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Effects of omega-3 on cognitive impairment and chemically-induced seizures in wistar rats

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Background: Epileptic seizures are associated with cognitive dysfunctions and antiepileptic drugs (AEDs) have failed to achieve complete seizure control in most epilepsy cases especially in intractable epilepsies.

Aim: Omega-3 may have more efficacious anticonvulsant effects compared with AEDs in the control of seizures and improving cognitive function.

Methods: A total of 60 rats divided in to 12-groups of 5 rats each: groups 1 received omega-3 orally, 2 received 0.9% normal saline orally (1 and 2 for the neurobehavioral assessment), 3 received PTZ, 4 received PTZ + omega-3, 5 received PTZ + diazepam, 6 received PTZ + carbamazepine, 7 received PTZ + sodium-valproate (3, 4, 5, 6, 7 for PTZ-induced seizures). 8 received strychnine, 9 received strychnine + omega-3, 10 received diazepam + strychnine, 11 received carbamazepine + strychnine, and 12 received sodium-valproate + strychnine (8, 9,10, 11, 12 for the strychnine-induced seizures). Seizure was induced using 3mg/kg and 80mg/kg of strychnine and PTZ respectively.

Results: Seizures related activities and cognitive function were assessed using revised Racine's scaling and novel object recognition and discrimination task respectively. The results showed that, omega-3 is protective against PTZ-induced seizures, but not in strychnine-induced seizures. Efficacy of omega-3 is comparable with that of Sodium-valproate but significantly lower than that of diazepam and carbamazepine in PTZ-induced seizures, and sodium-valproate is more efficacious than omega-3 in strychnine-induced seizure. Omega-3 improved novel object recognition index, and there was increased pyramidal cells of the hippocampus of rats treated with omega-3 for 2-weeks. Conclusion, omega-3 can be used as an anti-epileptic agent, and for improving cognitive performance.

Key words: seizures, efficacy, cognitive, epilepsy, anti-epileptic, anticonvulsant.