Screening for Mild Cognitive Impairment in Parkinson's Disease: Comparison of the Italian Versions of Three Neuropsychological Tests

Angela Federico[1], Alice Maier[1], Greta Vianello[2], Daniela Mapelli[2,3], Michela Trentin[4], Giampietro Zanette[4], Alessandro Picelli[1,5] Maria Luisa Gandolfi[1,5] and Stefano Tamburin[1]

[1]Department of Neurological and Movement Sciences, Neurology Section, University of Verona, Verona, Italy; [2]Department of General Psychology, University of Padova, Padova, Italy ; [3]Human Inspired Technologies Research Center, University of Padova, Padova, Italy; [4]Section of Neurology, Pederzoli Hospital, Peschiera del Garda, Verona, Italy; [5]Neuromotor and Cognitive Rehabilitation Research Centre, University of Verona, Verona, Italy

BACKGROUND

Mild cognitive impairment (MCI) is frequent in Parkinson's disease (PD). Recently proposed criteria for MCI in PD (PD-MCI) indicate level I diagnosis based on abbreviated assessment and level II based on comprehensive neuropsychological evaluation. Identifying PD-MCI is clinically important, as these patients appear to be at increased risk for developing PD-D, and they often present functional impairment and have worse quality of life. In the rehabilitation setting, recognizing PD-MCI is very important, in that it may negatively influence the outcome in patients undergoing motor rehabilitation. Moreover, PD-MCI may itself represent a target for cognitive training, pharmacological treatment, or their combination.

AIM OF THE STUDY

The study explored the sensitivity and specificity of the Italian versions of three neuropsychological tests for level I diagnosis of PD-MCI. The sensitivity and specificity of the Mini Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA), and the Addenbrooke's Cognitive Examination Revised (ACE-R) in comparison to level II diagnosis of PD-MCI were examined.

SUBJECTS AND METHODS

Subjects. Our population sample was a group of 100 consecutive Italian PD patients.

Inclusion criteria. (1) Diagnosis of PD based on the UK PD Brain Bank Criteria; (2) absence of PD-D; (3) no other possible causes for cognitive impairment (e.g., delirium, stroke or cerebrovas- cular disease, head trauma, metabolic abnormalities, and adverse effects of medication); (4) no other PD-associated comorbid conditions (e.g., marked motor impairment, severe or unpredictable motor fluctuations and/or dyskinesia, severe anxiety, excessive daytime sleepiness, or psychosis) that may have significantly influenced cognitive testing.
After screening for inclusion criteria 43 patients (27 males, 16 females, mean age 68.2 ± 9.2, range 44– 88; mean education 8.5 ± 2.9 years, range 4–13) were included in the study.

Neuropsychological Assessment. All patients underwent the Italian versions of MMSE, MoCA, and ACE-R and a full neuropsychological testing. Full neuropsychological testing included at least two types of neuropsychological testing for each of the five following cognitive domains: attention and working memory, executive function, language, memory, visuolspatial function. It was explored also the impairment on basic activities of everyday life (BADL) and instrumental activities of everyday life (IADL).

Statistical Analysis. All tests were carried out with the IBM SPSS version 20.0 and the Stata 11.0 statistical packages. Sensitivity and specificity of the MMSE (raw score and score corrected for age, sex, and education), MoCA (raw and corrected score), and ACE-R were calculated across all possible cutoff scores below which an individual would be classified as having PD-MCI. The area under the receiver-operator characteristics (ROC) curve (AUC) was calculated and compared across the three tests and the AUC 95% confidence intervals (CIs) were generated.

