itself. NCSE in patients with epilepsy and NCSE associated with an episode of clinical seizure have a better outcomes.

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Therapy of non-convulsive status epilepticus in severe brain injury

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Background: The study is intended to analyze the effectiveness of levetiracetam, valproic acid and carbamazepine in the treatment of non-convulsive status epilepticus in patients with severe brain injury.

Methods: The results of 30 patients' treatment (26 men, 4 women) aged from 20 to 65 years with severe traumatic brain injury who were examined and treated at the St. Petersburg Research Institute of Emergency Care named after I.I. Dzhanelidze are considered. The level of patients' consciousness was assessed on a Glasgow Come Scale. EEG registration was performed on the "Mitsar-EEG-202" complex in the standard derivations of "10-20%" system. Bandwidth: 1.6 - 35 Hz. EEG monitoring was performed in order to diagnose non-convulsive status epilepticus, in the dynamics with administration of anticonvulsant therapy and clear consciousness. The first group included 12 patients who received carbamazepine at a daily dose of 1200 mg. In the second group of 7 patients, carbamazepine was replaced by levetiracetam with an initial dosage of 2500 mg per day. 11 patients from the third group received valproic acid at a dosage of 1500 mg per day. The significance of differences was assessed using Fisher's exact test.

Results: The level of consciousness of all patients was from coma 1 to coma 2 (from 5 to 8 points GCS, respectively). Among the patients of the first group, carbamazepine was administered immediately after the clinical and electrophysiological verification of the non-convulsive status epilepticus in the initial dosage of 800 mg per day with a gradual increase in the daily dose to 1200 mg. The level of consciousness was restored to clear in 2 of 12 patients (16.7%) for 12-16 days. The apallic syndrome in the outcome was observed in 4 patients. Fatalities occurred in 6 of 12 cases.

In the second group, where carbamazepine therapy was replaced with levetiracetam at a dose of 2500 mg per day, consciousness was restored to a clear in 6 of 7 patients (85.7%) for 6-10 days. One observation was fatal.

In the third group, when confirming the diagnosis of non-convulsive status epilepticus, patients were prescribed valproic acid at a dosage of 1000-1500 mg per day. Of the 11 patients in this group, in 5 (45.5%), the level of consciousness recovered to a clear in 10-14 days. In three patients, an apallic syndrome was observed in the outcome. Death occurred in three cases.

Thus, the probability of a favorable outcome, consisting in recovery of clear consciousness, was significantly higher (85.7% versus 16.7% and 85.7% versus 45.5%, $p < 0.05$) when levetiracetam was used as anticonvulsant therapy. The duration of unconscious state in patients during the use of this drug was significantly reduced.

Conclusions: Registration of the continued epileptiform activity of a high index on EEG with severe brain injury necessitates the appointment of adequate anticonvulsant therapy in time.

The use of levetiracetam is more effective than the prescription of carbamazepine and valproic acid preparations.

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Dosing of anti-epileptic therapy in refractory status epilepticus

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Background: Status epilepticus (SE) is a life-threatening condition that if untreated, can lead to significant morbidity and mortality. Goals of SE care begin with patient stabilization followed by first line benzodiazepines. Intravenous anti-epileptic agents can subsequently be used for treatment and in refractory situations, anesthetic agents are necessary. Evidence based guidelines detail appropriate dosing for anti-epileptic treatments in SE. Our aim is to determine whether dosing guidelines are followed in regards to initial anti-epileptic therapy in refractory SE.

Methods: A retrospective chart review was conducted searching for patients aged 18-99 years admitted to Mayo Clinic Arizona over the last 10 years (2008-2018). Refractory SE patients on anesthetic agents during their admission were included in this study. Records were reviewed for initial benzodiazepine and loading doses of anti-epileptic medications at the time of SE identification. Medications reviewed included lorazepam, midazolam, fosphenytoin, levetiracetam, and valproate sodium.

Results: Seventy-six patients were identified with a mean age of 63.1 (27-89). The majority, 50% (38/76), presented in non-convulsive status epilepticus (NCSE). The remaining seizure types included: convulsive SE 25% (19/76), generalized tonic-clonic seizure followed by NCSE 21% (16/76), and myoclonic seizures 3.9% (3/76). Twenty-five patients had a history of seizure. Forty-seven patients had documented dosing of lorazepam as first therapy with an average dose of 0.05 mg/kg. Average dosing for remaining anti-epileptics included: .09 mg/kg midazolam, 17.8 PE/kg fosphenytoin, 22.5 mg/kg levetiracetam, and 17.5 mg/kg valproate sodium.

Conclusions: SE is life-threatening and requires appropriate dosing of anti-epileptic agents to ensure seizure cessation. Overall, our findings suggest that in general, anti-epileptic agents are underdosed in refractory status epilepticus. Guidelines suggest the following dosing regimens: 0.1 mg/kg lorazepam, 0.2 mg/kg midazolam, 20mg PE/kg fosphenytoin, 60mg/kg levetiracetam, and 40mg/kg valproate sodium. This study provides room for quality improvement in treating patients with SE. Future studies can be done to assess clinical outcomes from better dosing of anti-epileptic therapies.

