

UC Irvine

Journal of Education and Teaching in Emergency Medicine

Title

Status Epilepticus

Permalink

<https://escholarship.org/uc/item/4sd5c771>

Journal

Journal of Education and Teaching in Emergency Medicine, 2(2)

Authors

Lee, Jonathan
Wray, Alisa

Publication Date

2017

DOI

10.5070/M522034554

Copyright Information

Copyright 2017 by the author(s). This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

SIMULATION

Status Epilepticus

Jonathan Lee, BS* and Alisa Wray, MD*

*University of California, Irvine, Department of Emergency Medicine, Orange, CA

Correspondence should be addressed to Jonathan Lee, BS at j.b.lee@uci.edu

Submitted: February 16, 2017; Accepted: March 23, 2017; Electronically Published: April 15, 2017; <https://doi.org/10.21980/J8RC7V>

Copyright: © 2017 Lee, et al. This is an open access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) License. See: <http://creativecommons.org/licenses/by/4.0/>

ABSTRACT:

Audience: This simulation can be used for emergency medicine (EM) learners of any level including medical students, junior residents and senior residents.

Introduction: Seizures are the result of abnormal or disorganized cortical electrical activity in the brain. Status epilepticus is a dangerous complication of seizures. In adults and children older than five years old, generalized, convulsive status epilepticus refers to greater than 5 minutes of a continuous seizure OR two or more discrete seizures between which there is incomplete recovery of consciousness.^{1,2} As with all emergency situations treatment must occur simultaneously while the physician manages primary assessment and resuscitation and determines the underlying cause.

Objectives: At the end of this simulation session, the learner will: 1) Demonstrate the management of status epilepticus 2) Justify when airway intervention is needed for status epilepticus 3) Describe risk factors for status epilepticus 4) Prepare a differential diagnosis for the causes in status epilepticus.

Method: This educational session is a high-fidelity simulation.

Topics: Status epilepticus, seizure, intubation, anti-epileptic medications, alcohol abuse, toxicology.





USER GUIDE

List of Resources:

| | |
|----------------------------------|----|
| Abstract | 1 |
| User Guide | 2 |
| Instructor Materials | 4 |
| Operator Materials | 11 |
| Debriefing and Evaluation Pearls | 14 |
| Simulation Assessment | 17 |

Learner Audience:

Medical Students, Interns, Junior Residents, Senior Residents

Time Required for Implementation:

Instructor Preparation: 15-30 minutes

Time for case: 15-20 minutes

Time for debriefing: 10-30 minutes

Recommended Number of Learners per Instructor:

2-5

Topics:

Status epilepticus, seizure, intubation, anti-epileptic medications, alcohol abuse, toxicology.

Objectives:

At the end of this simulation, learners will be able to:

1. Demonstrate the management of status epilepticus
2. Justify when airway intervention is needed for status epilepticus
3. Describe risk factors for status epilepticus
4. Prepare a differential diagnosis for the causes in status epilepticus

Linked objectives and methods:

The etiology of seizures is vast, often caused by metabolic derangements, structural abnormalities, toxins, fevers, infections and by eclampsia.³ In adults and children older than five years old, generalized, convulsive status epilepticus refers to greater than 5 minutes of a continuous seizure OR two or more discrete seizures between which there is incomplete recovery of consciousness.⁴ Through the abrupt onset of symptoms seen in this patient simulation, learners will demonstrate their ability to quickly recognize signs and symptoms of status epilepticus. By resuscitating and managing the patient, learners will demonstrate their ability to stabilize a patient with status epilepticus with oxygenation or intubation (if indicated), as well as their ability to promptly administer the appropriate first and second line anti-epileptic medications. First line treatment for status epilepticus is benzodiazepines, although in special circumstances, such as eclampsia or INH overdose, first line treatment is magnesium sulfate or

pyridoxine, respectively.^{3,5} If status epilepticus is unable to be controlled with benzodiazepines, often fosphenytoin, valproic acid, or levetiracetam and in some cases drug-induced coma with continuous EEG may be needed.⁶ If the patient continues to seize after first and second line medications, repeat second line medications or administration of anesthetic doses of either thiopental, midazolam, pentobarbital, or propofol, with continuous EEG monitoring should be considered.⁶ This simulation will allow trainees to practice how to administer treatment while simultaneously managing the airway, breathing and circulation (ABCs) and attempting to determine the underlying cause. The learner will achieve the third tier of Miller's pyramid by "showing how" to diagnose and manage status epilepticus. The debriefing session can discuss any cognitive, diagnostic or management errors, problems with communication, or points of confusion.

Recommended pre-reading for instructor:

- Any resource to review status epilepticus treatment and management would be appropriate. For suggestions, please see reference list.

Learner responsible content (optional):

- Any resource to review status epilepticus treatment and management would be appropriate. For suggestions, please see reference list.

