

BCH Pediatric (> 1 month old) Convulsive Status Epilepticus Treatment Guidelines

STAGE	ACTION
0-5 minutes Stabilization Phase	- Stabilize patient, monitor vital signs - Time seizure from its onset - Maintain airway, intubate if needed. If intubated, place ETCO2 monitor - Collect finger stick blood glucose and treat as needed - Obtain IV access and collect labs (CBC, BMP, Ca, Mg, Phos, VBG with lactate, urine toxicology screen, ASM levels [if appropriate]) - In patient with known seizure disorder, check Apex for Seizure Action Plan
5-15 minutes Initial Therapy Phase Impending Status Epilepticus	Skip this stage if patient received 2 doses of benzodiazepines prior to arrival Lorazepam 0.1mg/kg IV bolus (max 4 mg) - Repeat dose in 5 min for persistent seizure (maximum 2 total doses, including pre-hospital doses) - If no IV access, use: - IM midazolam 5 mg for 13-40 kg patient, 10 mg for >40 kg patient - Buccal midazolam 0.5 mg/kg (max 10 mg) - IN midazolam 0.2 mg/kg (max 10 mg) - IN diazepam 0.2 mg/kg (max 20 mg) - If no IV access, obtain IV access now <i>If clinical seizure persists 5 minutes after completion of second benzo dose, proceed to next stage</i>
15-30 minutes Second Therapy Phase Status Epilepticus	Load (bolus) with ONE of the following agents: - Choose novel agent if patient is already on maintenance therapy of any of the following medications Fosphenytoin 20 mg/kg IV run over 10 minutes (max 1.5 g) Valproic Acid 40 mg/kg IV run over 10 minutes (max 3 g) - NOT for children younger than 2 years old - NOT for children known to have metabolic cause of epilepsy, Inborn Error of Metabolism, or Liver disease Levetiracetam 60 mg/kg IV run over 10 minutes (max 4.5 g) CALL CHILD NEUROLOGY NOW CALL PICU FOR TRANSFER/ADMISSION NOW if: - Clinical seizure does not stop after this step

	- Clinical seizure stops but there is concern for persistent subclinical seizure - Anticipate advanced airway (if not already in place) - Prepare for invasive BP monitoring with central line; ensure presence of at least two large-bore peripheral IV's - Order EEG and call EEG tech for STAT lead placement <i>If clinical seizure persists 5 minutes after completion of bolus, proceed to next stage</i>
30-45 minutes Third Therapy Phase Refractory Status Epilepticus	Initiate ONE of the following anesthetic infusions if possible (preferred) * Midazolam 0.2 mg/kg IV bolus (max 10 mg) and start infusion at 0.1 mg/kg/hr - Uptitration until seizure cessation clinically and on EEG: - Repeat midazolam 0.2 mg/kg IV bolus and increase infusion rate by 0.1 mg/kg/hr q5min (to max 2 mg/kg/hr in discussion with Neurology team) - Anticipate hypotension and possible respiratory depression Ketamine 1 mg/kg IV bolus (max 100 mg) and start infusion at 1 mg/kg/hr - Uptitration until seizure cessation on EEG: - Repeat ketamine 1 mg/kg IV bolus q30min. Increase infusion rate by 1 mg/kg/hr q4hr (to max 7 mg/kg/hr in discussion with Neurology team) <i>If clinical or electrographic seizure persists despite rapid uptitration as per above, proceed to next stage</i>
	If unable to initiate anesthetic infusion (e.g. patient in the Emergency Department, not yet in the Intensive Care Unit, at outside hospital unable to accommodate anesthetic infusion), load (bolus) with second non-anesthetic agent - Only choose agent that was NOT administered in preceding phase Fosphenytoin 20 mEq PHT/kg IV run over 10 minutes (max 1.5 g) Valproic Acid 40 mg/kg IV run over 10 minutes (max 3 g) - NOT for children younger than 2 years old - NOT for children known to have metabolic cause of epilepsy, Inborn Error of Metabolism, or Liver disease Levetiracetam 60 mg/kg IV run over 10 minutes (max 4.5 g) Phenobarbital 20 mg/kg IV run over 10 minutes (max 1 g) - Consider in patients younger than 2 years old - If seizure persists after completion of infusion, repeat 10-20 mg/kg IV over 10 minutes <i>If clinical or electrographic seizure persists 5 minutes after completion of bolus, proceed to next stage</i>
Starting at 45 minutes Fourth Therapy Phase	If anesthetic infusion was not initiated at prior step, choose ONE and initiate now: * Midazolam 0.2 mg/kg IV bolus (max 10 mg) and start infusion at 0.1 mg/kg/hr - Uptitration until seizure cessation on EEG: - Repeat midazolam 0.2 mg/kg IV bolus and increase infusion rate by 0.1 mg/kg/hr q5min (to max 2 mg/kg/hr in discussion with Neurology team) - Anticipate hypotension, respiratory depression