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High-Dose Diazepam Controls Dyskinesia in Anti-NMDA receptor Encephalitis

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Purpose: To determine whether the treatment with high-dose oral diazepam could control dyskinesia in anti-NMDA receptor encephalitis, we analyzed therapeutic efficacy of high-dose diazepam in dyskinesia associated with anti-NMDA receptor encephalitis.

Methods: We reviewed the cohort data of patients diagnosed with anti-NMDA receptor encephalitis who were admitted to Seoul National University Hospital between January 2012 and July 2018 with moderate to severe dyskinesia. Diazepam was administered orally or via a nasogastric tube, 3 to 6 times a day. We assessed the treatment effect by comparing dyskinesia severity using a grading system at the initiation of diazepam treatment, on the first day of high-dose diazepam, and after one week of treatment with high-dose diazepam.

Results: Thirty-three patients with anti-NMDA receptor encephalitis and dyskinesia were treated with high-dose oral diazepam (ranging from 6 mg to 180 mg), along with immunotherapy. The severity of dyskinesia improved significantly (p-value<0.001), from median grade 3.5 (ranging from 2 to 4) to median grade 2 (ranging from 0 to 4), after one week of high-dose diazepam. No patients had serious adverse events except mild sedation.

Conclusions: We have treated the dyskinesia with high-dose oral diazepam in number of cases, and the treatment was effective and safe. This study suggests that oral administration of high-dose diazepam could be a promising treatment option for the management of severe dyskinesia in anti-NMDA receptor encephalitis.

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Assessment of antiseizure and neuroprotective effects of novel compounds in a delayed-treatment rat model of organophosphate (OP) exposure

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Background: It is well-known that exposure to organophosphates (OP), including nerve agents, results in status epilepticus (SE) and neuronal damage in the brain. Early control of seizure activity reduces mortality and damage. In the event of a mass release, treatment is likely to be greatly delayed compared to what would occur in a hospital setting. Therefore, there is a pressing need for treatments that can be administered after a significant delay and in a pre-hospital situation. The CounterACT Neurotherapeutic Screening (CNS) Program has now tested 9 externally submitted and 8 internally chosen compounds for this purpose.

Methods: Male, Sprague Dawley rats (150-200 g) were implanted for electroencephalogram (EEG) recordings. SE was induced by diisopropyl fluorophosphate (DFP). One hour after SE onset, rats were co-administered midazolam (MDZ) and a test compound or MDZ alone. EEG was recorded for 24 hr, followed by perfusion, tissue collection and labeling with Fluoro-Jade B. Neurons positive for Fluoro-Jade B were counted in 10 brain regions: dorsal CA1, dorsal CA3, hilus, ventral CA1, ventral CA3, amygdala, thalamus, and the parietal, entorhinal and piriform cortices. All data were analyzed quantitatively with blind procedures.

Results: Of the externally submitted compounds, compared to MDZ alone, significant anti-seizure effects were found for two compounds. These compounds reduced both seizure power and seizure duration. Each of these compounds also reduced neuronal death, compared to when MDZ was administered alone. In the same protocol, these data were compared to: (1) ganaxolone (with MDZ), which had a minimal effect on seizures, and (2) bumetanide (also with MDZ), which had no effect on seizures. Both of these latter compounds also had no effect on neuronal death.

Conclusions: These data demonstrate that MDZ-induced suppression of OP-mediated SE can be enhanced by co-administration of other compounds, even when both compounds are administered at a long-delay (i.e., 1 hr) after SE onset. Furthermore, this delayed treatment can significantly reduce neuronal death. This screening program will continue to search for other compounds that may provide better treatment of OP-induced SE.

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Development of Antiepileptic Drugs Box for Status Epilepticus Fast Track (SE BOX)

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Background and Objective: Status epilepticus (SE) is one the most concerned issue in patient treatment. Due to it can lead to disability and mortality. Hence, the most important key is to control the seizure within 1 hour after patient had symptom. The principle of SE treatment is to shorten the time to receive the treatment. Physician must be able to give an early diagnose (Time to diagnosis) and start medicine immediately (Time to Treatment). This study aims to root cause analysis SE service problems and development SE BOX for ready to use.

Methods: The study design was action research phase I, we root cause analysis about problems of SE service by collected data from electronic hospital database between 1st October 2017 and 30st September 2018 at Srinagarind hospital.

Results: The important problems of SE service from root cause analysis 19 patients with SE were delay of treatment such as the mean time to diagnosis was 272 minutes (0-53 hours) and mean time to treatment was 32 minutes (0-80 minutes). The average waiting time of stat dose was 13.24 minutes and the percent achievement of 20 minutes guarantee time was 82.6%. However, this waiting time was collected only in pharmacy department not include the delivery time to carry the medicine to wards. Moreover, from drug information service data there were 17 questions about IV antiepileptic drug which were asked by physicians and nurse the most stability/compatibility, dose/administration, ADR/side effect respectively. From those issues, there are many steps and these can lead to the delay of treatment. As a result, Integrated Epilepsy Research Group is developing the system of antiepileptic drugs to be ready-to-use by preparing SE Box. The box consists of 4 drugs; Phenytoin injection (6 vials), Phenobarbital injection (5 amp),