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Effect of Pyridoxine on toxicity of Aminoguanidine and its Neuroprotective effect in Aluminum Chloride induced Dementia in rats

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Abstract

Background: Nitric oxide synthase inhibitor, aminoguanidine is widely investigated for treating various pathological conditions including neurodegeneration but reported to produce dose dependent toxicities. The toxicities of aminoguanidine are mainly associated with deficiency of pyridoxine. **Objective:** The present study was aimed to evaluate the effect of co-administration of pyridoxine along with aminoguanidine on the toxicities and memory improving effect of aminoguanidine in demented rats. **Material and methods:** Dementia was induced in rats by aluminium chloride (17 mg/kg, p.o.) administered for a period of 30 days. The demented rats received pyridoxine (10 mg/kg, p.o.), aminoguanidine 300 mg/kg, p.o. and 150 mg/kg, p.o. alone and the combination of intermediate dose (150 mg/kg, p.o.) of aminoguanidine along with pyridoxine (10 mg/kg, p.o.) for a period of 30 days. Behavioral studies, biochemical assays (nitrates, calcium and LDH), estimations of acetyl cholinesterase and pro-oxidant- antioxidant assays (assay for lipid peroxidation and superoxide dismutase) were done to evaluate the effect of the treatment in dementia. **Results:** Aminoguanidine alone at higher dose level and the combination of intermediate dose of aminoguanidine with pyridoxine caused significant improvement ($P<0.01$) in the physical parameters of memory in morris water maze and radial arm maze model. Aminoguanidine in combination with pyridoxine significantly ($P<0.001$) decreased the level of acetylcholinesterase, LDH, nitrite, calcium and TBARS and also improved the level of antioxidant enzymes in demented rats. **Conclusion:** Results concludes that aminoguanidine at intermediate dose level with pyridoxine is effective in improving memory loss in the demented rats with no associated toxicity.

***Keywords*:** Acetylcholinesterase, Aminoguanidine, Antioxidant, Nitric oxide synthase, Pro-oxidant