



Assessment of Practice Patterns and Provider Confidence in Management of Status Epilepticus in the Emergency Department



Alicia Dupre, MD¹; Manuel M Gonzalez Gonzalez, MD, MBA²; Alexa Lyon, MD¹; Christopher Zimmerman, MD¹; Julia Durrant, MD¹; Haley Manella, MD, MBA²; Katherine Park, MD¹
¹Oregon Health and Science University Department of Neurology, ²Oregon Health and Science University Department of Emergency Medicine

INTRODUCTION

First described between 718-612 BC, status epilepticus (SE) is now defined as convulsive generalized tonic-clonic seizures lasting longer than 5 minutes, or focal or absence seizures lasting longer than 10 minutes.

An estimated 7-41 per 100,000 people per year suffer from status epilepticus, with refractory SE occurring in 10-70% of patients. Mortality in this condition approaches 39%, and has been increasing since 1999, with higher rates of mortality in patients with first-time SE presentations and no history of prior seizures or epilepsy. Death from SE is further impacted by duration of status, as well as patient age and cause of status.

With this incidence and mortality, SE is one of the most common neurological emergencies and warrants timely appropriate therapy. Studies have shown the longer SE occurs, the more medically refractory it becomes due in part to the internalization of GABA_A receptors needed for benzodiazepine action. The excessive excitability in seizures, especially in SE, leads to neuronal injury due to massive glutamate release causing elevated intracellular calcium and downstream damage to mitochondria and adenosine triphosphate (ATP) production and cell death.

With this time necessity, current consensus guidelines recommend emergent treatment with benzodiazepines within 5 minutes, followed by second line agents within 10 minutes. From the ESETT trial, these second line agents can be levetiracetam, fosphenytoin, or valproic acid with equal efficacy. Despite this, approaches to status epilepticus are heterogenous, with insufficient dosing of antiseizure medications (ASMs) remaining prevalent.

Our objective is to assess the current state of practice habits and confidence of healthcare personnel in management of status epilepticus in the Emergency Department (ED) at a regional academic medical center.

METHODS

This project was part of an interprofessional and multidisciplinary quality improvement (QI) initiative to improve status epilepticus management in the ED. To assess the baseline practice patterns, an Electronic Medical Record (EMR) data exploration tool was used to identify adult patients aged 18 and greater treated for status epilepticus in the ED from 2022-2024. Post cardiac arrest patients and those determined to have non-epileptic events were excluded. Additionally, an anonymous survey was conducted to gauge the level of confidence in SE management amongst ED personnel.

RESULTS

	ED patients treated for status epilepticus (n = 30)	
	% (n)	Mean ± SD
Female	46.7% (14)	
Male	53.3% (16)	
Age (years)		46.2 ± 19
Length of Stay (days)		7.1 ± 7.3
Weight (kg)		81.1 ± 26.4
	Adequate ASM dose given (n = 10)	Inadequate ASM dose given (n = 20)
	Mean ± SD	
Length of Stay (days)	5.8 ± 9.0	7.8 ± 6.4

Table 1. Demographic information of patients identified to be in status epilepticus in the OHSU ED between 2022-2024.
SD - Standard Deviation; ASM - Antiseizure Medication; ED - Emergency Department