Results and tips for successful implementation:

This case can be completed on a high, moderate or low fidelity simulation set up. It can also be used as an oral boards case. The goal of this case is to expose the learner to status epilepticus that is not broken with seizure medications, forcing the learner to consider second- and third-line medications as treatment for status. If the learners are having difficulty determining what to do when the seizure does not resolve with first-line benzodiazepines, the nurse at bedside can prompt them by asking "can we give something other than benzos to help with the seizures." Further, the nurse can prompt the learner to intubate by having the patient vomit or desaturate. The simulation case was piloted with 8 PGY-2 and PGY-3 residents. After pilot implementation, we made moderate adjustments to make the diagnosis more straightforward and the resuscitation more difficult.

References/suggestions for further reading:

1. Chen JW, Wasterlain CG. Status epilepticus: pathophysiology and management in adults. *Lancet Neurol*. 2006 Mar;5(3):246-56. doi: 10.1016/S1474-4422(06)70374-X
2. Trinka E, Cock H, Hesdorffer D, et al. A definition and classification of status epilepticus—report of the ILAE Task



USER GUIDE

Force on classification of status epilepticus. *Epilepsia*. 2015;56(10):1515. doi: 10.1111/epi.13121

3. Delanty N, Vaughan CJ, French JA. Medical causes of seizures. *The Lancet*. 1998;352(9125):383-390. doi: 10.1016/S0140-6736(98)02158-8
4. Lowenstein DH, Bleck T, Macdonald, RL. It's time to revise the definition of status epilepticus. *Epilepsia* 1999;40(1): 120-122.
5. Appleton R, Macleod S, Martland T. Drug management for acute tonic-clonic convulsions including convulsive status epilepticus in children. *Cochrane Database Syst Rev*. 2008;(3):CD001905. doi: 10.1002/14651858.CD001905.pub2
6. Glauser T, Shlomo S, Gloss D. 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. doi: 10.5698/1535-7597-16.1.48
7. Tarabar AF, Ulrich AS, D'Onofrio G. Seizures. In: Adams JG, Barton ED, Collings JL, DeBlieux PM, Gisoni MA, Nadel ES, eds. *Emergency Medicine: Clinical Essentials*. 2nd ed. Philadelphia, PA: Elsevier; 2013:863.
8. Shearer PL, Jagoda A. In: Wolfson AB, ed. *Harwood-Nuss' Clinical Practice of Emergency Medicine*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2019:777.



INSTRUCTOR MATERIALS

Case Title: Status Epilepticus

Case Description & Diagnosis (short synopsis): Patient is a 22-year-old male with past medical history of seizure disorder on levetiracetam (Keppra), who is brought in by ambulance with increased seizure activity for one day. Paramedics state that per roommate the patient had two seizures this morning approximately 20 minutes apart, the seizures lasted less than one minute, and the patient returned to baseline between the seizures. Approximately 30 minutes ago, the patient began seizing and did not stop, prompting the roommate to call 911.

When paramedics arrived the patient was still seizing, and medics gave versed 5mg intramuscularly with no improvement. Blood sugar en route was 120 mg/dL. The patient arrived to the resuscitation bay with tonic-clonic seizure activity, on a cardiac monitor and non-rebreather. A quick but thorough physical exam should be performed, which will reveal tonic-clonic jerking, and mild tachycardia, but the rest of the exam will be unremarkable. The learners should start the patient on first line anti-epileptic medications, which will not improve the patient's seizures. The learner should then recognize the concern for status epilepticus and then start the patient on second line anti-epileptic medications, which also will not improve the patient's condition. Lastly, the learners should intubate the patient and consult neurology for electroencephalogram (EEG) monitoring and intensive care unit (ICU) admission.

Equipment or Props Needed:

- High- or moderate-fidelity simulator
- Infusion pumps
- Normal saline
- Prop benzodiazepine vials and syringes
- Prop barbiturate vials and syringes
- Intubation/airway tray
- Blood pressure cuff
- Cardiac monitor
- Pulse Oximeter
- Crash Cart

Confederates needed:

This simulation needs a confederate or narrator from the simulation control room to give the initial paramedic report and a nurse to assist with the management of the patient.



INSTRUCTOR MATERIALS

Stimulus Inventory:

- #1 Complete Blood Count (CBC)
- #2 Complete Metabolic Count (CMP)
- #3 Levetiracetam (Keppra) Level
- #4 Alcohol level
- #5 Urinalysis (UA) / Urine Drug Screen (UDS)
- #6 Lactate
- #7 Point-of-care glucose
- #8 Chest X-ray status post intubation

Background and brief information: The scenario takes place in an ED at a tertiary care teaching hospital. The patient is a 22-year-old male with a known seizure disorder who is brought in by paramedics for increased seizure activity for the last day. When he arrives, he has been seizing for approximately 30 minutes despite paramedics administering versed 5mg IM prior to arrival.

