Human analogue of the morris water maze for testing subjects at risk of Alzheimer's disease.
Abstract:
BACKGROUND: Patients with Alzheimer's disease (AD) and amnestic mild cognitive impairment (MCI) have difficulties with spatial orientation. Objective: To test hypothesis that spatial navigation is impaired early in MCI patients representing the presymptomatic stage of AD. METHODS: We tested patients with probable AD (n = 21), MCI, further classified according to Petersen's criteria as amnestic MCI (aMCI) single domain (n = 11), aMCI multiple domain (n = 31), or nonamnestic MCI (n = 7). The aMCI group was also stratified using cued recall according to Dubois' criteria into memory impairment of the hippocampal type (n = 10) and isolated memory retrieval impairment-nonhippocampal (n = 32) and also according to ApoE4 status into E4+ (n = 12) and E4- (n = 30). These patients and controls (n = 28) were tested in the human variant of the Morris water maze. Depending on the subtest, the subjects could use the egocentric or allocentric (hippocampus-dependent) navigation. RESULTS: The AD and aMCI multiple domain groups were impaired in all subtests. The aMCI single domain group was impaired in allocentric subtests. The hippocampal MCI group performed poorer than the nonhippocampal MCI group and similarly to the AD group. The ApoE4+ group was as bad as the AD group when compared with the E4- group. CONCLUSION: aMCI subjects represent a very heterogeneous population, and spatial memory or cued recall examination can add more value to aMCI classification. ApoE4+ patients are more impaired than ApoE4- patients.

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