CORRELATES OF COGNITIVE IMPAIRMENT IN MULTIPLE SCLEROSIS: DO ENVIRONMENTAL AND LIFESTYLE RISK FACTORS FOR THE DISEASE MATTER?

C. NICCOLAI, I. RIGHINI, B. GORETTI, M. GIANNINI, B. HAKIKI, L. PASTÒ, L. RAZZOLINI, E. PORTACCIO, M.P. AMATO

Department NEUROFARBA, Section of Neurosciences, University of Florence, Italy

Background

Cognitive impairment (CI) affects 40-65 % of multiple sclerosis (MS) patients and has negative impact on the subject everyday functioning. The search on (modifiable) risk factors/protective factors may provide opportunities for prevention /mitigation of CI.

The aim of our study was to assess correlates of CI in MS patients, including environmental and lifestyle factors that are currently recognized as risk factors for the disease.

Methods

Inclusion criteria

- RR-MS patients referred to our MS Centre since 2013
- Age≥ 18 years
- No relapses/steroid treatment in the month before the NP assessment
- Informed consensus and EC approval

Clinical and Neuropsychological assessment

- Rao's Brief Repeatable Battery and Stroop Test
  CI was defined as the failure of ≥3 tests (below 5th percentile of Italian normative data).
- Cognitive Reserve: Premorbid Intelligence Quotient (IQ) by Italian Version of the National Adult Reading TEST (NART) and Cognitive leisure activity questionnaire (Sumowski JF et al, 2010)
- Depression: Montgomery-Åsberg Depression Rating Scale (MADRS)
- Fatigue: Fatigue Severity Scale (FSS)
- Information collected by the patient and CG through a semi-structured questionnaire including: familiarity for MS, psychiatric diseases, cognitive impairment, cardiovascular risk factors, comorbidities, diet and lifestyle (current/past).

Statistical analysis

The relationship between the variables and the subject cognitive status was assessed through multivariable linear

Results

Table 1. Study sample

	Patients sample (#110)	Cognitively impaired (#26, 24 %)	Cognitively preserved (#84, 76 %)	p
Age, years	44.9 ± 11.8	50.3 ± 12.9	43.2 ± 10.9	**0.02**
Male/females	45/65	21/5	24/60	NS
Education, years, mean (SD)	12.9 ± 3.4	12.9 ± 4.5	12.9 ± 3.0	NS
Disease duration, mean (SD) years	12.5 ± 10.0	15.2 ± 11.2	11.7 ± 9.5	NS
Age at onset, mean (SD), years	32.2 ± 10.3	34.4 ± 11.4	31.5 ± 10.0	NS
EDSS (median IQR)	2.0 (1.5-2.5)	2.0 (1.5-3.5)	2.0 (1.0-2.5)	**0.02**
FSS, mean (SD)	39.3 ± 17.4	44.3 ± 15.8	37.8 ± 17.8	NS
Mild to severe depression (MADRS ≥ 9)	19 ± 17.3	5 ± 19.2	14 ± 16.7	NS
Relapses in the year before inclusion	0.3 ± 0.6	0.3 ± 0.5	0.3 ± 0.6	NS
Premorbid IQ score	99.7 ± 20.2	104.5 ± 3.2	106.3 ± 2.7	**0.02**

Legend to Table 1. SD standard daviation, EDSS Expanded Disability Status Scale, FSS Fatigue Severity Scale, MADRS Montgomery-Asberg Depression Rating Scale, IQ intelligence Quotient

Table 2. Risk factors for CI

	Cognitively impaired (#26)	Cognitively preserved (#84)	p
Cardiovascular risk factors			
Type 1 diabetes	7.7 %	1.2 %	0.07
Comorbidities			
Psychiatric disorder	26.9 %	10.7 %	0.04
Diet and lifestyle			
Physical activity in childhood-adolescence (Y/N)	50 %	67,9 %	0.09

- *A higher number of tests failed was associated to lower caffeine intake (cups/day Spearman rho -0.235, p=0.01), older age (Spearman rho 0.277, p=0.03) and higher EDSS score (Spearman rho 0.323, p=0.001).*

Table 3. Multivariate analysis

	OR (95% CI)	p
Premorbid IQ	0.79 (0.66-0.95)	**0.01**
Childhood-adolescence physical activity	3.22 (0.93-11.17)	0.06
EDSS	1.59 (1.04-2.43)	**0.03**
Type 1 diabetes	12.81 (0.91-179.47)	0.06

Legend to Table 3. IQ Intelligence Quotient, EDSS Expanded Disability Status Scale

Conclusions

- **Higher EDSS** confirms to be a **risk factors** for cognitive impairment in MS

- **Higher CR** (premorbid IQ) confirms to be a **protective factor**

- Interesting trends for **physical activity in childhood/adolescence** (protective factor?) and **diabetes comorbidity** (risk factor?)

- **Caffeine intake** suggested as possible enhancer of cognitive performance

Bibliography

- «Cognitive reserve in multiple sclerosis», Sumowski et.al, Mult. Scler. 2013
- «The Rao's Repeatable battery and Stroop Test:normative values with age, education and gender corrections in an Italian popolation», Amato et al., Mult. Scler. 2016
- **«Risk factors for and menagement of cognitive dysfunction in multiple sclerosis», Nature Reviews,/Drug Discovery 2011**