The prevalence and nature of Mild Cognitive Impairment in Parkinson’s disease (PD-MCI) identified using different cognitive testing methodologies

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BACKGROUND

Dementia develops rapidly in PD: the 8 year prevalence being 78.2% (1) and in a recent study 27% of PD-MCI patients converted to dementia within 3 years (2).

This is notably higher than the 4-6% incidence of Alzheimer’s disease (AD) up to 75 years, and the 5-10% annual conversion rate of MCI to AD, though most do not convert to AD within 10 years (3).

While the reported incidences of MCI in the general population vary from 5 to 30%, the Muyo Clinic Study using published criteria found it to be 16% (4).

The incidence of MCI in 8 PD cohorts was 25.8% (5) and the MDS task force review of 48 PD studies identified the incidence as 26.7% (6).

Compared with AD, the more rapid development of dementia in PD, particularly in PD-MCI, suggests that these identified incidences of PD-MCI may be conservative.

Although deficits to attention and information processing are notable in PD, automated tests designed to assess these domains are unique in their field, and the present study sought to evaluate the incidence of PD-MCI including such measures.

METHODOLOGY

Since Delors in 1969 (7) developed the first automated attention tests, simple reaction time (SRT) and choice reaction time (CRT), these have been the mainstay of attention testing in cognitive psychology, together with among others, vigilance tasks.

The CDR System is an automated set of cognitive tests which has been used in approaching 1400 clinical trials since the 1980s.

The CDR System has tests of attention (SRT, CRT, digit vigilance), working memory (articulatory & visuo-spatial) and episodic recognition memory (verbal and non-verbal).

The tests can be performed in 15 minutes and their domain specificity has been confirmed by factor analysis.

The CDR System was administered to 484 PD patients (mean age 66.7 yrs, SD 10.4) and the data compared to 1896 age-matched controls.

The 2011 MDS Level 2 criteria for PD-MCI (8) were applied using cut-offs of 1.5 & 2 SD for 4 domains: attention & information processing, working memory, episodic memory, and visuospatial.

In the Table, MCI was also calculated for the individual domains using either accuracy or speeded measures.

RESULTS

In the Table, MCI was also calculated for the individual domains using either accuracy or speed scores, where the speed scores consistently identified higher prevalence of MCI.

CDR System

The authors find these higher ratios of PD-MCI to be in line with the increased incidence and more rapid onset of dementia in PD.

DISCUSSION & CONCLUSIONS

Compared to controls, PD patients were most impaired on the speeded measures from the attention tasks, with an effect size (ES) of 2.0, and to stimulus detection in the vigilance task (ES=2). ESs of deficits to working & episodic memory ranged from 0.4 to 1.4.

Accordingly, attentional PD-MCI was most prevalent in this study, and previous work from our group has shown poor performance on the attention tests to predict subsequent cognitive decline (9).

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Compared with AD, the more rapid development of dementia in PD, particularly in PD-MCI, suggests that these identified incidences of PD-MCI may be conservative.

It is concluded that to definitively measure the range and extent of cognitive dysfunction in PD, the assessments should include automated domain specific cognitive tests which capture both speed and accuracy.

REFERENCES


