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Innovations in Novel Formulation strategies for Post Traumatic Epilepsy

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Posttraumatic epilepsy (PTE) is a major long-term complication of traumatic brain injury (TBI). PTE usually develops within 5 years of head injury. The risk for developing PTE varies with TBI type. Antiepileptic drug (AED) prophylaxis seems to be effective in controlling the early provoked seizures. One pitfall is that AEDs tend to have a high incidence of side effects. Many of these side effects are due to actions on the central nervous system such as cognitive impairment and neurobehavioral problems. These unwanted sides effects could be augmented in patients with TBI. An attempt was made to develop nanosystems of carbamazepine, a nonsedative antiepileptic to prevent side effects.

Purpose: Carbamazepine (CBZ) is a major antiepileptic drug with clinical efficacy against post traumatic epilepsy. A novel nanosystem for CBZ was developed to have acceptable tolerability for human use. Such Nano systems of CBZ have been proposed to be suitable for administration in treatment of Posttraumatic epilepsy epilepsy.

Method: A series of seizures in 30 min was induced by repeated trans auricular electrical stimulation in rats. In this model of epilepsy, the anticonvulsant potency of novel Nano system of CBZ was evaluated with that of reference standard.

Results: The rate of absorption from novel Nano systems of carbamazepine was 1.5 fold than from suspension. A very high significant improvement in half life and oral bioavailability was observed with Nano system of carbamazepine. In both groups, CBZ suppressed seizures after oral administration. Potent anticonvulsant activity was obtained as early as 10 mins (Nano system was rapid) & 25 mins (suspension) after oral administration, peak effects were observed at 20 mins (Nano system) & 45 mins (suspension) respectively. ED50 for blockade of seizures throughout the 30-min period of repeated electrical stimulation was 5 mg/kg. The Nano system was tolerated by the animals with no pronounced behavioural or motor adverse effects, the marketed preparation (suspension) induced marked sedation and motor impairment, indicating possibly because of erratic absorption profile of carbamazepine as cited in the previous literature.

Conclusion: The use of antiepileptic drugs at an early stage in order to prevent Post traumatic epilepsy is beneficial. This showed a good efficacy in the prevention of early post traumatic seizures. A novel Nano system of CBZ might be suitable for future administration for its use because CBZ has the advantage of being almost free of respiratory or cardiovascular adverse effects.

Keywords: Trauma, Neurological, Epilepsy, Carbamazepine, Innovation

Speaker Biography

Gannu Praveen Kumar is currently working as Professor and Principal in Sahasra Institute of Pharmaceutical Sciences. He is an external examiner for Post Graduation and PhD. He has guided M. Pharm and PhD students. He published in both National and International journals of repute. He received Gem of India award in the year 1999. He visited London, Dubai, Spain, Singapore, Malaysia and USA as invited speaker.

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