

Brain reserve is associated with cognition in AD and MCI patients in different vascular risk factors status

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Dementia due to Alzheimer's disease (AD) is the major type of dementias in the world. In addition to amyloid plaques and neurofibrillary tangles, cerebrovascular disease is another important pathophysiological cause of AD. Cerebrovascular disease is highly associated with vascular risk factors (VRFs). Well-treated VRFs might decrease the risk and progression of AD. However, findings on the impact of VRFs treatment status on cognitive decline after the diagnosis of AD established are unclear, and there is no direct evidence supporting well-treated VRFs can slow down the AD progression.

This study recruited mild cognitive impairment (MCI) and mild AD patients (CDR = 0.5 or 1) with at least one VRF. The treatment status of the VRFs was identified and all participants were evaluated by a standard neuropsychological test battery. FreeSurfer was used to calculate total gray matter volume, hippocampus volume, and AD signature cortical thickness. Cerebrovascular lesions, including perivascular spaces in centrum semiovale, basal ganglia, the presence of lobar cerebral microbleeds, and the volume of white matter hyperintensities were estimated by visual rating scales and Lesion Segmentation Tool for Statistical Parametric Mapping.

We recruited 47 patients (15 MCI and 32 AD) and divided these patients into two groups according to the status of well-controlled or partially-controlled VRFs. In MCI, the patients with well-controlled VRFs had higher discrimination index score of 12-item memory test (11.5 vs. 7.0, $p=0.028$), and more severe atrophic hippocampus (3482.2 vs. 3554.1, $p=0.033$). In AD, the results of neuropsychological tests were similar between patients with well-controlled VRFs and those with partially-controlled VRFs, but thinner middle temporal cortical thickness (2.4 vs. 2.6, $p=0.011$) and more severe atrophic hippocampus (2876.6 vs. 3224.6, $p=0.047$) were found in patients with well-controlled VRFs.

Brain reserve in the AD and MCI patients with well-controlled VRFs might contribute cognitive function

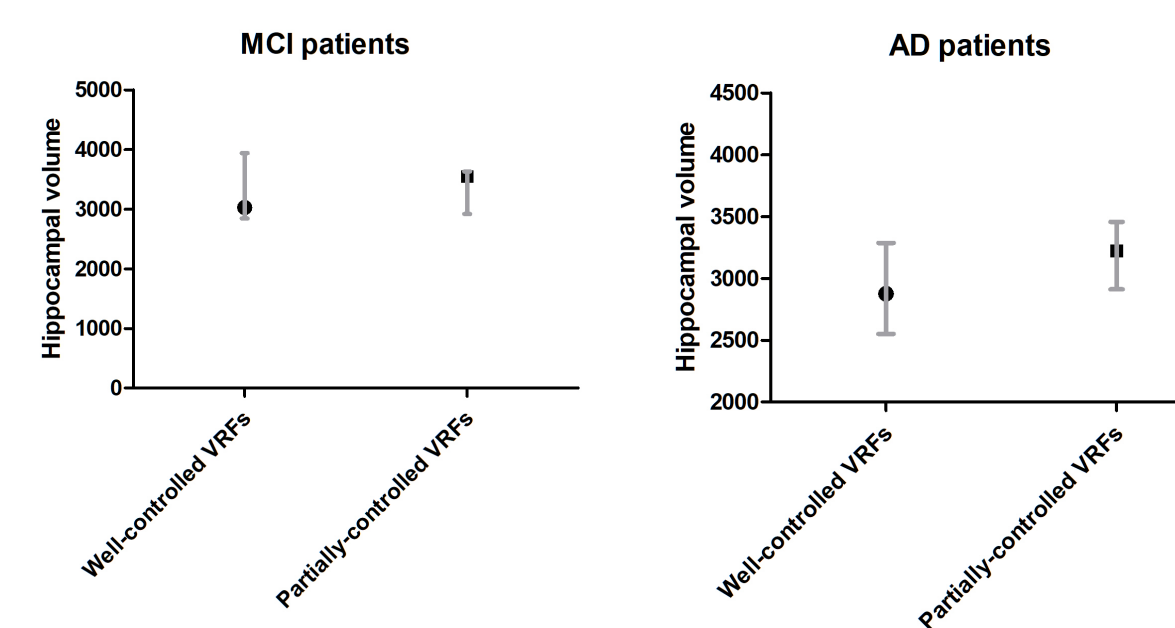


Figure. The MCI and AD patients with well-controlled VRFs have relatively atrophic hippocampus even though their cognitive functions are similar. In patients with well-controlled and partially-controlled VRFs.

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