

Arterial Territory Topography of White Matter Lesions Across Neurodegenerative and Vascular Cohorts

P #10645

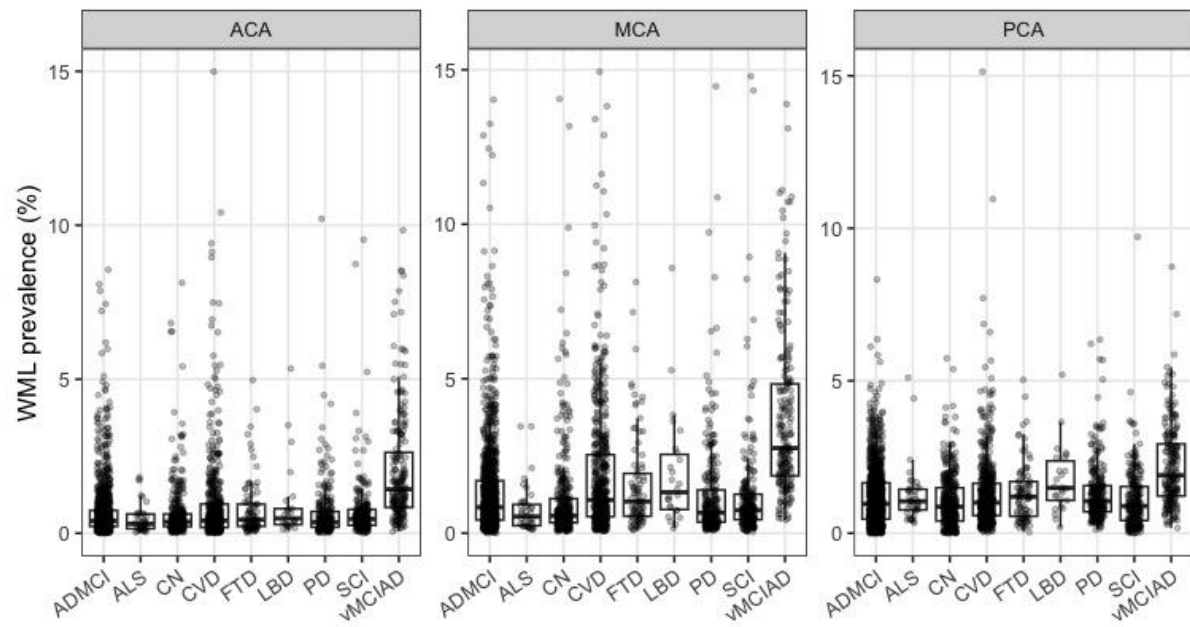
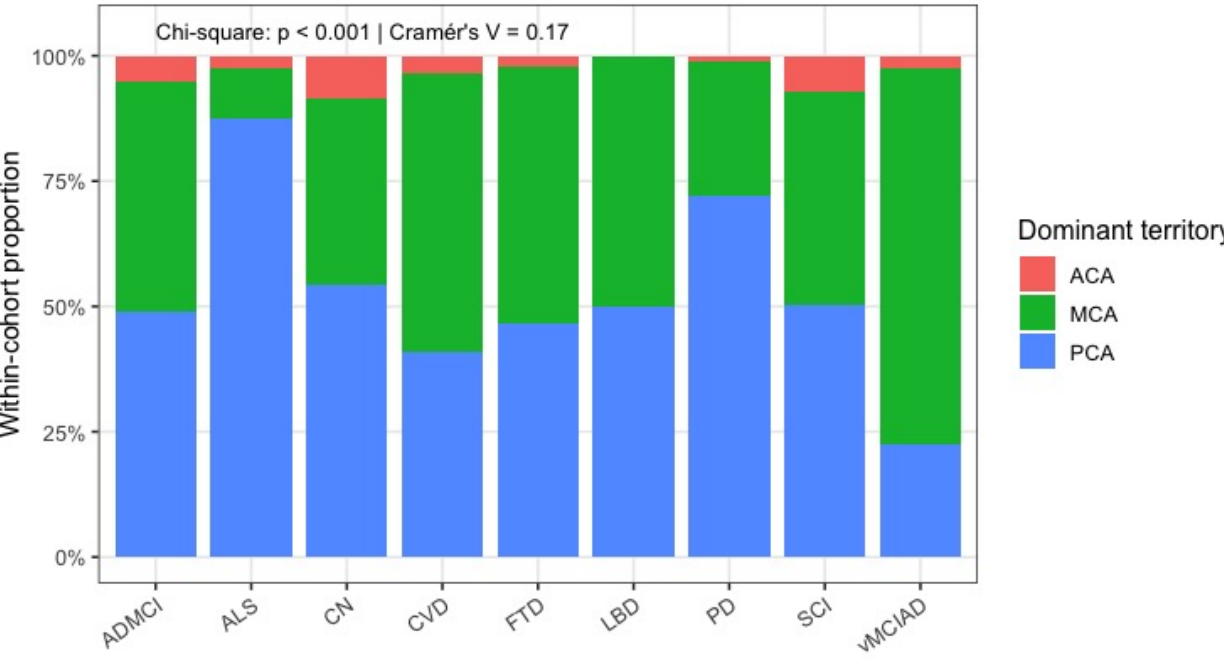
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Key Take Aways:

1) **Diagnosis-specific spatial patterns:** White matter lesions show distinct arterial territory distributions across neurodegenerative and vascular cohorts, beyond total lesion burden.

2) **Cognitive relevance:** Posterior (PCA) lesion burden is associated with lower MOCA scores in disease cohorts (ADMCI, vMCIAD, PD), linking regional white matter damage to cognitive decline.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
- White matter lesions (WML) are common on brain MRI in older adults and are associated with cognitive decline and dementia risk. - It is unclear whether vascular and neurodegenerative diseases produce distinct spatial patterns of WML beyond differences in total burden. - Arterial territory mapping (ACA, MCA, PCA) can identify region-specific WML patterns and help differentiate diagnostic cohorts. - Understanding these spatial patterns may provide insights into disease mechanisms and explain variability in cognitive trajectories.	- Analyzed a multi-cohort FLAIR MRI dataset (n = 2,924) from ONDRI, CCNA, and CAIN, mapping WML prevalence to ACA, MCA, and PCA territories. - Assigned each participant a dominant territory (highest WML prevalence) and calculated an anterior–posterior index (PCA – [ACA + MCA]). - Used age- and sex-adjusted linear models, multinomial models, and post hoc contrasts to compare territorial prevalence and assess associations with MOCA scores.	 Figure 1. WML prevalence (%) across ACA, MCA, and PCA territories by cohort. Points = participants; boxplots = distribution.  Figure 2. Proportion of participants by dominant WML territory differs across cohorts (χ^2 p < 0.001; Cramér's V = 0.17).	- White matter lesions exhibit diagnosis-specific spatial patterns beyond total lesion burden. - Arterial territory phenotypes provide insight into underlying vascular and neurodegenerative mechanisms. - These measures are scalable and may help predict cognitive decline, with longitudinal validation as a next step.	Wardlaw J, Smith C, Dichgans. Small vessel disease: mechanisms and clinical implications The Lancet Neu. ology, 2019; 18, 684-696 Prins, N., Scheltens, P. White matter hyperintensities, cognitive impairment and dementia: an update. Nat Rev Neurol 11, 157–165 (2015). Nasreddine, Z.S., Phillips, N.A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J.L. and Chertkow, H. (2005), The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool For Mild Cognitive Impairment. Journal of the American Geriatrics Society, 53: 695-699.
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