



In The Nam of God



Status epilepticus



Definitions

- The classical definition: SE requires that seizures (continuous or intermittent without return to baseline mental status) last for a minimum of 30 minutes
- seizures which last longer than 5 minutes are unlikely to stop spontaneously and may be referred to as *impending SE*

- SE presents as a seizure that lasts longer than expected
- ILAE defines: a seizure that shows no clinical signs of arresting after a duration encompassing the great majority of seizures or recurrent seizures without interictal resumption of baseline central nervous system function
- The incidence is highest in children younger than 1 year



ETIOLOGY

- Most episodes of SE begin in previously healthy children in the out-of-hospital setting
- The most common etiology of pediatric SE is febrile/infectious followed by other acute symptomatic causes (metabolic, low antiepileptic drug levels,...)
- Genetic factors might promote or protect patients from developing prolonged seizures



CLINICAL PRESENTATION

- Regardless of the etiology and type, SE represents a lifethreatening emergency that should be managed rapidly
- Generalized tonic-clonic SE is associated with intense muscle activity with the consequent metabolic and cardiovascular demands
- Focal seizures are associated with less metabolic demands but are equally harmful to the brain if sustained in time



INITIAL MANAGEMENT

The initial therapy for SE includes:

- ✓ Maintenance of adequate brain oxygenation and cardiorespiratory function
- ✓ Identification and correction of seizure triggers such as hypoglycemia, electrolyte imbalance, lowered drug levels, infection, and fever
- ✓ Prevention of systemic complications



TIME TO TREATMENT

- There are three major determinants of prognosis in SE: age, etiology, and SE duration
- A delay of more than 30 minutes in administering the first antiseizure drug was associated with worse response to treatment
- An early and appropriate treatment may markedly reduce the duration and improve patient outcomes

Status Epilepticus Guideline

Treatment Algorithm for Status Epilepticus
for Children Older than Neonates



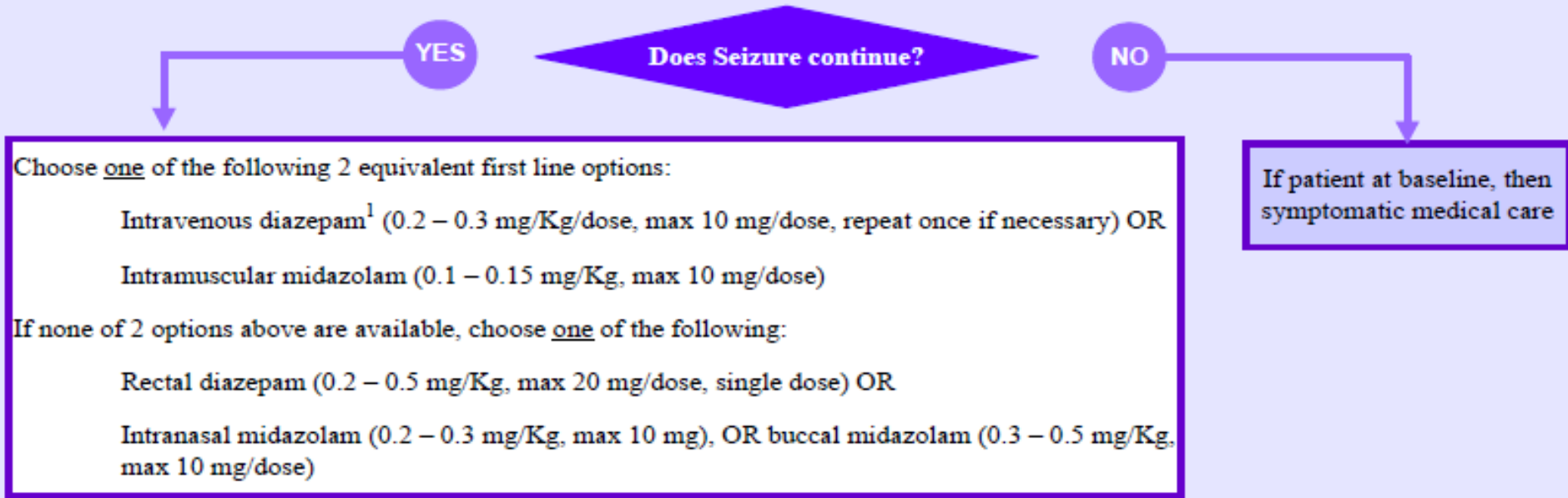
SHIRAZ SCHOOL OF MEDICINE
PEDIATRIC NEUROLOGY WARD



