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**Letter to the Editor**

# Carotid Intima-Media Thickness and Periventricular White Matter Hyperintensities are Unlikely Predictors of Cognitive Decline

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**Letter to the Editor**

We read with interest the article by Li *et al*. on a prospective cohort study on the association between carotid intima-media thickness (CIMT) assessed by ultrasound and periventricular white matter hyperintensities (PWMH) assessed by 3T NRI with mild cognitive impairment (MCI) assessed by 10 neuropsychological tests across 5 domains in 541 patients with Parkinson's disease [1]. The prevalence of MCI was 45% and independent predictors of MCI were PWMHs, CIMT, homocysteine levels, Hoehn and Yahr stage, and MDS-UPDRS score [1]. The diagnostic value was higher for combined CIMT and PWMHs compared to either marker alone [1]. The study is appealing but several points merit discussion.

The first point is that CIMT varies greatly between examinations and between observers [2]. The level at which CIMT was measured in the common carotid artery, the bulb, and the internal carotid artery was not defined [1]. Since the thickening of the artery wall varies greatly depending on the measurement height, it is important to measure CIMT at the same height in all included patients. The authors should also indicate the inter- and intra-observer variability of CIMT measurements, which may also be high in this study [3].

The second point is that there are also large variations in PWMH [4]. How great was the variability between different examinations in the same patient, and how great was the inter- and intra-observer variability of the PVWH measurement? It is also important to define the term "periventricular." How was 'periventricular' distinguished from "peripheral," "subcortical," and "deep white matter"?

The third point is that the definition of MCI is arbitrary [1]. Five domains were tested, and if abnormal performance was found in two domains or in two tests of a single domain, MCI was diagnosed [1]. However, if, for example, two tests in the language domain were impaired, why is it justified to diagnose someone with MCI?

The fourth point is that several different causes of PWMH were not listed as exclusion criteria [1]. These include smoking, traumatic brain injury, metabolic encephalopathy, infections, prematurity, demyelinating diseases, cerebral hypoxia, and cardiovascular disease (e.g., atrial fibrillation) [1]. If patients with these conditions were included, the results may be misleading.

Finally, we should be informed about how vascular encephalopathy was distinguished from PWMH. PWMH itself may be due to cerebrovascular disease [5].

In summary, CIMT and PWMH are poor biomarkers for predicting MIC in patients with Parkinson's disease unless all factors influencing the development of PWMH are included in the analysis.

**Declarations**

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**Consent for Publication:** Not applicable.

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