General Medical: Seizure

Goals: Prompt cessation of seizures in the prehospital setting; minimizing adverse events in prehospital seizure treatment; minimizing risk of seizure recurrence during transport
Inclusion Criteria: Seizure activity upon EMS arrival, new/recurrent seizure activity lasting > 5 minutes, or patients who are post-ictal upon EMS arrival
Exclusion Criteria: None
Refer to: Behavioral Emergencies/Excited Delirium, Diabetic Emergencies, Head Injury/TBI, Heat-Related Emergencies, Poisoned Patient/Overdose, OB/Gyn, Stroke, Toxic Chemical Exposure and Trauma CPGs

NOTES:
- Seizures are a non-specific manifestation of neurologic injury or disease, as either a primary condition or a secondary condition resulting from a wide range of abnormalities ("AEIOUTIPS").
- These include, among others: Alcohol/substance withdrawal, Epilepsy, Insulin (hypoglycemia), Overdose, "Underdose"/uremia, Trauma/tumor, Infection, Pregnancy, and Structural changes/stroke.
- Fever with seizure in children less than 6 months old or greater than 6 years old is NOT consistent with simple febrile seizure; E.D. evaluation is needed to exclude meningitis, encephalitis or other serious cause.
- Status epilepticus (seizures lasting more than 5 minutes, or 2 or more seizures without lucid interval) may cause a massive release of catecholamines, resulting in hypertension, tachycardia, dysrhythmias, hyperglycemia, hyperthermia, and/or acidosis from muscle rigidity and poor ventilation. The primary goal of EMS care is to stop the seizure.

Basic Level

1. Assess and support ABCs according to UNIVERSAL CARE – ADULT or UNIVERSAL CARE – PEDIATRIC, and to Airway Management – Adult or Airway Management – Pediatric, as clinically indicated:
    a. A (Airway): Ensure airway patency with suctioning and OPA or NPA, as needed
    b. B (Breathing): Provide supplemental oxygen to maintain SpO_2 at least 94% (continuous monitoring); assist ventilations with BVM, as needed
    c. C (Circulation): Assess perfusion
    d. D (Disability): Assess and document GCS; assess nystagmus, pupillary size and reactivity
    e. E (Exposure/Environmental): Assess for trauma, overdose, sepsis and other etiologies; begin cooling measures, per Heat-Related Emergencies CPG, as needed
2. Positioning:
    a. If trauma is not suspected, position the patient in a position of comfort, or in the left lateral decubitus position, facing EMS Providers, in order to monitor and manage the airway:
        i. If trauma is suspected, refer to the Spinal Motion Restriction Policy and Trauma CPG
3. Perform and document a POC Glucose analysis and treat according to the Diabetic Emergencies CPG
    a. Do not administer oral glucose to a patient who is unresponsive or unable to protect his/her airway – assist Advanced Level Provider with parenteral dextrose or glucagon administration
4. As soon as possible, obtain focused history about the current seizure; past medical history, such as: seizures/diabetes/trauma/pregnancy/toxin exposure; concurrent symptoms; anticonvulsant medications
5. Once advanced level care arrives on scene, give report and transfer care

Advanced Level

6. Initiate continuous ECG and $PetCO_2$ monitoring and continue SpO_2 monitoring until patient care has been transferred to hospital staff
7. Consider Advanced airway placement only if non-invasive measures (positioning, suctioning, OPA/NPA) are unsuccessful or to protect the airway in case of regurgitation/vomiting
8. Treat hypoglycemia according to the Diabetic Emergencies CPG:
    a. For a patient who is unable to tolerate oral glucose, IV/IO dextrose is the preferred treatment
    b. IM/IN glucagon is an alternative, only if reasonable attempts at vascular access are unsuccessful
    c. Obtain and transmit a 12-Lead ECG (Adult at least 14 years of age)

9. If the patient is actively seizing upon EMS arrival or seizes again after EMS arrival, administer anticonvulsants as soon as possible:
    a. Generally, IM or IN route of administration is preferred
    b. IV or IO route of administration is not usually necessary for seizure treatment, but may be indicated for other reasons (e.g. fluid resuscitation for trauma/shock/heatstroke)
    c. Before benzodiazepine administration, prepare for assisted ventilation with 100% FiO_2 (especially in the pediatric patient)
    d. ADULT at least 14 years of age:
        i. Midazolam 2.5 – 5 mg IM or IN (preferred) or IV/IO
        ii. May repeat once after 5-10 minutes, up to a maximum, total, cumulative dose of 10 mg; **OR**
        iii. Diazepam 2.5 – 5 mg IV/IO (IM and IN routes are not recommended)
        iv. May repeat once after 5-10 minutes, up to a maximum, total, cumulative dose of 10 mg
        v. Do not administer more than two doses of either medication without BioTel authorization

e. PEDIATRIC patient less than 14 years of age:
i. Appropriately sized BVM equipment must be available
ii. **IN Midazolam is the drug and route of choice**
iii. Infant 1 to 6 months of age: Midazolam 0.2 mg/kg IN (maximum dose 1 mg)
iv. Infant at least 6 months of age or child: Midazolam 0.2-0.3 mg/kg IN (max 5 mg)
v. Divide the IN dose between the two nostrils, if possible
vi. **ONLY if IN route is unavailable**, administer 0.15-0.2 mg/kg IV (max 5 mg)
vii. **3rd-line treatment:** Diazepam 0.5 mg/kg per rectum (maximum dose 10 mg)
viii. Monitor closely for respiratory depression
ix. Contact BioTel if more than a single anticonvulsant dose is needed

10. Special considerations:
    a. Cyanide Toxicity: Refer to the Cyanide Exposure CPG
    b. Eclampsia:
        i. Consider eclampsia if 3rd-trimester pregnancy, peri-partum or up to 2 weeks post-partum
        ii. Treatment consists of both anticonvulsants AND magnesium sulfate (refer to OB/Gyn CPG)
    c. Head Injury/TBI: Refer to the Head Injury/TBI CPG
    d. Heatstroke: Refer to the Heat-Related Emergencies CPG
    e. Organophosphate Toxicity: Refer to the Toxic Chemical Exposure CPG
    f. Stimulant Toxicity/Excited Delirium Syndrome: Refer to the Behavioral Emergencies/Excited Delirium CPG
    g. Stroke (rare in adults, somewhat more common in children): Refer to the Stroke CPG
11. Transport:
    a. All patients treated in the field for seizure/status epilepticus MUST be offered transport, especially those who received multiple anticonvulsant doses
    b. Hypoglycemic patients treated in the field for seizure should be transported, even if they return to baseline mental status after treatment
    c. All pediatric patients with seizures should be transported, especially those with fever and seizure
    d. All pregnant patients with seizures MUST be transported: contact BioTel and/or receiving hospital as soon as possible en route, to facilitate patient care
    e. If a patient or parent/guardian (pediatric patient) refuses to accept EMS transport, contact BioTel for further guidance and assistance
12. For additional patient care considerations not covered under standing orders, consult BioTel