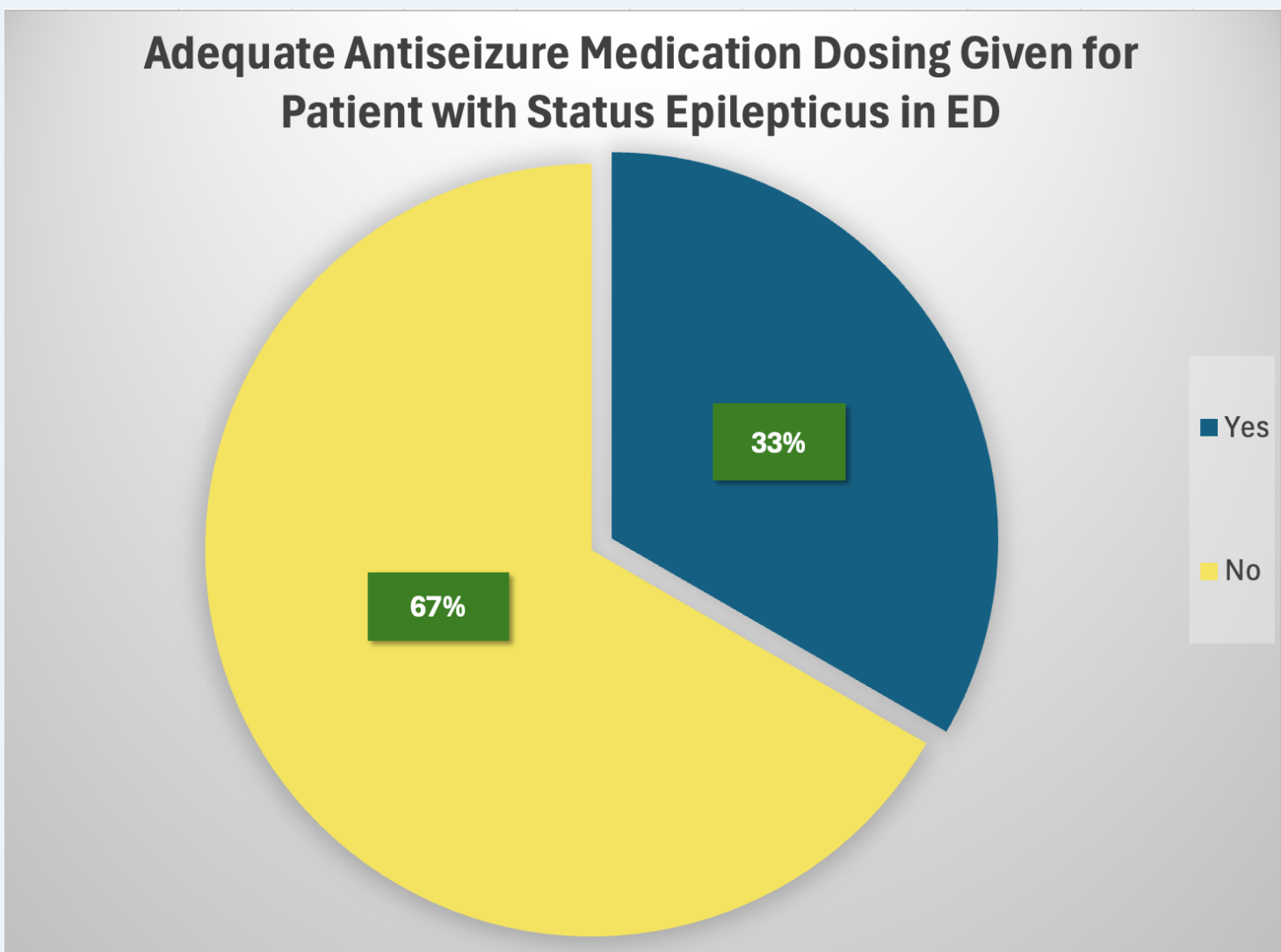


Figure 1. Of the 30 patients identified for status epilepticus treatment, only 10 were treated with guideline recommended dosing of antiseizure medications (33%).