0-5 min (Stabilization Phase)

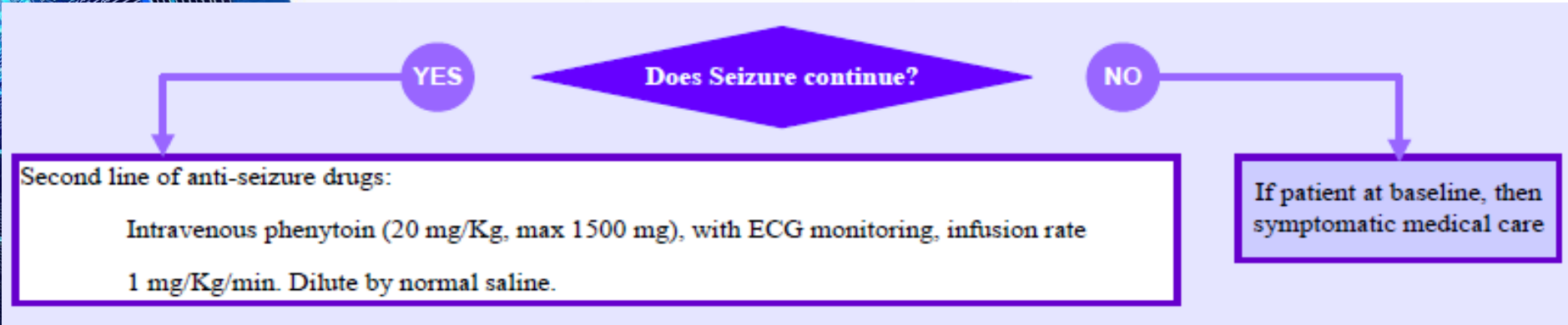
1. Stabilize patient (airway, breathing, circulation, disability-neurologic exam)
2. Time seizure from its onset, monitor vital signs
3. Access oxygenation, give oxygen via nasal cannula/mask, consider intubation if respiratory assistance needed
4. Initiate ECG monitoring
5. Collect finger stick blood glucose. If glucose < 60 mg/dl then children receive 5 ml/Kg D10W, wt > 60 kg receive 50 ml D50W
6. Attempt IV access and collect electrolytes, hematology, toxicology screen, (if appropriate) anticonvulsant drug levels

5-10 min (First Therapy Phase)

