The Effect of Pentoxifylline on Global Ischemia/Reperfusion Induced Spatial Memory Impairment in Estrous Phase of Female Wistar Rat

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Background

The short discontinuance of cerebral blood flow causes permanent brain injury and behavioral dysfunction. The hippocampus, specifically the CA1 pyramidal cell layer, is highly vulnerable to ischemic injuries. There is no effective pharmacological strategy for improving brain tissue damage induced by cerebral ischemia. Previous studies reported that pentoxifylline has a neuroprotective effect on brain trauma and it is well known that endogenous estrogen improves stroke outcome during vascular occlusion by exerting both neuroprotective and flow-preserving effects. The possible positive effects of pentoxifylline and endogenous estrogen on behavioral deficit were studied in female Wistar rats in estrous phase subjected to an experimental model of transient global brain ischemia.

Aims & Objectives

To determine the effect of pentoxifylline on global ischemia/reperfusion induced spatial memory impairment in estrous phase of female Wistar rat.

Material & Methods

Animals (n= 56) were assigned to control, ischemia, vehicle, and pentoxifylline - treated (200 mg/kg IP) groups and according to vaginal smear and methylene blue staining, all of them were in their estrous phase of estrous cycle. Pentoxifylline (200 mg/kg IP) administered at 1 hour before and 1 hour after ischemia. Global cerebral ischemia was induced by bilateral common carotid artery occlusion, followed by reperfusion. Memory dysfunction was determined by Morris water maze and histological changes of CA1 pyramidal cells were studied by Nissl staining method.

Results

According to Morris water maze test results, pentoxifylline administration in cerebral ischemia significantly improved hippocampal-dependent memory and cognitive spatial abilities after reperfusion as compared to ischemia and vehicle-treated animals. In Nissl study, Four days after ischemia/reperfusion, the rats were sacrificed and brain sections were stained. There were no significant differences between number of pyramidal cells in both control and pentoxifylline - treated groups (Pd"0.05).

Conclusions

Our study illustrated that pentoxifylline can reduce CA1 cells damages and cognitive impairment in female rats (in estrous phase) were subjected to brain global ischemia.

Keywords: Pentoxifylline; Spatial memory; Brain ischemia; Estrous phase.