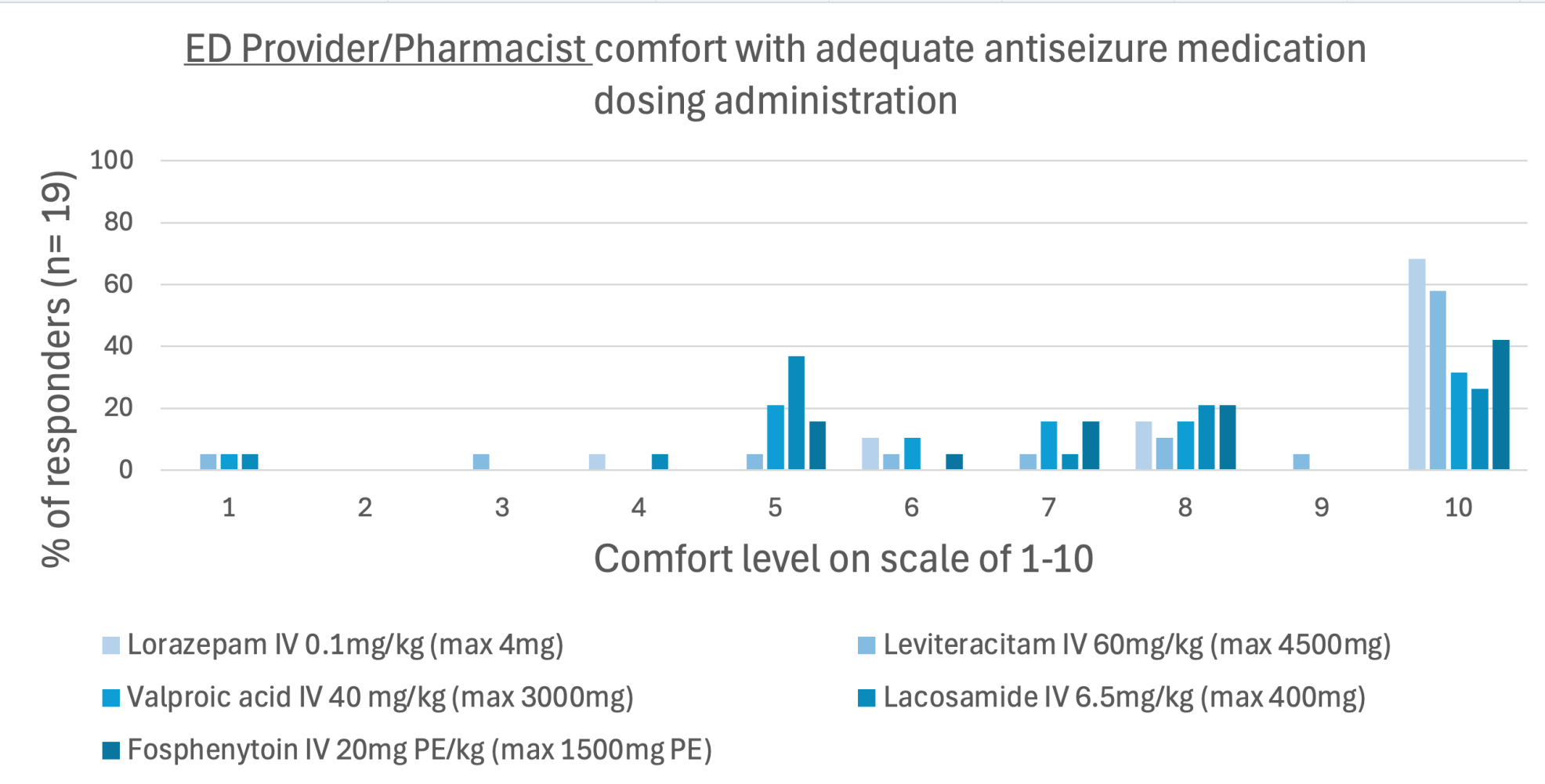


Figure 2a. Comfort level amongst ED physicians and pharmacists with regards to correct dose administration of lorazepam and standard first line agents in status epilepticus treatment including levetiracetam, fosphenytoin, valproic acid, and lacosamide.

