

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

Author: Rita Zeidan, MS IV Editors: Andrea Sarchi, DO ; Jason Mansour, MD

Volume 3 | Issue 13 | Dec 2016

Status Epilepticus

A 54-year-old female with no past medical history presents to the ED via EMS with altered mental status and new onset of seizure lasting 2 minutes. Per the patient's son, she had no history of any drug use, trauma, or inciting incident. He states he found her on the floor twitching and unconscious when he called 911. En route to the hospital, EMS states that the patient had another tonic-clonic seizure lasting less than 2 minutes. Upon arrival to the ED, patient is hypotensive, tachycardic and afebrile. She is unresponsive to verbal or painful stimuli and appears to be making incomprehensible sounds. Within ten minutes she is able to both open her eyes and extend to painful stimuli, but is still making incomprehensible sounds. She then undergoes another tonic-clonic seizure. She has no urinary or bowel incontinence. The episode lasted less than two minutes. She was stabilized, IVs were placed, blood was drawn and IV fluids were started.

Question 1: You witness a young woman lying on the street outside the hospital unconscious, with symmetric convulsive movements. Which of the following is an appropriate immediate measure to take in the field?

- Restrain the patient's upper extremities to prevent self-injury
- Restrain the patient's lower extremities to prevent self-injury
- Insert a tongue depressor into her mouth to prevent tongue biting
- Turn the patient to her side to prevent aspiration
- Elevate the head to lower cerebral blood flow

Question 2: The convulsive movements stop and the patient is brought directly into the hospital's ED. On exam, she remains unarousable. She has evidence of a tongue laceration and urinary incontinence. The patient then has two more generalized tonic-clonic seizures in rapid succession. Which of the following pharmacologic agents should be used first?

- | | |
|------------------|------------------|
| a. Lorazepam | d. Phenobarbital |
| b. Carbamazepine | e. Propofol |
| c. Phenytoin | |

A. Acyclovir taken orally in doses of 400 mg orally 5 times daily for 10 days



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Status epilepticus occurs when:

- The active part of a tonic-clonic seizure lasts 5 minutes or longer
- A person goes into a second seizure without recovering consciousness from the first one
- A person is having repeated seizures for 30 minutes or longer

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

Department of Emergency Medicine
1625 SE 3rd Avenue
Fort Lauderdale, FL 33316

Question 1:

Appropriate measures to take for a patient having presumed GTC seizures include **repositioning into a lateral decubitus position to prevent aspiration** in the event of vomiting and loosening of tight clothing. Attempts at restraining will generally be ineffective and could increase the risk of injury. Nothing should be inserted in the mouth, as this increases the chance of dental injury or foreign object ingestion. Lowering cerebral blood flow is not an appropriate intervention for acute seizures.

Question 2:

The patient appears to be in status epilepticus, defined as either a state of continuous seizure activity or the recurrence of seizures one after the other without return to normal in between. In this case, the patient is having repeated generalized tonic-clonic seizures without intervening recovery. This is a medical emergency and pharmacologic treatment usually begins with administration of an IV benzodiazepine such as **lorazepam**. Phenytoin, phenobarbital, and propofol can be used in later steps if needed. Carbamazepine is not available in parenteral form and is not generally used in status epilepticus therapy.

Discussion

Status epilepticus is a state of prolonged, uncontrolled seizures, common in the ED and potentially life threatening. Mortality approaches 30% if left untreated. Presentations vary from clinically evident tonic-clonic convulsions, to subtle focal seizures, to seemingly bizarre sensory alterations associated with partial seizures. The condition can occur as convulsive or non-convulsive. Convulsive status epilepticus may more likely lead to long-term injury. Convulsions may include jerking motions, grunting sounds, drooling, and rapid eye movements. In the non-convulsive patients, they may appear confused or look as if they are daydreaming. Patients may be unable to speak or behave in an irrational manner.

Pathophysiology: excess excitation and reduced inhibition most commonly due to glutamate and GABA

Etiology: stroke, hypoxic injury, tumor, head trauma, drugs/toxins, alcohol withdrawal, electrolyte abnormalities (hypo/hyponatremia, hypercalcemia, encephalopathy), neoplasms, and CNS infection

Epidemiology: 50,000-200,000 cases annually

Patients at risk include: those with poorly controlled epilepsy, low blood sugar, stroke, kidney failure, liver failure, encephalitis, HIV, alcohol or drug abuse, genetic diseases, or head injuries

Symptoms: muscle spasms, falling, confusion, unusual sounds, loss of bowel or bladder control, clenched teeth, irregular breathing, unusual behavior, difficulty speaking, a daydreaming look.

Physiologic changes: tachycardia, cardiac arrhythmias, hyperglycemia, hypotension, hyperthermia, rhabdomyolysis, aspiration, marked acidosis

Workup: labs - glucose, electrolyte levels, CBC, renal and liver function tests, toxicology screening, anticonvulsant drug levels, arterial blood gas. Depending on the clinical setting, may obtain an EEG, blood cultures, UA and/or CSF analysis. Imaging - CT and/or MRI of the brain, CXR

Management: most patients can be managed with benzodiazepines (lorazepam, diazepam, midazolam). Second line pharmacotherapy includes phenytoin/fosphenytoin, barbiturates (phenobarbital, pentobarbital) and if status epilepticus does not stop, general anesthesia is indicated (propofol). Supportive therapy: maintenance of vital signs, airway, breathing, circulation (hemodynamic/cardiac monitoring), respiratory support, neurologic assessments. Prognosis is related to the underlying process.

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **"Conference"** link.

All are welcome to attend!

Warriors

Start an IV line, administer a 50 mL bolus of 50% dextrose IV and 100 mg of thiamine, then start the anticonvulsant. In some settings where drug intoxication might be likely, consider adding naloxone at 0.4 – 2.0 mg IV to the dextrose bag.

Electrolytes, calcium, magnesium, CBC, liver and renal function tests, toxicology screen, anticonvulsant levels, arterial blood gas

Diazepam (.15mg/kg) or Lorazepam (.1mg/kg) IV over 5 minutes.

Phosphenytoin 15-20 mg or phenytoin 18-20 mg. Mix phenytoin in NS to minimize risk of crystal precipitation. If seizure continues after 20 minutes, give an additional anticonvulsant.

Phenobarbital 15mg/kg IV if continues.

General anesthesia as last resort.

Insert urinary catheter

UA, urine toxicology

Cardiac O2 saturation, monitors

Intubate if necessary and control hyperthermia

Consider: trauma, infection, stroke, drug ingestion. As indicated: CXR, CT/MRI, LP, blood cultures, blood toxicology screen

Assess the ABCs: airway, breathing, circulation

Check fingerstick glucose

Establish IV access

Send blood laboratory studies

Give 100 mg IV thiamine, followed by 50% dextrose infusion

Lorazepam 0.1 mg/kg IV

If status epilepticus continues

Phenytoin 20 mg/kg IV (or fosphenytoin equivalent)

If status epilepticus continues

Intubate if not already done

Phenobarbital 20 mg/kg IV

If status epilepticus continues

Induce coma with barbiturates, midazolam, or propofol

Institute continuous bedside EEG monitoring



ABOUT THE AUTHOR

This month's case was written by Rita Zeidan. Rita is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in October 2016. Rita plans on pursuing a career in Internal Medicine after graduation.

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Take Home Points:

- Status epilepticus is defined as the active part of a seizure lasting greater than 5 minutes, repeated seizures lasting for 30 minutes or more, or if a person has a second seizure without recovering from the first one.
- Treatment options include benzodiazepines followed by anticonvulsants, barbiturates and general anesthesia as a last resort