ORIGINAL ARTICLE

A comparative study of neuroprotective effect of angiotensin converting enzyme inhibitors against scopolamine-induced memory impairments in rats

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ABSTRACT

The comparative study of neuroprotective effect of angiotensin converting enzyme inhibitors against scopolamine-induced neuroinflammation in albino Wistar rats was studied. Male albino rats were administered with scopolamine to induce memory impairment. The standard nootropic agent, piracetam (200 mg/kg b.w., [i.p.]), perindopril (0.1 mg/kg b.w., [i.p.]), enalapril (0.1 mg/kg b.w., [i.p.]), and ramipril (0.1 mg/kg b.w., [i.p.]) were administered in different group of animals for 5 days. On 5th day, scopolamine (1 mg/kg b.w., i.p.) was administered after 60 min of the last dose of test drug. Memory function was evaluated in Morris water maze (MWM) test and pole climbing test (PCT). Biochemical estimations like glutathione (GSH), malondialdehyde (MDA), and acetylcholinesterase activity in the brain were estimated after completion of behavior study. All three test groups shows improvement in learning and memory in comparison to control group. Perindopril treated group showed a more effective significant decrease in escape latency time and transfer latency time compared to enalapril and ramipril treated group on day 4 in MWM test and PCT, respectively. Perindopril shows a significant reduction in MDA level and acetylcholinesterase activity and a significant rise in GSH level compared to enalapril and ramipril. The finding of this study indicates that Perindopril is more effective in memory retention compared to enalapril and ramipril.

Key words: Angiotensin converting enzyme inhibitors, comparative study, scopolamine-induced memory impairment

INTRODUCTION

Alzheimer's disease (AD) is a progressive neurodegenerative brain disorder that is slow in onset but leads to dementia, unusual behavior, personality changes and ultimately death.[1] Neuropathological examination of AD brain reveals extensive atrophy, accumulation of neurofibrilatory tangles and β-amyloid fibrillar deposits.[2] The National Institute of Health predicts, if the current trend continues, there will be more than 8.5 million AD patients by the year 2013 in USA alone.[3]

Formation of memory is the most complex process and involves multiple neuronal pathways and neurotransmitters.[4] The cholinergic neural system plays an important role in learning and memory in humans and animals.[5] Scopolamine, a nonselective muscarinic cholinergic antagonist, is a well-known centrally acting cholinergic probe, which causes impairment in learning and memory.[6] At present tacrine and donepezil are two reversible acetylcholinesterase (AChE) inhibitors approved by Food and Drug Administration for the treatment of mild to moderate dementia coupled with AD. Hepatotoxicity and high cost limit the use of tacrine. Donepezil has the advantage of long $t^{1/2}$, about 70 h.[7]

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