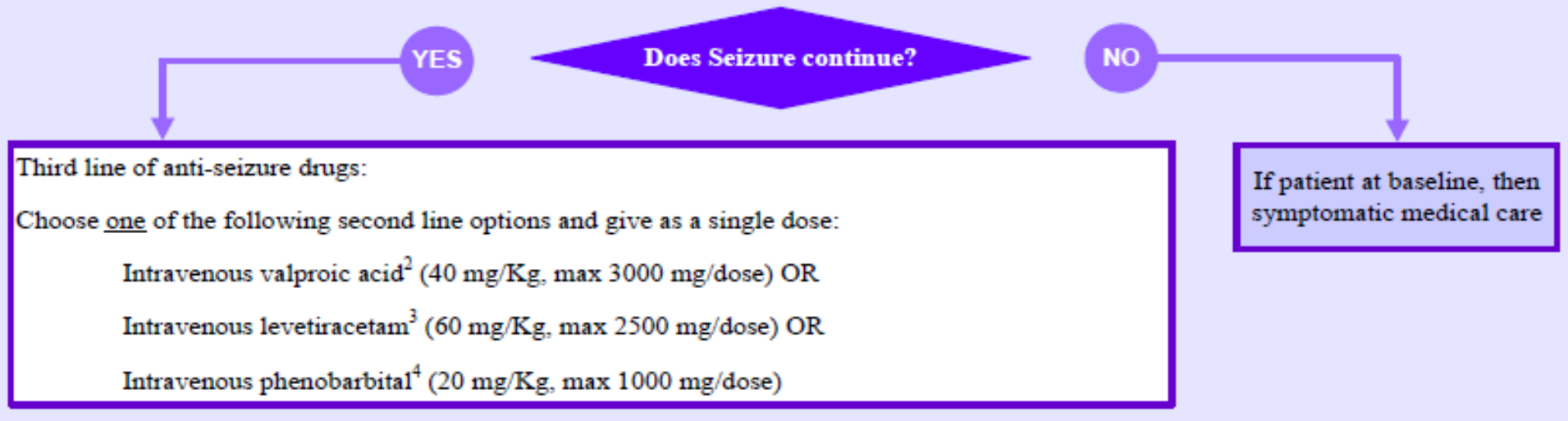


1 Intravenous diazepam infusion rate is 2 mg/min. The only repeatable drug as the first line is IV diazepam.

10-30 min (Second Therapy Phase)



>30 min (Third Therapy Phase)

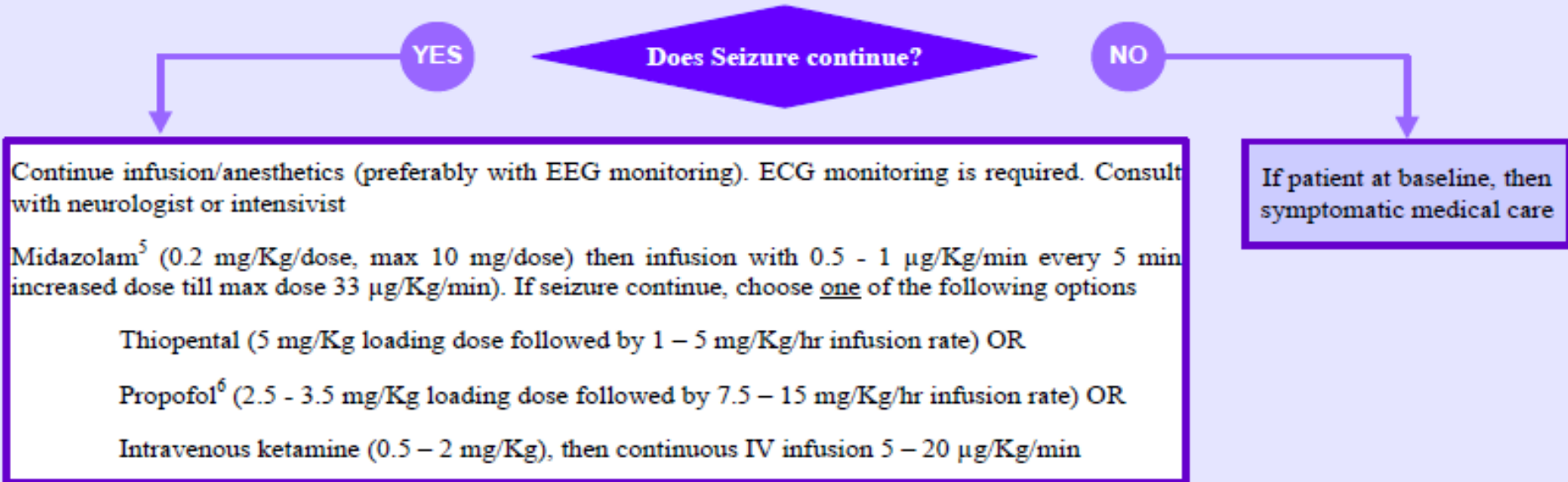


² Intravenous valproic acid infusion rate is 3 – 6 mg/Kg/min.

