Role of white matter hyperintensities in aging and dementia spectrum

Sarath Govindaraj, Nithin Thanissery, Faheem Arshad, Bharath Ravindra, Vikram Chaudhary, Sunil Khokhar, Subasree Ramakrishnan, Jitender Saini, Rose Dawn Bharath, Suvarna Alladi

Presenting Author: Dr Sarath G, NIMHANS

Introduction

- Among approximately 5.3 million dementia patients in India, nearly 40% are estimated to be due to vascular contribution. White matter hyperintensities (WMHs), are indicative of small vessel disease and have been increasingly recognized as contributors to cognitive impairment in neurodegenerative disorders.

Aim

- To quantify and compare the burden of periventricular (PWMH) and deep white matter hyperintensities (DWMH) among cognitively normal (CN) individuals, patients with Alzheimer's disease (AD) and frontotemporal dementia (FTD) and examined their association with cognitive performance using the Addenbrooke's Cognitive Examination-III (ACE-III).

Methodology

- The study included 39 cognitively normal (CN) controls, 49 AD patients and 64 FTD patients for whom FLAIR images were acquired on a 3T MRI scanner.

- ACE-III was used to access cognition which included a global and sub-scores for attention, memory, fluency, language and visuospatial domains. And the WMHs were graded using Fazekas grading.

- Two independent researchers assessed the axial FLAIR MRI brain sequence (see image 1) for each of the 90 patients, with the sole focus of assigning a Fazekas score (0–3) to each study as a means of quantifying the burden of ischemic white matter lesions. The neuroradiologists were blinded to the scoring assigned by their counterpart and to the clinical information.

Results

Figure 1:Burden of WMHs in Dementia vs Controls

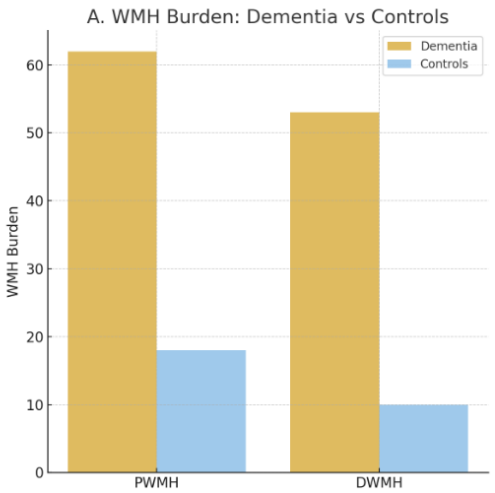
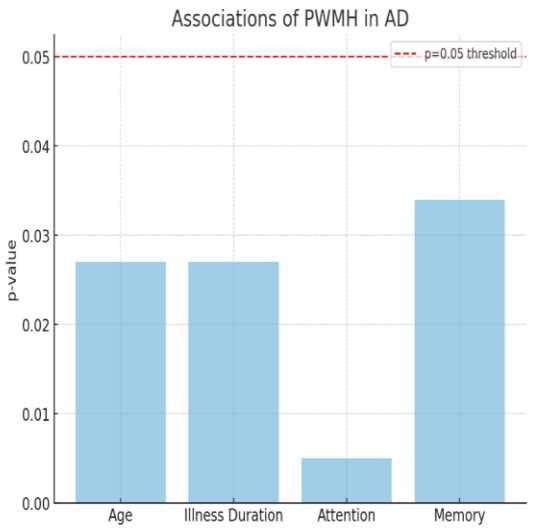
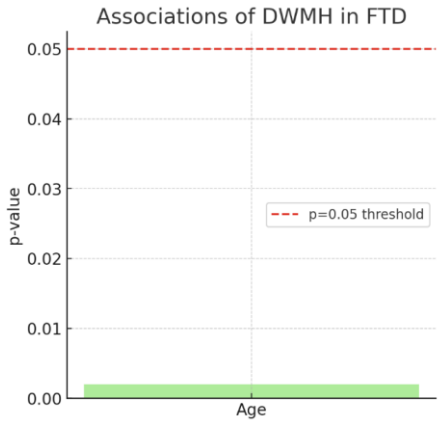


Figure 2 and 3: Association of PWMH in AD and DWMH in FTD





Conclusion

- The findings reveal a significantly greater burden of PWMH and DWMH in individuals with AD and FTD compared to cognitively normal controls. In AD group, increased PWMH burden was associated with advancing age, longer disease duration, and lower attention and memory scores.
- The results highlight patterns of WMH distribution and their cognitive correlates in AD and FTD.
- This study indeed emphasises the importance of vascular contribution to dementia and its subtypes.