CEREBRAL SMALL VESSEL DISEASE CHANGES OVER TIME: DEVELOPMENT OF A PROGRESSION SCORE AND ITS RELATION TO COGNITION

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1. Aims:

- To develop a cerebral small vessel disease (cSVD) progression score.
- To study the longitudinal association of this score with changes in cognitive function and incident Mild Cognitive Impairment (MCI).

2. Methods:

➤ Characteristics of the study:

ISSYS (Investigating Silent Strokes in hYpertensive patients Study).

Study design	Longitudinal population based study
Patients	Hypertensive patients free of dementia and stroke at baseline
Assessment of cognition	Dementia Rating Scale 2 nd version (DRS-2: Attention, executive function, memory and total scores)

➤ Change in Cognitive Status:

Baseline Diagnosis	Follow-up diagnosis	Cognitive Change
Normal Aging (NA)	NA	Stable NA
NA	MCI	Incident MCI
MCI	MCI	Stable MCI
MCI	NA	Reversion to NA

➤ Qualitative assessment of cSVD changes:

cSVD MRI marker	Assessment of progression
Change in White Matter Hyperintensities (WMH)	Total Rotterdam Progression Scale $\geq 2,5$
Incident lacunar infarcts	Strive criteria
Incident deep Cerebral Microbleeds (CMB)	Strive criteria
Change in Basal Ganglia Enlarged Perivascular Spaces (BG-EPVS)	Change in Potter's Scale ≥ 1

3. Results:

3.1. cSVD progression score (0 to 4) in the sample:

3.2. Principal characteristics of the sample:

- 345 patients (44.6% female) were followed up for 4 (± 0.41) years.
- Mean office systolic and diastolic blood pressure at baseline visit was 143 (131; 154) and 78.2 (71; 84.5), respectively.

3.3. cSVD progression score and change in cognition:

3.4. cSVD progression score and change in cognitive status:

Nº of markers	cSVD Progression score and change in cognitive diagnosis					
	Reversion to NA		Stable MCI		Incident MCI	
	OR (CI)	P-value	OR (CI)	P-value	OR (CI)	P-value
None	REF	REF	REF	REF	REF	REF
1 markers	0.71 (0.22; 2.31)	0.57	0.69 (0.26; 1.82)	0.45	0.64 (0.22; 1.89)	0.42
≥ 2 markers	2.74 (0.73; 10.30)	0.14	0.57 (0.07; 4.84)	0.61	2.13 (0.65; 7.00)	0.21

The multinomial regression model has been constructed considering stable NA as the reference category. cSVD progression score has been entered in the model as predictor and adjusted by baseline age, sex, education, time between visits, baseline diastolic BP, baseline abdominal obesity and respective baseline cSVD burden.

4. Conclusions:

- We observed that a progression in ≥ 2 markers of cSVD was associated with a significant decrease in executive function compared to no progression. However, this result was not observed for neither memory, nor attention, nor total score.
- We observed no relationship between cSVD progression score and incident MCI.
- We developed a cSVD progression score which may be useful in the longitudinal study of cSVD. Further longitudinal studies are needed in order to examine its clinical usefulness and whether or not has an additive value compared to evaluate cSVD disease lesions separately.

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