Cortical microinfarcts on 3T MRI: Clinical correlates in memory-clinic patients

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Abstract
Background: This is the first study to assess cerebral microinfarcts (CMIs) on 3 tesla (3T) magnetic resonance imaging (MRI) in a memory clinic population.
Methods: We included 238 consecutive patients (aged 72.5 ± 9.1 years) from a memory clinic in Singapore. All patients underwent extensive neurological and neuropsychological testing and 3T MRI on the same day. Cortical CMI rating criteria were adapted from a previous study on 7T MRI. We analyzed the frequency and association of cortical CMIs with demographic, clinical, cognition, and other MRI findings.
Results: Seventy-five patients (32%) had cortical CMIs (median 1, range 1–43). Patients with CMIs showed worse cognitive functioning on MMSE, and in the domains of language and visuoconstruction. The presence of CMIs was related to other markers of small vessel disease, but most strongly to larger cortical infarcts. Patients with CMIs were more often diagnosed with vascular dementia.
Conclusion: Cortical CMIs on 3T MRI are a novel marker of cerebrovascular disease in dementia.

Keywords: Dementia; Small vessel disease; Microinfarcts; Atrophy; Alzheimer's disease; Memory clinic population; MRI

1. Introduction
Cerebrovascular disease is an important contributor to cognitive decline and dementia in the aging population [1]. On autopsy, vascular pathology is found in most patients with clinically diagnosed dementia [2]. This vascular pathology frequently involves the cerebral small vessels. In vivo, signs of cerebral small vessel disease (SVD) on conventional magnetic resonance imaging (MRI) include white matter hyperintensities (WMHs), lacunes, and microbleeds [3,4]. However, these conventional MRI markers do not fully capture the burden of SVD in cognitive decline and dementia. In this context, cerebral microinfarcts (CMIs) have attracted increasing attention [5]. CMIs are regarded as the most widespread form of brain infarction and hence could play an important role in cognitive decline and dementia [5,6]. A systematic review with a pooled analysis of autopsy studies showed that CMIs are observed in 24% of nondemented older subjects, in 43% of patients with Alzheimer’s disease (AD), and in 62% of patients with vascular dementia (VaD) [6]. Moreover, autopsy studies

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