NEUROMELANIN IMAGING IN THE LOCUS CERULEUS IN MILD COGNITIVE IMPAIRMENT

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Introduction: The locus ceruleus (LC) degenerates at an early phase of Alzheimer's disease (AD), but pathological procedures are restricted to the late phase of this disease. Therefore in vivo examination is essential to study mild cognitive impairment (MCI). LC melanin imaging was possible with 3T MRI, which enabled selective visualization of neuromelanin cells in the LC.

Aims: To compare neuromelanin cell loss in patients with AD and MCI, we analyzed melanin using 3T MRI.

Methods: A total of 31 subjects were enrolled: 12 with MCI (5 men and 7 women; mean age: 69.6 years), 9 with AD (4 men and 5 women; mean age: 70.9 years; FAST IV: 6 cases, FAST V: 3 cases), and 10 normal controls without neurological and MRI abnormalities. All scans were performed using the 3T MRI system. We employed the melanin imaging sequence (T1-weighted fast spine-echo; TR. 600 ms; TE. 14 ms; matrix: 512 × 320, FOV 220 × 220 mm; 2.5 mm thickness; and 1 mm gap). The intensity ratios of LC to pontine tegmentum signal intensity were calculated.

Results: In the MCI and AD cases, LC signal intensity ratios were significantly lower than those of the controls. Further, AD intensity ratios tended to be lower than the MCI ratios.

Conclusions: Our findings suggest that using 3T MRI might enable the visualization of LC cell loss in patients with AD and MCI. Furthermore precognition of behavioral and psychological symptoms of dementia (BPSD) in patients with AD or MCI is possible with this technique.