Emergency Department Guideline
Seizure

Inclusion criteria:
- Patient > 4 weeks of age presents with:
  - Ongoing seizure activity
  - Reported concern for resolved seizure activity prior to arrival
  - If VP shunt present, refer to suspected shunt malfunction guideline for workup

Triage considerations:
- If actively seizing:
  - ESI triage level 1
  - Immediate placement in resuscitation room
  - Assess and stabilize ABCs; additional management as below
  - Notify physician
  - Provide O2, ready suction
- If seizure resolved:
  - ESI triage as appropriate
  - Full set of vitals including blood pressure
  - Place on continuous cardiac monitoring
  - Notify MD if depressed mental status or significantly abnormal vital signs
  - Antipyretics if febrile

Laboratory studies:
- If actively seizing, place IV and draw:
  - iStat VBG (CG8) if available
  - If iStat not available: immediate bedside blood glucose
  - Send BMP to lab
  - If fever: CBC, blood culture, place foley for UA and culture. Consider LP, but do not delay antibiotics if indicated.
  - Consider toxicology screen
  - Patients with known seizure disorder—check drug level if on:
    - Tegretol (carbamazepine)
    - Trileptal (oxcarbazepine)
    - Phenobarbital
    - Depakote (valproate)
    - Dilantin (phenytoin)
    - Other drugs such as Keppra and topiramate only as requested

This UMMCH Guideline addresses only key points of care for the specific population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Guideline does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgments regarding the priority of any specific procedure or course of action.

Seizure
June 2014
Division of Pediatric Emergency Medicine
• **Do not delay ABC care for labs**
  
  • If seizure resolved and child at baseline or mildly post-ictal:
    - If fever in child age 6 mos-6 years:
      - Labs ONLY as otherwise indicated in this patient (e.g., CBC/blood cx/UA/Ucx in infant, ill-appearing, or unvaccinated, LP if meningismus).
        Many febrile seizure patients DO NOT need labs.
    - If no fever:
      - Labs rarely indicated (unless clinical suspicion of electrolyte abnormality, e.g. severe diarrhea)
  
  • Patients with known seizure disorder—check drug level if on:
    - Tegretol (carbamazepine)
    - Trileptal (oxcarbazepine)
    - Phenobarbital
    - Depakote (valproate)
    - Dilantin (phenytoin)
    - Other drugs such as Keppra and topiramate only as requested

**Imaging:**

• Once ABCs stabilized, head CT without contrast if:
  - Refractory seizure with unknown etiology
  - Asymmetric or focal abnormalities on neurologic exam
  - Concern for trauma
  - No return to baseline mental status within 30-60 minutes
  - Presence of CSF shunt
  - History concerning for intracranial mass lesion (e.g. morning vomiting, severe headache, history of prior brain tumor or metastatic malignancy)

**Medications/interventions:**

• **All patients require ongoing monitoring of respiratory status and vital signs**

• First line: *Lorazepam* (Ativan)
  - 0.1 mg/kg IV/IO, max 4 mg per dose
  - May repeat q5min; monitor airway and breathing carefully

• First line if no IV: *Midazolam* (Versed)
  - 0.4 mg/kg intranasal with atomizer, max 10 mg per dose, divided between nares
  - May repeat q5min (but consider IO if still no access)

• Second line (if persistent seizure after 2 doses of benzodiazepine): *Fosphenytoin*
  - 20 mg PE/kg IV/IO

• Second line (if toxin induced): *Phenobarbital*
  - 20 mg/kg IV/IO, max 1 gram (monitor for apnea)

• Third line (if persistent after 30 minutes of therapy):
  - Obtain secure airway.
  - Consult PICU and pediatric neurology.
  - May repeat second line or advance to
    - Propofol (2-3 mg/kg IV bolus followed by infusion at 100-300 mcg/kg/min—DO NOT USE if on ketogenic diet) or
    - Pentobarbital (5-15 mg/kg IV bolus followed by infusion at 0.5-5 mg/kg/hour).
• If rapid sequence intubation required for respiratory depression:
  o Sedation: Additional dose of lorazepam, 0.1 mg/kg max 4 mg, as needed
  o Muscle relaxant: Succinylcholine 1-1.5 mg/kg
    ▪ Avoid longer acting agents due to potential to obscure ongoing seizure activity, unless EEG monitoring in place
• If hypoglycemia (glucose ≤ 60), D10 at 5 ml/kg or D25 at 2 ml/kg, IV/IO
  o Dextrose relatively contraindicated if on ketogenic diet
• If hyponatremia, 3% saline at 2-6 ml/kg IV/IO, max rate 20 ml/min
• Acetaminophen (Tylenol) prn fever
  o 15 mg/kg PO/PR

Consultations:
• Pediatric neurology (unless simple febrile seizure)

Reassessments:
• Continuous cardiorespiratory monitoring with pulse ox while ongoing seizures or significantly post-ictal
• Once seizures stopped and patient awakening, VS with BP q1h, or as otherwise indicated by clinical status

Differential diagnosis:
• New onset unprovoked seizure
• Simple or complex febrile seizure
• Toxin ingestion
• CNS infection
• Intracranial mass lesion
• Shunt failure (if shunt in place)
• Pseudoseizure
• Other non-seizure “spell”

Discharge or Admission criteria:
• PICU
  o Intubated patient
  o Concern for ongoing seizure activity
  o Evidence of increased ICP
  o Vital sign instability
• Inpatient floor
  o Total duration of seizure > 15 minutes (unless known seizure patient cleared in consultation with neurology)
  o Ongoing altered mental status beyond 2-3 hours
  o Atypical febrile seizure (focal, 2nd episode in 24 hours, required medications to stop)
  o Seizure required more than single dose of benzo to break
  o New focal nonfebrile seizure
  o Need for expedited evaluation
Evidence of serious bacterial infection, electrolyte abnormality, severe parental anxiety, or other non-seizure indication for admission

- Discharge home
  - Any workup done is reassuring
  - If known seizure patient, cleared by consultation with neurology (med adjustments as needed)
  - Neurologically at baseline
  - Family with reliable phone access and understands situation well enough to return if recurrent seizure
  - **If first unprovoked (non-febrile) seizure, on discharge:**
    - Advise follow-up with Pediatric Neurology’s “First Seizure Clinic.”
    - Family to call 612-365-6777 to make appointment, or ED can engage care coordinator’s assistance.
  - **In all cases on discharge,** educate family on seizure first aid:
    - No objects in mouth
    - Move patient to safe place
    - Roll on side if vomiting
    - Gently open airway if cyanosis or other signs of respiratory difficulty
    - Careful supervision in baths and while swimming, no high climbs or driving until cleared in follow-up
    - Call EMS if seizure over 5 minutes

**Quality measures:**
- Check blood glucose within 5 minutes of arrival for active seizure
- Check sodium within 10 minutes of arrival for active seizure
- First dose of benzo within 10 minutes in active seizure

**References:**


Wilfong A. UpToDate: Management of status epilepticus in children.