Quality Improvement Initiative to Enhance the Management of Refractory Status Epilepticus

Logan J Eslinger, MD[1]; Izad-Yar Rasheed, MD[2]

University of Kentucky College of Medicine
Department of Neurology

BACKGROUND

Status Epilepticus (SE) is a neurological emergency with high mortality and morbidity. Prompt treatment is crucial to prevent neuronal damage, treatment resistance, disability, and the development of epilepsy.

The University of Kentucky (UK) previously implemented an SE alert system, which improved the time to second-line antiseizure medication (ASM) administration.[1] However, since that study, there has been no high-quality evidence guiding the effective management of refractory SE (RSE), particularly regarding third-line medication dosing.[2] Additionally, SE alert activations at UK have declined due to a lack of awareness about the protocol and how to initiate an alert.

The current order set in Epic lacks updated and appropriate dosing guidelines for RSE, leaving neurology residents and ICU providers to rely on external knowledge. This may prolong the time needed to achieve adequate seizure control. Furthermore, the existing algorithm for neurology residents does not offer structured guidance or a stepwise approach to drug administration. This increases cognitive burden and reliance on neurology consults from other services, which could be avoided in acute settings where rapid seizure control is critical.

It is hypothesized that implementing a standardized RSE protocol will reduce the time to burst suppression by at least 2 hours, therefor improving patient outcomes and reducing ICU length of stay, morbidity, and mortality.

OBJECTIVES

Our objective is to implement an updated RSE protocol with pharmacy-approved dosing, distribute it to neurology residents, and integrate it into the Epic order set. The goal is to measure the time to burst suppression in SE before and after implementation.

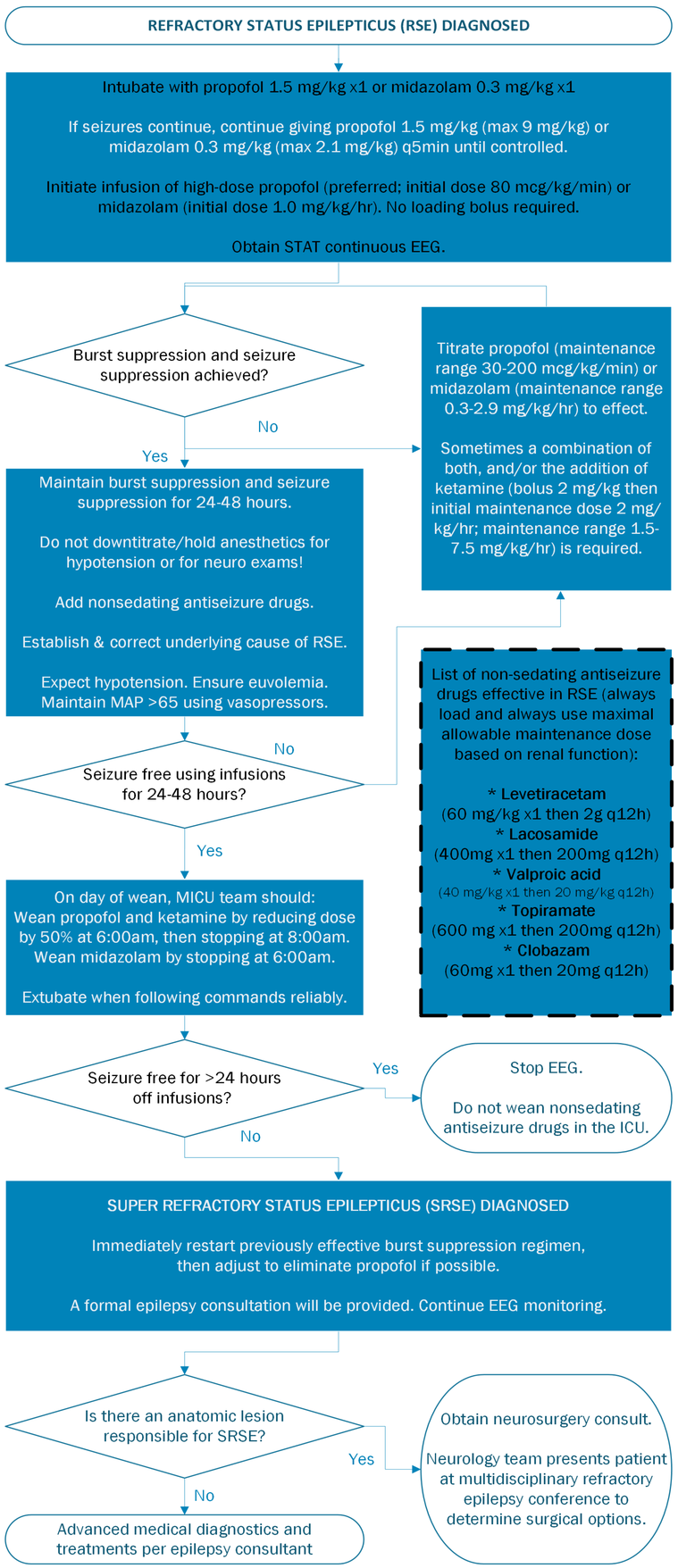

Figure 1: Proposed algorithm for management of RSE at UK.

METHODS

A protocol was developed to standardize the management of RSE at UK, aiming to implement standardized dosing regimens in a stepwise manner. The protocol specifications are as follows:

1. Propofol is the preferred initial anesthetic over midazolam due to its faster weaning period and short-term use.
2. Higher initial doses of propofol or midazolam are recommended compared to the 2012 guidelines, which suggest starting with lower doses and titrating up. Lower initial dosing is associated with a threefold increased risk of recurrent seizures.[3]
3. Burst suppression is defined as <20% burst and >80% suppression.
4. Sedation-related hypotension should be managed with vasopressors, prioritizing seizure control.
5. Standardized burst suppression duration is set at 24–48 hours, with a defined weaning protocol.

A 2-sample t-test will be performed comparing time in hours to burst suppression in patients before and after implementing the protocol. A confidence level of 95% will be used using a sample size of approximately 34 patients with 17 in each cohort and an estimated standard deviation of 2 hours in the population.

To encourage the use of SE alerts, a visual pamphlet for education will be developed and distributed to as many units around the hospital and as many residents and attending physicians as possible.

REFERENCES

1. Villamar MF, et al. Status epilepticus alert reduces time to administration of second-line antiseizure medications. Neurol Clin Pract. 2018 Dec;8(6):486-491.
2. 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. Epilepsy Curr 2016;16(1):48-61.
3. Muhlhofer WG et al. Duration of therapeutic coma and outcome of refractory status epilepticus. Epilepsia 2019 May;60(5):921-934.

1. Logan.eslinger@uky.edu; 2. izad.rasheed@uky.edu