³ Intravenous levetiracetam infusion rate is 5 mg/Kg/min.

⁴ The usual loading dose is 20 mg/Kg. Additional dose 5 - 10 mg/Kg, max 40 mg/Kg. Infusion rate is 2 mg/Kg/min.

Patient Should be Intubated




⁵ Simple calculation method: $3 \times \text{wt (Kg)}$ Midazolam diluted in 50 cc D5W (max 50 mg in 50 cc D5W). 1 cc/hr of this solution = 1 $\mu\text{g/Kg/min}$ midazolam.

⁶ Propofol infusion with the rate of ≥ 5 mg/Kg/hr is not recommended for more than 2 days in the children.



NEONATAL STATUS EPILEPTICUS



Etiology	N (%)
Perinatal asphyxia	32 (28.6)
Intracranial bleeding	19 (17)
Metabolic disease	12 (10.7)
Hypoglycemia	9 (8)
Anomaly of cerebral development	5 (4.5)
Familial epileptic syndrome	5 (4.5)
Hyperbilirubinemia	4 (3.6)
Sepsis	4 (3.6)
Meningitis	4 (3.6)
Hypocalcemia	2 (1.8)
Hypoglycemia + hypocalcemia	2 (1.8)
Pyridoxine dependency	2 (1.8)
Benign neonatal convulsions	1 (0.9)
Attributable to drugs	1 (0.9)
Unknown	10 (8.9)



NEONATAL STATUS EPILEPTICUS

- Because neonatal seizures typically reflect an underlying functional or structural lesion, the mortality and morbidity burdens are typically higher than in older children
- Diagnosis of neonatal seizures is challenging because many repetitive neonatal movements do not have an ictal EEG correlate and many electrographic seizures do not have associated clinical manifestations



NEONATAL STATUS EPILEPTICUS

- Antiseizure medicines may stop clinical seizures although seizures persist on EEG, a phenomenon termed “*electroclinical uncoupling*”
- Therefore clinical observation alone may yield false positives (nonictal movement leads to administration and escalation of therapies) and false negatives (EEG seizures go undetected and thus untreated)



NEONATAL STATUS EPILEPTICUS

- In the guideline of the American Clinical Neurophysiology Society (ACNS): conventional video-EEG monitoring is the gold standard for neonatal seizure
- The definition of SE in newborns is not as straightforward as in older children or adults



