Effect of co-administration of donepezil and folic acid on spatial memory impairment in adult male rat model of Alzheimer's disease

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Abstract

Background: Alzheimer's disease is a neurodegenerative disorder that is diagnosed with a lack of memory and perception.

Objective: The aim of this study was to evaluate the effect of donepezil and folic acid on reference and working memory disorders caused by electrical lesion of nucleus basalis magnocellularis (NBM).

Methods: In this experimental study, 49 adult male Wistar rats were divided into 7 groups: control and, nucleus basalis magnocellularis (NBM) lesion group, which received electrically-induced lesion (0.5 mA, 3 s) in NBM, sham group (the electrode was impaled in to the nucleus basalis magnocellularis with no lesion), donepezil group (lesion + donepezil 0.1 mg/kg), folic acid group (lesion + folic acid 5 mg), interaction group (lesion + donepezil-folic acid) and vehicle group (lesion + saline). Acquisition and retention tests were done by using an eight-radial arm maze task.

Findings: Results showed that there was a significant difference between control and lesion groups (P<0.05). Combination treatment with donepezil and folic acid improved the parameters of spatial memory errors in the acquisition and retention tasks comparing to the control group (P<0.05).

Conclusion: The degradation of the nucleus basalis magnocellularis caused to increase reference and working memory errors. Also the co-administration of donepezil and folic acid led to a reduction in these errors and improved spatial memory of the rat.

Keywords: Alzheimer's disease, Nucleus basalis magnocellularis, Donepezil, Folic acid, Memory