
Abstract:
Background: The effect of APOE ε4 allele (ε4) on spatial navigation in amnestic mild cognitive impairment (aMCI) is unknown. Objective: Our purpose was to examine the characteristics of spatial navigation impairment in ε4-positive (ε4+) and ε4-negative (ε4–) aMCI subgroups. Methods: Blood samples were collected to determine the APOE genotype. A total of 34 aMCI patients were stratified into aMCI-ε4– (n = 23) and aMCI-ε4+ (n = 11) groups. Control (n = 28) and mild Alzheimer's disease (AD; n = 16) groups were also used. We used a human analogue of the Morris water maze (enclosed arena 2.9 m in diameter) to examine body-centered (egocentric) and world-centered (allocentric) spatial navigation. Results: The aMCI-ε4+ group performed poorer on spatial navigation than the aMCI-ε4– group in both egocentric and allocentric tasks even though these 2 groups did not differ in global cognitive functioning or neuropsychological tests. The aMCI-ε4+ and mild AD groups performed similarly on all Morris Water Maze tasks and were outperformed by the aMCI-ε4– group, which also resembled the control group in performance on the egocentric tasks. The aMCI groups showed poor spatial navigation learning regardless of their ε4 positivity. Conclusion: We found more profound deficits in spatial navigation in aMCI-ε4+ relative to aMCI-ε4– patients. The aMCI-ε4+ group resembled the mild AD group in spatial navigation performance. Although the ε4 genotype was indicative of spatial navigation performance, it was not indicative of the aMCI patients' ability to learn the tasks. Spatial navigation testing represents a promising area with respect to identifying individuals at higher risk for AD among the heterogeneous MCI population.

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