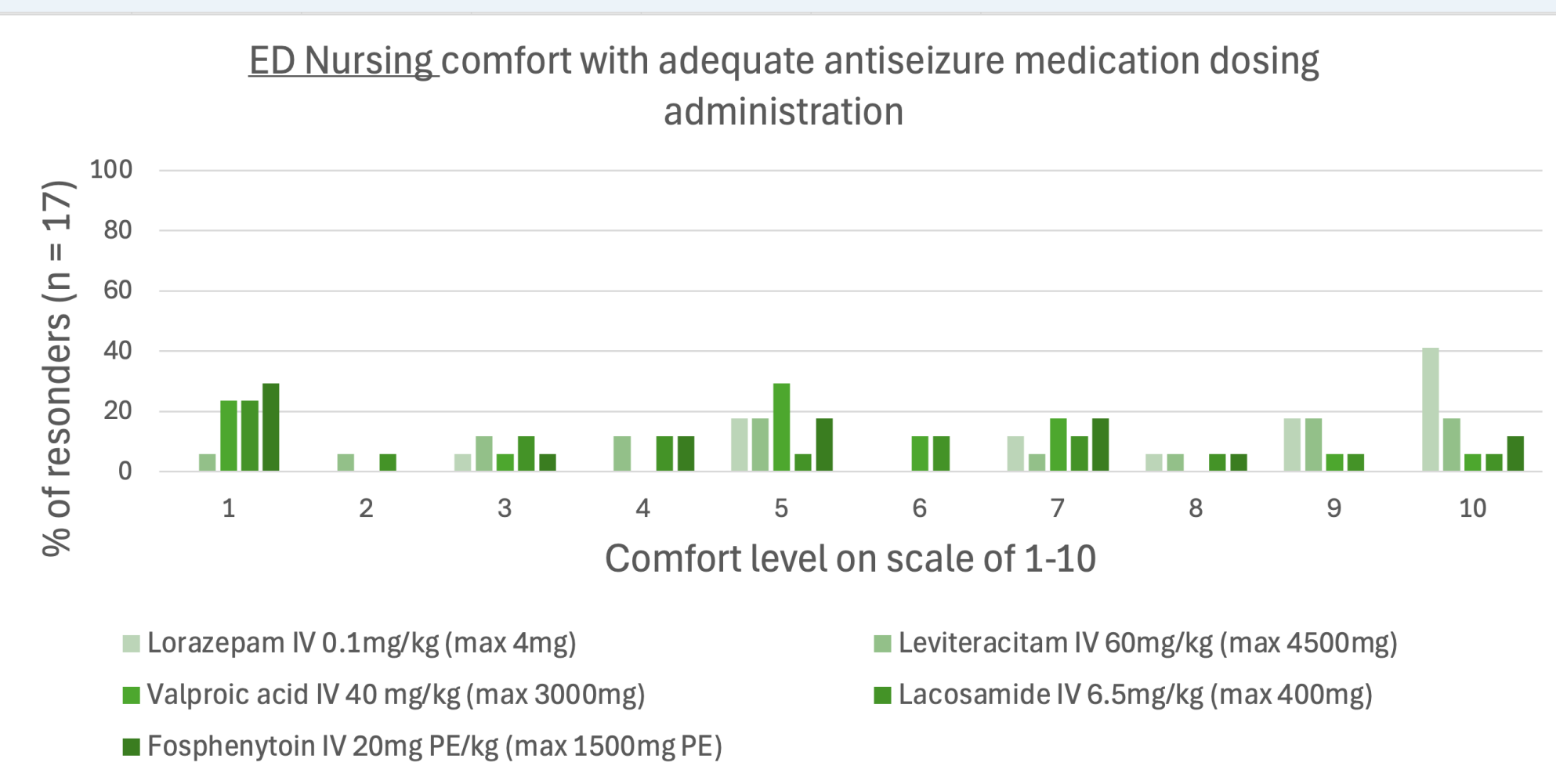


Figure 2b. Comfort level amongst ED nurses with regards to correct dose administration of lorazepam and standard first line agents in status epilepticus treatment including levetiracetam, fosphenytoin, valproic acid, and lacosamide.

