Evaluation of Anticonvulsant Treatment in Pediatric Status Epilepticus

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Background: Success rate of a single agent to induce resolution of status epilepticus occurs in about one-third to one-half of children. Recent literature from The Established Status Epilepticus Treatment Trial (ESETT) has shown increased evidence around the safety of second phase medications in status epilepticus. Data from the ESETT trial concluded that there was no statistical difference in safety or efficacy comparatively between levetiracetam, fosphenytoin, or valproate. Clinically, the ESETT trial supports the use of high dosed second line study medications in the setting of status epilepticus to aid in quick seizure resolution. The study evaluated the impact of this literature on our current practice at our pediatric hospital.

Objectives:

Primary Outcome: Assess medications administered within 60 minutes for pediatric patients diagnosed with status epilepticus for compliance the American Epilepsy Society Guideline recommendations

- Correct order of medications administered
- Appropriate dose

Secondary Outcomes:

- Resolution of the seizure within 60 minutes
- Safety and efficacy of maximum doses of anticonvulsants administered including total dose per day with consideration of home dose

Methods

- Single center, retrospective, quality improvement study
- Patients admitted to the Pediatric Emergency Department (PED) or Pediatric Intensive Care Unit (PICU) for status epilepticus between January 1, 2019 - June 30, 2020
- Inclusion and exclusion criteria can be found in Table 1
- Patient data were identified through ICD.10 billing codes for status epilepticus
- Data was collected retrospectively through chart review within the electronic medical record (EMR)
- Frequencies, counts, rate, and measures of central tendency were used to summarize collected data

Results

- A total of 150 patients were reviewed and 22 patients met inclusion criteria.
- Patients with status epilepticus were treated more often in the PED (73.1%) than in the PICU (68.2%)

Primary Outcome

- Proper medication choice and appropriate selection of weight-based dosing in accordance with guideline recommendations occurred in 35% of cases (Tables 3 and 4)

Secondary Outcomes:

- Study medications were not associated with discontinuation due to adverse drugs reactions of intubation or hypotension
- Seizure resolution occurred in 21 of the studied patients (Table 5)
- No study drugs were discontinued when medication was given in addition to home anticonvulsant

Limitations

- Limited by small sample size and inability to detect for confounding variables
- Secondary outcome of time to seizure resolution was unable to be detected
- Valproic acid was on backorder during study time

Discussion

- Levetiracetam can be given IV push allowing for it to be given quickly in STAT situations
- Phenobarbital use resulted in adverse reaction
- Results from this study aligned with those of previously published literature

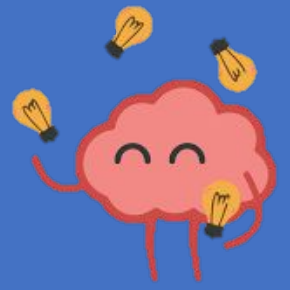
Conclusions:

- Provider and nursing education was encouraged to discuss differences in practice from recommendations of clinical guidelines
- This pediatric hospital was not aligned with recommended clinical literature of optimized weight-based dosing of second phase status epilepticus medications

Implications:

- This study demonstrated an opportunity for education to help support recommendations for high dose second phase medications in pediatric status epilepticus
- Further investigation of time to seizure resolution is needed

Ascension St. Vincent Hospital



Anticonvulsants administered to pediatric patients during **active status epilepticus** at our Children's Hospital **met guideline weight-based dosing recommendations in 35% of cases when correct algorithm medication was chosen.**

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Inclusion Criteria		Exclusion Criteria	
< 18 years old	Treated in PED or PICU	≥ 18 years of age	Ketogenic diet
Diagnosed with status epilepticus	At least one dose of AES guideline first line drug	Seizure from an acute event	Study medications not administered in PICU or PED
No known allergies or contraindications to anticonvulsant medications	≥ 1 dose/s of anticonvulsant study drug: Levetiracetam Fosphenytoin Valproic Acid	Pregnant	Administration of anticonvulsants for SE occured after 60 minutes
		Administration of study drug for non-status epilepticus	

Table 1. Inclusion and exclusion criteria

Table 2. Patient demographics included in the study

Demographics (N=22)		n (%)
Gender	Female	9 (40.9%)
	Male	13 (59.1%)
Age	0-24 months	7 (31.82%)
	2-5 years	7 (31.82%)
	> 5-7 years	2 (9.09%)
	> 7-10 years old	0
	> 10-12 years old	2 (9.09 %)
	> 12 and <18 years	4 (18.18 %)
ICD.10 Billing Code		
	G40.101	2 (9.1%)
	G40.201	1 (4.5%)
	G40.401	5 (22.7%)
	G40.901	8 (36.4%)
	G40.911	2 (9.1%)
	other	4 (18.2%)
Location of Patient Treatment		
	PICU	7 (31.8%)
	PED	15 (68.2%)

Medication Administered	n	%
Levetiracetam	14	63%
Fosphenytoin	5	24%
Phenobarbital	2	9%
Valproic Acid	1	4%

Table 3. Summary of study drug selected after benzodiazepine administration

Were the Study Medications Dosed Appropriately Per Guidelines		
Medication	**Yes**	**No**
Levetiracetam	**2 (14.3%)**	**12 (85.7%)**
Fosphenytoin	**1 (50%)**	**1 (50%)**
Valproic Acid	**1 (100%)**	**0**
Total	**7 (35%)**	**13 (65%)**

Table 4. Summary of study drug dose selection in population in accordance with guideline recommendations

Which anticonvulsant was attributed to seizure resolution						
Medication	Fosphenytoin	Levetiracetam	Valproic Acid	Phenobarbital	Lorazepam	Total
n	4	11	1	4	1	21
%	19.0%	52.4%	4.8%	19.0%	4.8%	100.0%

Table 5. Summary of study drug that was documented as contributing to seizure cessation