Levetiracetam vs. (fos)phenytoin for early onset post-traumatic seizure prophylaxis in pediatric patients

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Abstract

PURPOSE: Current pediatric traumatic brain injury (TBI) guidelines recommend prophylactic treatment with (fos)phenytoin for the prevention of early post-traumatic seizure (PTS), defined as seizure activity within the first seven days after TBI. Levetiracetam is commonly used in clinical practice for these patients, despite the lack of evidence. The objective of this study is to compare the efficacy and safety of levetiracetam to (fos)phenytoin for use in early PTS prophylaxis in pediatric patients with TBI.

METHODS: In this retrospective chart review, electronic medical and pharmacy billing records were used to identify patients 18 years old and younger who were admitted with TBI. Data points collected included patient demographics; mechanism of injury; Glasgow Coma Scores; time to first seizure determined by electroencephalogram (EEG) or direct observation; neurosurgical interventions performed; or hypersonic therapy initiated; and adverse medication events.

RESULTS: 198 patients were included for evaluation, with 137 patients in the (fos)phenytoin group and 61 patients in the levetiracetam group. The majority of patients were white males (95.5%) with blunt TBI (95.5%). Early PTS activity occurred in 8.8% (12/137) in the (fos)phenytoin group and 3.3% (2/61) in the levetiracetam group (p = 0.16). EEG monitoring was applied selectively. Adverse drug events were not screened for. In patients with early PTS, seizure activity was confirmed by EEG in 41.7% (5/12) of patients receiving (fos)phenytoin and 50.0% (1/2) of patients receiving levetiracetam. The median time to first seizure was similar between groups. In the (fos)phenytoin group, there were three reported adverse medication events (popular rash, elevated aspartate transaminase levels, elevated total bilirubin levels) that led to discontinuation of the medication. There were no reported adverse medication events that led to discontinuation of levetiracetam.

CONCLUSIONS: In pediatric patients with TBI, there was no statistically significant difference in early PTS activity or adverse medication events between (fos)phenytoin and levetiracetam.

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