Proposed Treatment Algorithm for Convulsive Status Epilepticus in Adults

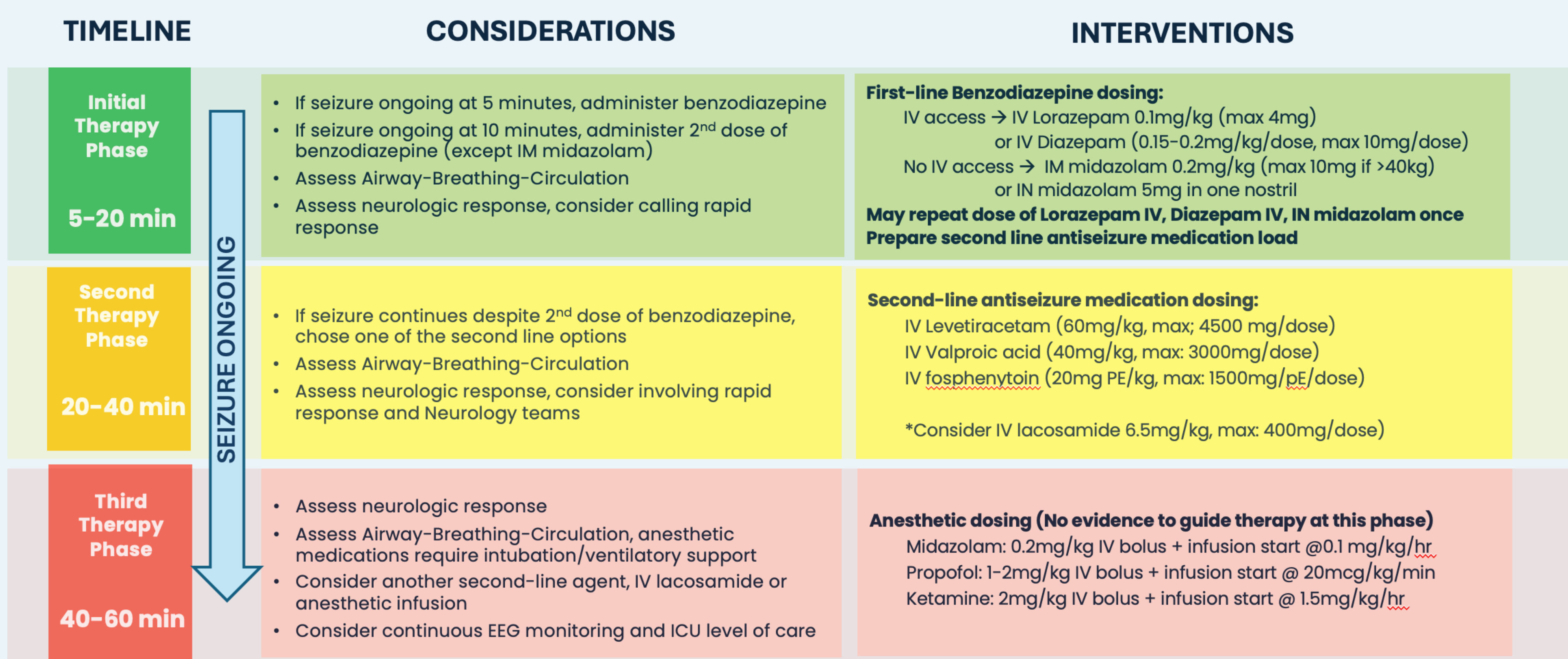


Figure 3- The stepwise treatment algorithm we propose for implementation at our institution to improve SE treatment and provider comfort.

Adapted from Glauser T et al. Evidence-Based Guideline: Treatment of Convulsive Status Epilepticus in Children and Adults: Report of the Guideline Committee of the American Epilepsy Society; Chamberlain JM et al. Neurological Emergencies Treatment Trials: Pediatric Emergency Care Applied Research Network investigators. Efficacy of levetiracetam, fosphenytoin, and valproate for established status epilepticus by age group (ESETT): a double-blind, response-adaptive, randomised controlled trial. *Lancet*. 2020 Apr 11;395(10231):1217-1224. doi: 10.1016/S0140-6736(20)30511-5. Epub 2020 Mar 20. Erratum in: *Lancet*. 2023 May 6;401(10387):1498. doi: 10.1016/S0140-6736(23)00855-6. PMID: 32203651; PMCID: PMC7241415.

RESULTS

• 30 patients were identified as being clinically treated for status epilepticus in the OHSU Emergency Department between 2022 and 2024.

• 20 of the 30 patients (66.7%) were given insufficient doses of ASM therapy.

• Of the 10 patients who received adequate dosing, 3 patients had significant delays in timing of administration which we defined as 1+ hours between order and administration of the chosen ASM.

• Our anonymous survey was completed by 36 individuals from the Emergency Department, composed of: registered nurses (47.2%), physicians (30.6%), pharmacists (19.4%), and advanced practice providers (2.8%).

• Four knowledge - based questions were presented regarding correct administration of ASMs, with a mean correct response rate of 62.5% .

• Only 61% of responders felt comfortable with the maximum recommended dose of intravenous lorazepam.

• 5.9% of nurses and 36.4% of physicians were comfortable administering the maximum recommended dose of levetiracetam (Keppra).

CONCLUSION

Our assessment of the current state of practice amongst those on the front line for status epilepticus management calls for the need to implement standardized practice guidelines, combined with interprofessional education programs and workflow improvement.

This data serves as a crucial element that will drive quality improvement efforts in our institution. Further work on this QI endeavor will include order set generation in our EMR as well as education on status epilepticus and its treatment with care team members. Following this, we will reassess our patient population for adequate ASM management of SE.

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