

Relationship between apathy and executive dysfunctions in Parkinson's Disease

G. Santangelo¹, F. Piscopo¹, A. D'Iorio¹, S. Cuoco², C. Baiano¹, M.T. Pellecchia², M. Amboni³, P. Barone², C. Vitale^{4,5}

1. Department of Psychology, University of Campania Luigi Vanvitelli, Caserta, Italy.

2. Department of Medicine, Center for Neurodegenerative Diseases (CEMAND), University of Salerno, Fisciano, Italy.

3. Institute of Diagnosis and Care (IDC), Hermitage-Capodimonte, Naples, Italy.

4. Department of Motor Sciences and Wellness, University "Parthenope", Naples, Italy.

5. Institute of Diagnosis and Care (IDC), Hermitage-Capodimonte, Naples, Italy.

Introduction

Apathy is a neurobehavioral disturbance occurring at early and advanced stages of Parkinson's Disease (PD). Until now, few studies have explored the cognitive correlates of apathy in PD patients by evaluating such behavioural disorder regardless of the severity of the motor symptoms. Therefore, the present study was conducted to investigate the relationship between cognitive dysfunctions and apathy by means of the Dimensional Apathy Scale (DAS), which allows to measure apathy without the confounding effect of PD motor disability.

Results

The two groups did not differ on age and education. After Bonferroni correction ($p=0.007$), a statistically significant difference between apathetic and non-athetic PD patients was found on MoCA total score, on part A and B of the TMT and on interference task of Stroop Test. No significant between-group differences were found in the remaining cognitive tests (Table 1).

Conclusions

The findings evidenced reduced control/executive functions (i.e. set-shifting and inhibitory control) in PD patients with clinically significant apathy, and confirming a significant association between apathy and frontal lobe dysfunction, regardless motor disability. The findings also supported the idea that apathy and executive defects are two epiphenomena of a dysfunctional prefrontal-subcortical circuitry, shared by the two disorders.

Material and Methods

We enrolled 56 non-depressed and non-demented PD patients, out of them 24 PD patients had clinically significant apathy and 32 PD patients were non-athetic. All patients completed the Dimensional Apathy Scale (DAS) to assess apathy and Beck Depression Inventory to assess depressive symptoms. Moreover, they underwent a standardized neuropsychological battery evaluating frontal/executive functions (i.e., part A and B of the Trail Making Test (TMT) and the classic version of the Stroop Color-Word Test), memory (i.e., immediate and delayed recall of the words list) and visuospatial abilities (i.e., Judgment of Line Orientation of Benton, form H).

Bibliografia

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Table 1. Comparison between apathetic PD patients and non-athetic PD patients on demographic, cognitive and behavioral variables

	Apathetic PD patients		Non-athetic PD patients		U	P
	Standard Deviation	Standard Deviation	Mean	Standard Deviation		
Age (years)	68.63	9.34	64.28	7.36	274.000	0.068
Years of schooling	9.75	4.63	11.66	4.39	284.000	0.091
Montreal Cognitive Assessment	19.69	3.38	21.90	3.63	232.500	0.020
Immediate recall of the word list	34.30	8.95	37.94	11.60	293.500	0.182
Delayed recall of the word list	6.90	3.03	8.19	3.14	272.500	0.090
Trail Making Test – part A	71.15	37.94	36.72	23.36	149.500	0.001
Trail Making Test – part B	203.85	135.61	104.13	84.39	143.500	0.002
Trail Making Test – part B-A	129.75	108.00	77.55	76.07	197.500	0.060
Stroop Color-Word Test	14.60	11.83	19.56	6.41	178.000	0.004
Judgment of Line Orientation of Benton	18.61	5.53	22.41	5.95	155.500	0.038
DAS Executive subscale	11.27	2.31	4.07	3.35	19.000	< 0.01
DAS Emotional subscale	10.13	2.77	9.57	3.07	180.500	0.448
DAS Cognitive/Behavioral Initiation	13.40	3.06	6.59	3.96	40.000	< 0.01
Beck Depression Inventory - II	9.58	4.76	7.09	4.44	267.500	0.053