

Protective Effect of Levetiracetam on Aggravation of Memory Impairment in Temporal Lobe Epilepsy by Phenytoin

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Abstract : Objectives: (1) To assess the extent of memory impairment induced by Phenytoin (PHT) at normal and reduced dose on temporal lobe epileptic mice. (2) To evaluate the protective effect of Levetiracetam (LEV) on aggravation of memory impairment in temporal lobe epileptic mice by PHT. Materials and Methods: Albino mice of either sex (n=36) were used for the study for a period of 64 days. Convulsions were induced by intraperitoneal administration of pilocarpine 280 mg/kg on every 6th day. Radial arm maze (RAM) was employed to evaluate the memory impairment activity on every 7th day. The anticonvulsant and memory impairment activity were assessed in PHT normal and reduced doses both alone and in combination with LEV. RAM error scores and convulsive scores were the parameters considered for this study. Brain acetylcholine esterase and glutamate were determined along with histopathological studies of frontal cortex. Results: Administration of PHT for 64 days on mice has shown aggravation of memory impairment activity on temporal lobe epileptic mice. Although the reduction in PHT dose was found to decrease the degree of memory impairment the same decreased the anticonvulsant potency. The combination with LEV not only brought about the correction of impaired memory but also replaced the loss of potency due to the reduction of the dose of the antiepileptic drug employed. These findings were confirmed with enzyme and neurotransmitter levels in addition to histopathological studies. Conclusion: This study thus builds a foundation in combining a nootropic anticonvulsant with an antiepileptic drug to curb the adverse effect of memory impairment associated with temporal lobe epilepsy. However further extensive research is a must for the practical incorporation of this approach into disease therapy.

Keywords : anti-epileptic drug, Phenytoin, memory impairment, Pilocarpine

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