Generalized Convulsive Status Epilepticus (GCSE)

Emergency Department (ED)

Nationwide Children's — When your child needs a hospital, everything matters.

Center for Clinical Excellence

Inclusion Criteria:

Patients ≥ 28 days in generalized convulsive status epilepticus (GCSE)

Exclusion Criteria:

- Focal status epilepticus
- Psychogenic nonepileptic events (PNEE)
- Presenting history incudes trauma prior to seizure activity (follow trauma activation protocols)
- Hyponatremic etiology for seizures
- Known toxicological ingestion

Initial management

- Cardiorespiratory monitoring
- Suction secretions
- Supplemental oxygen for O2 sats < 90%
- Place Intravenous (IV) line

Labs

- Point of care Glucose
- Consider blood gas if clinical concern for electrolyte disturbance
- Complete Metabolic Panel
- Complete Blood Count
- Serum pregnancy for females ≥ 10 years
- Urine drugs of abuse screen, if indicated
- Anticonvulsant levels, if indicated

Do not delay medication administration in order to obtain labs

Generalized Convulsive Status Epilepticus:

Bilateral tonic-clonic (BTC) seizures lasting ≥ 5 minutes
or
≥ 2 discrete BTC seizures between which there is incomplete recovery of consciousness

- **Lorazepam IV** 0.1 mg/kg (max 4 mg/dose) over 1 minute

or

- **Midazolam IN** 0.3 mg/kg (max 10 mg/dose), split between nostrils

- If glucose < 60 mg/dL give 5 mL/kg **D10% IV bolus** (max 250 mL)

Prepare next medication while waiting for current medication to take effect

Seizure continues for 5 minutes

Repeat

- **Lorazepam IV** 0.1 mg/kg (max 4 mg/dose) over 2 minutes

or

- **Midazolam IN** 0.3 mg/kg (max 10 mg/dose), split between nostrils

Seizure continues for 5 minutes

Levetiracetam IV
60 mg/kg (max 4500 mg/dose) infuse over 5 minutes

Seizure continues for 10 minutes

Fosphenytoin IV
20 mg PE/kg (max 1500 mg PE/dose) infuse over 10 minutes
*If patient has known allergy to fosphenytoin/phenytoin, consider **Phenobarbital** or **Valproic Acid***

Consult neurology if GCSE not responsive to Fosphenytoin or for any other concerns

Seizure continues for 10 minutes

Additional medical management in consultation with Neurology

Patient on Chronic Antiseizure Medications

GCSE versus PNEE

Neuroimaging

Concern for CNS Infection

Discharge Criteria & Planning

Admission criteria
Neurology (HP6)
versus
PICU

Generalized Convulsive Status Epilepticus (GCSE) versus Psychogenic Non-Epileptic Events (PNEE)

Distinguishing GCSE and PNEE can be challenging, and it is important to recognize that exceptions can occur.

Below is generalized guidance to distinguish GCSE and PNEE

Signs Favoring PNEE	Signs Favoring Epileptic Seizures	Indeterminate Signs
• Long duration • Fluctuating Course • Asynchronous Movements* • Pelvic Thrusting* • Side-to-side Head or Body Movements** • Forced Eye Closure • Ictal Crying • Memory Recall	• Occurrence from Physiologic Sleep • Postictal Confusion • Stertorous Breathing	• Gradual Onset • Non-Stereotyped Events • Flailing or Thrashing Movements • Opisthotonos • Tongue Biting • Urinary Incontinence

*May not reliably differentiate between PNEE and frontal lobe partial epileptic seizures
** May only be helpful in distinguishing convulsive PNEE and epileptic seizures

Adapted from:

Avbersek A, Sisodiya S. Does the primary literature provide support for clinical signs used to distinguish psychogenic nonepileptic seizures from epileptic seizures? J Neurol Neurosurg Psychiatry. 2010; 81:719–725.

Perez DL, LaFrance WC. Nonepileptic seizures: an updated review. CNS Spectr. 2016 June;21(3:) 239-246.

