Cerebral microbleeds and neuropsychiatric symptoms in an elderly Asian cohort

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ABSTRACT

Objectives Neuropsychiatric symptoms (NPS) are commonly found in patients with cerebral small vessel disease such as white matter hyperintensities and lacunar infarcts. However, the association between cerebral microbleeds (CMBs) and NPS has not been examined. Hence the present study sought to investigate the relation between CMBs and NPS in an elderly population.

Methods This is a cross-sectional study of elderly Asians living in the community, who were assessed on a comprehensive neuropsychological battery and underwent clinical examinations as well as brain MRI scans. The 12-item neuropsychiatric inventory (NPI) was administered to a reliable informant. Total scores for individual symptoms and for NPI global performance were calculated and compared across three groups: no CMB, presence of 1 CMB and presence of multiple CMBs, controlling for demographics, vascular risk factors, history of stroke, and other small vessel and large vessel disease markers.

Results A total of 802 participants were included in the analysis. Participants with multiple CMBs had higher NPI total score compared to those with no CMB (1.06 vs 2.66, p=0.03). On individual symptom scores, higher score on depression (0.16 vs 0.53, p=0.02) and disinhibition (0.01 vs 0.14, p=0.04) was found in those elderly with multiple CMBs, independent of demographic and vascular risk factors, history of stroke, and other small vessel and large vessel disease markers.

Conclusions The presence of multiple CMBs is associated with high global neuropsychiatric disorder burden, in particular symptoms of depression and disinhibition. Future studies are recommended to investigate the importance of CMBs in the pathogenesis and longitudinal progression of neuropsychiatric disorders in the general elderly population.

INTRODUCTION

Cerebral microbleeds (CMBs) are associated with adverse clinical outcomes such as cognitive impairment and functional decline. CMBs often occur concomitantly with other markers of small vessel disease such as white matter hyperintensities (WMHs) and lacunar infarcts, and reflect the presence of both ischaemic and haemorrhagic cerebral vasculopathy. The effects of WMH and lacunar infarcts on neuropsychiatric symptoms (NPS) have been previously reported among patients with stroke. Furthermore, the clinical importance of CMBs in the development of post-stroke depression has been highlighted in hospital-based samples. However, the association between CMBs and NPS in a population-based sample has not been investigated. In this study, we examine the association between CMBs graded on MRI with NPS in elderly people living in the community in Singapore.

METHODS

Study population

The Epidemiology of Dementia In Singapore (EDIS) study participants were drawn from the Singapore Epidemiology of Eye Disease study, a multiethnic population-based study among persons aged 40–85 years, which included Chinese, Malays and Indians. There are two phases in the EDIS study. In phase 1, participants aged 60 years and above (n=3800) were screened using the Abbreviated Mental Test and a self-report of progressive forgetfulness. Screen-positive participants (n=937) agreed to take part in the second phase of this study, where they underwent the Mini-Mental State Examination, the Montreal Cognitive Assessment, and a locally validated neuropsychological battery (the vascular dementia battery, VDB), uniform clinical examination and MRI scan of the brain. Details of the study methodology have been described elsewhere. Ethical approval was obtained from the National Healthcare Group Domain-Specific Review Board. Written informed consent was obtained in the preferred language of the participants.

Assessment of NPS

To ensure the reliability of the information, suitable informants with frequent interactions with study participants for at least 10 hours a week were administered the 12-item neuropsychiatric inventory (NPI). The NPI is a structured interview investigating the presence, frequency, severity and caregiver distress of 12 symptoms. Details and the administration procedure have been described elsewhere. For each symptom, the total score is calculated by multiplying frequency and severity. The NPI total score is the sum of individual symptom scores.

Vascular risk profile

A vascular risk profile was recorded for all study participants, which included: (1) hypertension: defined as a previous diagnosis of hypertension or the use of antihypertensive medication; (2)