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Cortical cerebral microinfarcts on 3 Tesla Magnetic Resonance Imaging - a novel marker for cognitive impairment

Objectives:

We examined the risk factors of cerebral cortical microinfarcts (CMIs) and their association with cognitive impairment in a subsample from a population-based study in Singapore.

Methods:

Chinese and Malay subjects, who were recruited into the Epidemiology of Dementia in Singapore (EDIS) Study, underwent extensive neuropsychological tests and 3T brain MRI. CMIs were assessed on T1-weighted images, aided by FLAIR and T2-weighted images; and defined as hypointense lesions on T1, <5mm, restricted to the cortex, and distinct from perivascular spaces. Cognitive function was categorized into no cognitive impairment, cognitive impairment no dementia (CIND)-mild, CIND-moderate and dementia in accordance with previously established criteria. These associations were examined using linear and logistic regression models.

Results:

A total of 580 subjects were included in the analysis, of whom 172 were diagnosed with CIND mild, 202 with CIND moderate and 31 with dementia. A total of 43 (7.4%) subjects had any CMIs. In the age and sex adjusted models the most important risk factors of CMIs were Malay ethnicity, smoking, and other MRI markers of cerebral small vessel disease. In the fully adjusted models, only Malay ethnicity, and presence of infarcts were independently associated with CMI. With respect to cognition, increasing numbers of CMIs were associated with CIND moderate/dementia [age, sex and education adjusted odds ratio (OR): 2.46; 95% confidence interval (CI): 1.29-4.68]. Additional adjustments for cardiovascular risk factors did not alter these associations. However, the associations were attenuated after including MRI markers such as white matter lesions, cortical and lacunar infarcts.

Conclusions:

In this study we found that CMIs are a common finding on 3T MRI and can be considered a novel marker of cerebrovascular pathology in cognitive impairment.