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Patient on Chronic Antiseizure Medications

Patient on chronic antiseizure medications:

- Follow GCSE pathway
- Consult neurology
- Check medication level if on any of the following as results may impact care in the acute setting:
  - Carbamazepine
  - Phenobarbital
  - Phenytoin
  - Valproic acid

  May consider checking levels for other anti-seizure medications – discuss with neurology

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Neuroimaging

Consider neuroimaging when clinically stable if any of the following:

- Acute focal deficit (see Sudden Neurologic Deficit Pathway)
- Risk for bleeding
- Presence of VP shunt

Fast MRI preferred

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Concern for CNS Infection

Complete:

- CSF studies
- Other tests as indicated
- Antibiotics/Acyclovir per Febrile Infant 29-60-day order set

Do not delay *antibiotic or acyclovir to wait for completion of lumbar puncture*

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Medications

- **Glucose < 60 mg/dL:** 5 ml/kg D10% IV bolus (max dose 250 mL).
- **Lorazepam IV:** 0.1 mg/kg (max 4 mg/dose) over 2 minutes.
- **Midazolam IN:** 0.3 mg/kg (max 10 mg/dose). Split dose between nostrils.
- **Levetiracetam IV loading dose:** 60 mg/kg (max 4500 mg/dose) infuse over 10 minutes.
- **Fosphenytoin IV loading dose:** 20 mg PE/kg (max 1500 mg PE/dose) infuse over 10 minutes.
- Known **allergy to fosphenytoin/phenytoin**, consider:
  - **Phenobarbital IV loading dose:** 20 mg/kg (max 1000 mg/dose) infuse over 15-20 minutes (monitor for respiratory depression and potential need for intubation).

  or
  - **Valproic acid IV loading dose:** 30 mg/kg (maximum 3000 mg/dose) infuse over 10 minutes.
    - *Contraindications:*
      - *< 2 years old*
      - *Known mitochondrial disorder*
    - *Relative Contraindications:*
      - *Pregnancy*
      - *Hepatic dysfunction*

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Admission Criteria

Neurology (HP6)
- Status epilepticus resolved
- No airway compromise
- Improving mental status

Pediatric Intensive Care Unit
- Concern for persistent GCSE
- Concern for subclinical status epilepticus
- Requiring continuous IV medications for seizure control
- Airway compromise (requiring nasal trumpet, BiPAP, endotracheal intubation)

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Discharge Criteria & Planning

Discharge home from the Emergency Department may be considered if all of the following criteria are met:

- GCSE that resolves spontaneously or after 1 dose of benzodiazepine
- Patient mental status has returned to baseline
- Family comfortable with discharge plan and follow-up

If criteria met:

- **Provide prescription for seizure rescue medication**
- **Follow Up:**
  - PCP within 2-3 days if Neurology follow-up is not already established

  and / or
  - Neurology follow-up as recommended

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References

- Brophy GM, Bell R, Claassen J, et al. Guidelines for the evaluation and management of status epilepticus. *Neurocrit Care*. 2012;17(1):3-23. doi: 10.1007/s12028-012-9695-z. PMID: 22528274.
- Abend NS, Bearden D, Helbig I, et al. Status epilepticus and refractory status epilepticus management. *Semin Pediatr Neurol*. 2014;21(4):263-274. doi: 10.1016/j.spen.2014.12.006.
- Kapur J, Elm J, Chamberlain JM, et al. Randomized trial of three anticonvulsant medications for status epilepticus. *N Engl J Med*. 2019;381(22):2103-2113.
- Chamberlain JM, Kapur J, Shinnar S, et al. Efficacy of levetiracetam, fosphenytoin, and valproate for established status epilepticus by age group (ESETT): a double-blind, responsive-adaptive, randomised controlled trial. *Lancet*. 2020;395(10231):1217-1224.
- Silbergleit R, Lowenstein D, Durkalski V, Conwit R; Neurological Emergency Treatment Trials (NETT) Investigators. RAMPART (Rapid Anticonvulsant Medication Prior to Arrival Trial): a double-blind randomized clinical trial of the efficacy of intramuscular midazolam versus intravenous lorazepam in the prehospital treatment of status epilepticus by paramedics. *Epilepsia*. 2011;52 Suppl 8(Suppl 8):45-7.
- Glauser T, Shinnar S, Gloss D, 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.
- Vidaurre J, Albert DVF, Parker W, et al. Improving time for administration of second-line antiseizure medications for children with generalized convulsive status epilepticus using quality improvement methodology. *Epilepsia*. 2021;62(10):2496-2504.
- Avbersek A, Sisodiya S. Does the primary literature provide support for clinical signs used to distinguish psychogenic nonepileptic seizures from epileptic seizures? *J Neurol Neurosurg Psychiatry*. 2010;81(7):719-725.
- Perez DL, LaFrance WC. Nonepileptic seizures: an updated review. *CNS Spectr.* 2016;21(3):239-246.

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Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associates with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

For more information about our pathways and program please contact:
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Metrics

Pathway Goal

Timely treatment and evaluation of Generalized Convulsive Status Epilepticus (GCSE)

Quality Measures

Outcome Metrics

- Time to first antiepileptic drug administration
- Time to IV access

Process Metrics

- Pathway Visualization
- Pathway Order Set Utilization

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