Refractory Status Epilepticus Goal: Seizure Cessation	Ketamine 1 mg/kg IV bolus (max 100 mg) and start infusion at 1 mg/kg/hr - Uptitration until seizure cessation on EEG: - Repeat ketamine 1 mg/kg IV bolus q30min. Increase infusion rate by 1 mg/kg/hr q4hr (to max 7 mg/kg/hr in discussion with Neurology team) <i>If clinical or electrographic seizure persists despite rapid uptitration as per above, proceed to next stage</i>
Fifth Therapy Phase Super Refractory Status Epilepticus Goal: Seizure Cessation	If first anesthetic infusion was uptitrated appropriately and did not result in clinical and/or subclinical seizure cessation, consider initiation of second anesthetic infusion: *** Midazolam 0.2 mg/kg IV bolus (max 10 mg) and start infusion at 0.1 mg/kg/hr - Uptitration until seizure cessation on EEG: - Repeat midazolam 0.2 mg/kg IV bolus and increase infusion rate by 0.1 mg/kg/hr q5min (to max 2 mg/kg/hr in discussion with Neurology team) - Anticipate hypotension, respiratory depression Ketamine 1 mg/kg IV bolus (max 100 mg) and start infusion at 1 mg/kg/hr - Uptitration until seizure cessation on EEG: - Repeat ketamine 1 mg/kg IV bolus q30min. Increase infusion rate by 1 mg/kg/hr q4hr (to max 7 mg/kg/hr in discussion with Neurology team) <i>If clinical or electrographic seizure persists despite rapid uptitration as per above, proceed to next stage</i>
Coma induction, after failure of one or two anesthetic infusions Super Refractory Status Epilepticus Goal: Burst Suppression	Pentobarbital 10 mg/kg IV bolus (max 100 mg) and start infusion at 1 mg/kg/hr - Uptitration until seizure cessation AND burst-suppression on EEG: - Repeat pentobarbital 5 mg/kg IV bolus q30min. Increase infusion rate by 1 mg/kg/hr q1hr (to max 5 mg/kg/hr in discussion with Neurology team) - Anticipate myocardial stunning, ileus, hypotension, respiratory suppression, hyperglycemia/inability to maintain ketosis
Coma phase	Continue coma medication(s) x 24 hrs after last seizure on EEG Continue all prior anti-seizure medications at maintenance dosing
Weaning phase	Midazolam: reduce continuous infusion by 0.05 mg/kg/hr q3hrs Ketamine: wean off slowly over at least 24 hrs Pentobarbital: reduce continuous infusion by 1 mg/kg/hr q6hrs
Repeat coma phase	Restart previous effective coma medication(s) x 24 hrs Consider additional initiation of:

(seizure recurred during wean)	• Topiramate 10 mg/kg NG bolus x 1 (max 400 mg), start maintenance at 10 mg/kg/day divided BID (max 400 mg/day) • Lacosamide 8-10 mg/kg IV bolus x 1 (max 600 mg), start maintenance at 6-8 mg/kg/day divided BID (max 600 mg/day) • Ketogenic diet – obtain pre-KD labs if a second anesthetic infusion is required • Immunomodulatory therapy
Coma phase	Continue coma medication(s) x 24 hrs after last seizure on EEG Continue all prior anti-seizure medications at maintenance dosing
Weaning phase	Midazolam: reduce continuous infusion by 0.05 mg/kg/hr q3hrs Ketamine: wean off slowly over at least 24h Pentobarbital: reduce continuous infusion by 1 mg/kg/hr q6hrs

* Consider ketamine as the first-line anesthetic infusion in patients for whom an adverse effect of hypotension is contraindicated: e.g., patients with Moyamoya, acute cerebral infarction, shock with hypotension, etc. This decision should be made in discussion with Neurology team.

*** Ketamine infusion for management of Super Refractory Status Epilepticus as second anesthetic infusion should only be initiated in discussion with Neurology team.

References for updates to guideline ¹⁻¹²:

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