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## Pentylenentrazol-induced status epilepticus and the ultra-structure of rat hippocampus: A study using electron microscopy

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Post status epilepticus model is provoked by single, systemic or local administration of convulsive dose of epilepsy-produced drug or electrical stimulation. This model closely resemble some forms of human epilepsy when acute episode of seizures also known as status epilepticus is followed by a latency period with subsequent seizure activities, enhanced neuronal excitability and specific biochemical, molecular and structural alterations in epileptogenic regions of brain. While behavioral, electrophysiological and molecular alterations accompanying post status epilepticus have been studied intensively, corresponding structural modifications are described only in a few studies. A Pentylenetetrazol (PTZ)-induced status epilepticus model in rats was used. The brains were studied one month after treatment. Electron-microscopic observations performed in the hippocampal CA1 region of epileptic brains demonstrated the following major changes over normal brain: The ultra-structure of some neurons, synapses and glial cells is pathologically altered; the alterations are found to be dependent on the frequency of seizure activities following treatment. If seizure episodes are frequent and severe, the hippocampal ultra-structure is significantly changed. The area is found to be only moderately altered if seizure episodes following status epilepticus are rare and more superficial; alterations in mitochondria and dendrites are the most common ultra-structural changes seen suggesting cell stress and changes to cellular metabolism. Such altered morphology is a reflection of epileptic pathophysiology. Further studies at the chemical and molecular level will further reveal the nature of these changes.

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## Choice of anti-epileptic drugs for glioma associated seizure

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Glioma is the most frequent and deadliest primary malignant brain neoplasm in humans and accounts for more than 40% of all adult brain tumors. Although gross-total resection is an effective control measure for glioma-related epileptic activity approximately 30% of glioma patients with a history of preoperative seizures do not achieve satisfactory seizure prognoses which significantly affects the glioma patients' quality of life and makes it difficult for these patients to return to work and society. Surprisingly, at present, there are no specific GAS guidelines to aid neurosurgeons in prescribing Anti-Epileptic Drugs (ADEs) for post-surgery glioma patients; instead, the choice of prescriptions is based on the neurosurgeons' personal preferences and clinical experiences. We did a series of meta-analysis on the choice of AEDs for glioma patients; their efficiency and impact on the overall survival for glioma patients. Phenytoin, carbamazepine, sodium valproate and levetiracetam are the most frequently used AEDs in clinical settings for the treatment or prevention of seizure activity in post-surgery glioma patients. We found that no significant difference between the efficacies of P450 enzyme-inducing and non-enzyme-inducing anti-epileptic drugs for prophylactic late seizure treatment was observed, however, valproic acid used in adult glioblastoma multiform could prolong the patients' survival and we found that levetiracetam is an efficient ADE for glioma associated seizure.

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