was to investigate the relationship between a novel dual-task (DT) paradigm and cognitive performance, as well as clinical measures of disease severity.

Twenty-two subjects with PD (Off medication, age

67± ,5.5 MDS-UPDRSIII: 41[MM1] ± 14.5) and six healthy control (HC, age: 69[MM2] , SD: 8.5) performed two, two-minute, DT test; a sitting test and a turning in place test. Participants were required to push a handheld button as quickly as possible after hearing an "AI" sequence, via an auditory modified AX-Continuous Performance Task. Reaction times (RT) and accuracy (AC) were computed for both sitting and turning. Cognitive function was assessed with the MoCA and disease severity with the MDS-UPDRSIII.

The PD group showed less AC (p=0.005), but similar RT, in performing the cognitive DT compared to the HC group when sitting; while no differences were observed between groups when turning. Only for the cognitive DT while turning, a higher MoCA was associated to lower RT (r= -0.526, p= 0.014) and higher AC (r= 0.599, p= 0.003); and a higher MDS-UPDRSIII scores significantly related to lower AC (r= -0.539, p= 0.008).

Our findings indicate that AC while performing a cognitive task requiring attention may be impaired in people with PD when Off dopaminergic medication. No differences among PD and HC were found in the cognitive DT when performed while turning, as in general turning in place is a difficult motor task in the elderly. Lastly, we found significant associations between motor and cognitive severity of PD and the cognitive DT while turning, indicating that disease severity and cognitive dysfunction contribute to deterioration in cognitive performance only when two tasks occur simultaneously.