Results. According to the MDS Task Force level II criteria, PD-MCI was diagnosed in 22 patients (51%). Eight out of the 22 (36%) PD-MCI patients were classified as single-domain MCI, with five of them showing impairment in executive function and three with impaired memory. The other 14 patients (64%) were classified as multiple-domain MCI. Disease duration was significantly longer in patients with MCI than in those without MCI. PD motor and impairment scales were more severely impaired in MCI group than in patients without MCI. The other variables did not differ between the two groups. None of the demographic and clinical variables significantly differed according to the MCI subtype. (Table 1)

TABLE 1 – Characteristics of patients, according to the diagnosis and subtype of PD-MCI (MDS Task Force Level II criteria)

	No PD-MCI (n = 21)	PD-MCI (n = 22)	p	Single-domain PD-MCI (n = 8)	Multiple-domain PD-MCI (N = 14)	p
Age	67.5 ± 11.2	68.9 ± 7.2	n.s.	65.5 ± 7.7	70.8 ± 6.2	n.s.
Sex (M/F)	12/9	15/7	n.s.	7/1	8/6	n.s.
School (y)	8.7 ± 3.1	8.3 ± 2.8	n.s.	9.3 ± 2.6	7.6 ± 2.8	n.s.
Duration (y)	7.8 ± 5.3	12.8 ± 8.1	0.03	13.1 ± 8.6	11.4 ± 8.1	n.s.
H-Y (1–5)	1.9 ± 0.7	2.5 ± 0.6	0.014	2.3 ± 0.8	2.6 ± 0.5	n.s.
UPDRS-III (0–108)	23.3 ± 8.9	30.2 ± 8.4	0.02	27.5 ± 10.2	31.5 ± 9.0	n.s.
Treatment						
LD (yes/no)	17/4	20/2	n.s.	7/1	13/1	n.s.
DA (yes/no)	12/9	7/15	n.s.	2/6	5/9	n.s.
MAO-I (yes/no)	4/17	1/21	n.s.	0/8	1/13	n.s.
Total LED (mg)	821 ± 413	889 ± 394	n.s.	893 ± 439	888 ± 384	n.s.
Depression (yes/no)	8/13	9/13	n.s.	3/5	6/8	n.s.

School: education (years); duration: disease duration (years); H-Y: Modified Hoehn and Yahr Staging Scale (range 1–5); UPDRS-III: Unified Parkinson's Disease Rating Scale part III (range 0–108); LD: levodopa; DA: dopamine agonist; MAO-I: monoamine oxidase inhibitors; LED: levodopa equivalent dose (daily).

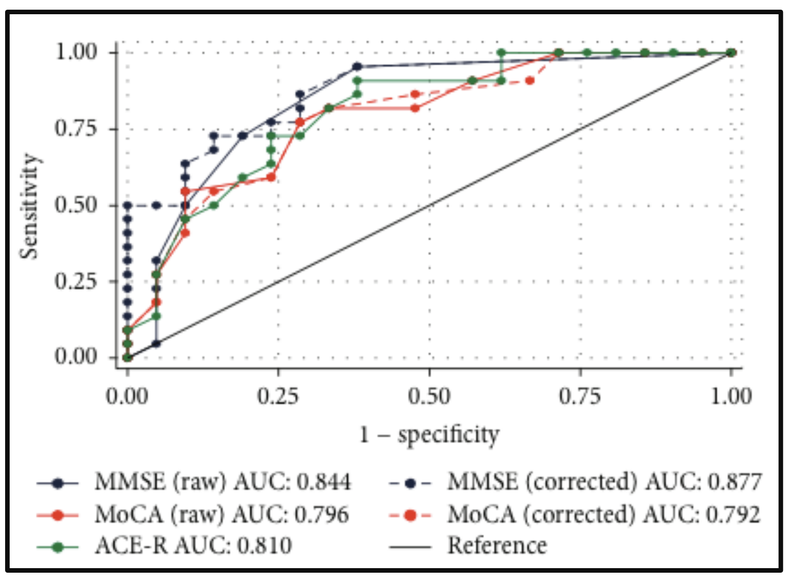

FIGURE 1 - Receiver-operator characteristics (ROC) curves for the three screening tests (raw and corrected data)

CONCLUSIONS

Our data documented that the performances of the three tests were similar and that they could achieve a limited trade-off between sensitivity and specificity, with a slight advantage of MMSE and the use of corrected data. The time of administration favored MMSE. In Italian-speaking PD patients, MMSE might represent a good screening tool for PD-MCI, because of the shorter time of administration and the performance comparable to those of MoCA and ACE-R. Further studies are needed to validate the new PD-MCI criteria across different languages and cultures.

Sin

XLVII CONGRESSO NAZIONALE
22-25 OTTOBRE 2016 – VENEZIA