

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

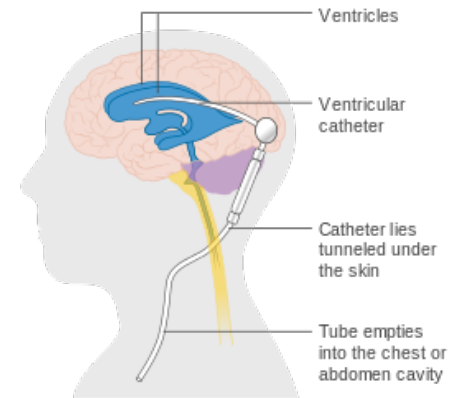
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The Emergent Treatment of Seizures

A 32-year-old male with a history of ventriculoperitoneal (VP) shunt placement and alcohol abuse presents to the ED with seizures. Witnesses saw him seize twice before EMS arrived on scene. They state that it looked like the patient had "tightened up" and then become unresponsive. On route, the patient was given 4 doses of lorazepam (Ativan), and had 2 more seizures. Upon arrival in the ED, the patient is treated with an additional dose of Ativan, and 1 dose of levetiracetam (Keppra), which still did not control seizures. At this point, what is the proper next step of seizure control?

- A. Continue levetiracetam doses, spaced 10 minutes apart, until seizures cease.**
- B. Emergent Electroencephalogram (EEG)**
- C. Immediate Head CT**
- D. Return to giving lorazepam only**
- E. Rapid sequence intubation and propofol (Diprivan) sedation**



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Graphic representation of a VP Shunt

A VP shunt is the placement of a connection between the ventricles of the brain to the peritoneum, so that cerebrospinal fluid (CSF) may drain away from the brain, allowing for decompression of pressure build-up from increased levels of CSF.

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

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The correct answer is E.

Given the treatment failure of this case of status epilepticus, the patient now needs to be sedated and intubated to control the seizures.

It is important to know how to control acute seizures in the ER setting. This patient was having seizures refractory to treatment, occurring over an extended amount of time, making this status epilepticus. First and second-line drugs have failed to control the seizures, and thus the last step is to use propofol as sedation, and intubation to protect the airway.

Discussion:

A seizure is a neurologic dysfunction caused by aberrant overactivity of a large network of neurons. The activation of these neurons manifests clinically through motor, sensory, behavioral, or autonomic activity. Trauma from seizures is very common, ranging from ecchymosis to traumatic brain injury. Similarly, uncontrolled seizures stress the body, and prolonged electrical activity of the brain can damage neurons. Thus, it is important to control seizures as soon as possible.

It is important to determine whether what is occurring is actually a seizure. Differential diagnoses should include syncope, sleep disorders, paroxysmal movement disorders, psychological disorders, etc. A detailed history of the event is essential for this.

It is also important to elucidate the cause of the seizure. Provoked seizures have many causes, including metabolic disturbances, vascular compromise, mass effect, and neurologic origin. Work-up may include CMP, serum glucose, calcium/magnesium levels, renal/liver function tests, urine and serum toxicology screen, etc., depending on the most likely cause. Without solving the underlying issue, provoked seizures will recur.

In this case, the patient had a VP shunt, which was imaged and evaluated through X-ray and CT. The shunt was not the cause of seizures in this case. (It ended up being alcohol withdrawal.)

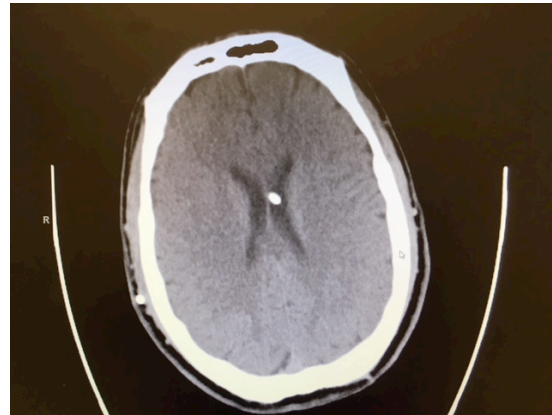


Figure above: A VP shunt shown on CT

Treatment:

In the acute setting, seizure control occurs in a linearly progressive fashion. The first line medications for controlling acute seizures are benzodiazepines (BZDs). Second-line agents are more variable, including fosphenytoin (Cerebyx), phenytoin (Dilantin), valproic acid (Depakote), and levetiracetam (Keppra). Studies have not shown a significant difference between seizure control efficacy in these drugs. Finally, the last-line drugs include sedatives that sedate the patient to the point where they must be put on external support devices. Sedatives include propofol, midazolam (Versed), or phenobarbital (Luminal)

1st line drugs: BZDs are used to break the initial seizure. They are the initial drug of choice due to their relatively milder side-effect profiles, and increased efficacy compared to other drugs. Common choices include lorazepam and diazepam (Valium/Diastat).

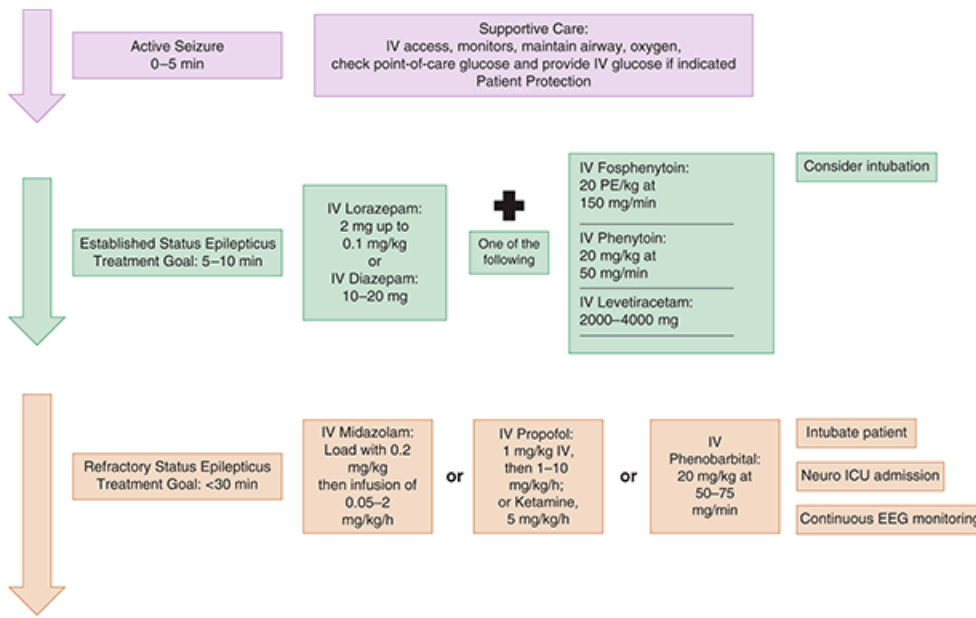
2nd line drugs: These drugs are used to prevent recurrence. Unlike BZDs, they cannot stop a seizure once it occurs; these drugs try to prevent the next one from happening.

3rd line drugs: These drugs are for refractory seizures only. In this final step, it is important to monitor the patient with an EEG, BP cuff, and O₂ monitor, as the patient will no longer be able to exhibit signs of continued seizures or deterioration once sedated.

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



ABOUT THE AUTHOR

This month's case was written by Kevin Liu. Kevin is a 4th year medical student from FIU HWCOC. He did his emergency medicine rotation at BHMC in October 2016. Kevin plans on pursuing a career in Internal Medicine after graduation.

Shown above is one of many algorithms used to control acute seizures. This algorithm highlights the time-sensitive nature of controlling seizures, as well as necessary steps taken in the final step of sedating patients with refractory seizures.

Take Home Points

- The presentation of a seizure should first be confirmed with a proper history, and a differential diagnosis should include pathologies that mimic seizure presentation.
- The underlying cause of a seizure should be elucidated in order to attempt to stop recurrence of seizures.
- Continuous seizures can cause permanent sequelae, and thus must be controlled as soon as possible.
- 1st line treatment for seizures are benzodiazepines. 2nd line drugs include levetiracetam, phenytoin, and valproic acid. 3rd line drugs include midazolam, phenobarbital, and propofol.
- Close monitoring is necessary when putting seizure patients on sedation, as external signs of seizures and decompensation are no longer apparent.

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