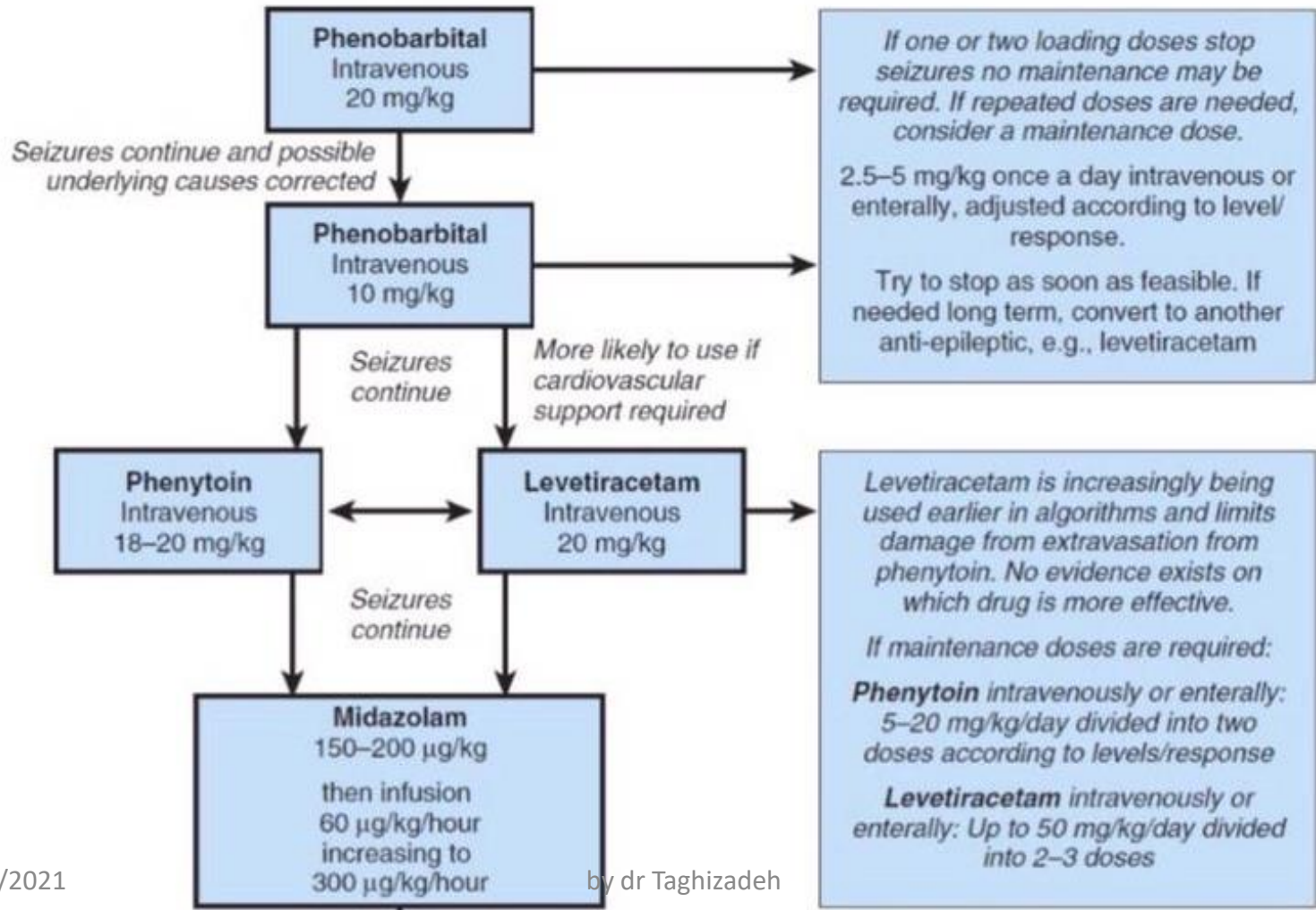
NEONATAL STATUS EPILEPTICUS

- There is no consensus on the definition of SE in newborns to be present when more than 50% of a 1-hour EEG epoch contains seizures, which may be a single continuous 30-minute seizure or a series of briefer seizures totaling 30 minutes



NEONATAL STATUS EPILEPTICUS

- Regardless of how SE is defined in newborns, a higher seizure burden is associated with less favorable outcomes, even after controlling for potential confounders
- Regarding treatment of neonatal seizures and neonatal SE, phenobarbital and phenytoin remain the preferred choices



Seizures continue or recur on weaning midazolam

Pyridoxine
100 mg intravenous
2 doses – 2 hours apart

Consider seizures as refractory
Seek specialist advice

Seizures continue

Pyridoxal phosphate
Enterally
50 mg/kg/day divided in 4–6 doses
(if not able to tolerate, continue to give pyridoxine intravenously)

Biotin
5–10 mg enterally or intravenously BD

Calcium, follinate
5 mg enterally BD

We continue vitamins until either the biochemical tests come back ruling out these conditions or there has been no response after two weeks.

If a response is seen, consider maintenance doses whilst working out which drug has had the most effect.

Treatment determined by underlying cause

Thanks For Your Attention



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by dr Taghizadeh