Initial presentation: Patient presents brought in by ambulance, in status epilepticus.

How the scenario unfolds: Participants should ask paramedics to stay, and get an initial history from the paramedics. Participants should then realize that patient has been seizing for greater than 30 minutes at this time and recognize that the patient is in status epilepticus. They should manage the airway initially by placing the patient on a non-rebreather, then obtain IV access, attempt to control his seizures with intravenous benzodiazepines, and order blood work. A quick but thorough physical exam should be performed, which will reveal tonic-clonic jerking, altered level of consciousness, and mild tachycardia, but the rest of the exam will be unremarkable.

The patient will require multiple doses of intravenous benzodiazepines; however, the patient will continue to seize. The participants should then consider the differential diagnosis of status epilepticus. Lab work will reveal mildly elevated white blood count (WBC), normal electrolytes, mildly elevated aspartate aminotransferase (AST), elevated lactic acid, and elevated alcohol level. The patient's urinalysis and urine drug screen will be within normal limits. Participants may choose to start a benzodiazepine drip or to administer second line anti-epileptic (such as fosphenytoin, valproic acid, levetiracetam (Keppra)); however, this will not stop the patient's seizures. If the learners do not start second line anti-epileptics, the



INSTRUCTOR MATERIALS

nurse or pharmacist in the room can prompt the learner by asking if there is another medication they would like to give.

Given continued seizures and altered mental status, learners should choose to intubate the patient for airway protection. Neuromuscular blocking agents should ideally be avoided for rapid intubation in a patient with status epilepticus, because it can mask ongoing motor signs of status epilepticus.^{1,2} Instead, midazolam or thiopental are preferred for intubation whenever possible with continuous EEG monitoring.^{1,2} If the learners do not choose to intubate, the patient will begin vomiting and desaturate making intubation difficult. Post-intubation, if the patient continues to seize after first and second line medications, participants should either repeat second line medications or administer anesthetic doses of either thiopental, midazolam, pentobarbital, or propofol, all with continuous EEG monitoring. Furthermore, participants should consult neurology for status epilepticus and continuous EEG monitoring as well as for admission to the intensive care unit.

Critical Actions:

1. Recognize that patient is in status epilepticus
2. Airway (ultimately resulting in intubation), Breathing, Circulation
3. IV, oxygen, monitor
4. History (obtained from paramedics) and physical exam
5. Order first line anti-epileptics (benzodiazepines)
6. Order appropriate labs and imaging: complete blood count, comprehensive metabolic panel, lipase, lactate, levetiracetam level, alcohol level, urinalysis, urine drug screen, post intubation chest X-ray
7. Order and administer second line anti-epileptics (levetiracetam, fosphenytoin, or valproic acid)
8. Consult neurology for EEG and admission to ICU



INSTRUCTOR MATERIALS

Case title: Status Epilepticus

Chief Complaint: A 22-year-old male with past medical history of seizure disorder on Keppra brought in by ambulance with increased seizure activity for the last 1 day.

Vitals: HR: 111 BP: 115/78 RR: 18 Temp: 37.3 Celsius O2Sat: 100%

General Appearance: non-responsive, rhythmic jerking of all 4 extremities

Primary Survey:

- **Airway:** Normal oxygen saturation, no obstruction.
- **Breathing:** Clear to auscultation bilaterally. No wheezes, rales, or rhonchi. Normal oxygen saturation and respiratory rate.
- **Circulation:** Tachycardic, regular rate and rhythm. No murmurs, rubs, or gallops. No cyanosis. 2+ Pulses in all 4 extremities

History:

- **History of present illness:** The patient is a 22-year-old male with past medical history of seizure disorder on levetiracetam (Keppra), who is brought in by ambulance with increased seizure activity for one day. Paramedics state that per roommate the patient had two seizures this morning approximately 20 minutes apart, the seizures lasted less than one minute, and patient returned to baseline between the seizures. Approximately 30 minutes ago, the patient began seizing and did not stop, prompting the roommate to call 911. When paramedics arrived, the patient was still seizing, and medics gave versed 5mg intramuscularly with no improvement. Blood sugar en route was 120. The patient arrived to the resuscitation bay with tonic-clonic seizure activity, on a cardiac monitor and non-rebreather.
- **Past Medical history:** Epilepsy
- **Past Surgical history:** Unknown
- **Patients Medications:** Levetiracetam 500mg BID per medics
- **Allergies:** Unknown
- **Social history:** Unknown.
- **Family history:** Unknown



INSTRUCTOR MATERIALS

Secondary survey/physical examination:

- **General appearance:** non-responsive, rhythmic jerking of all 4 extremities with gaze deviation
- **HEENT:**
 - **Head:** Normocephalic, atraumatic. Tongue chewing, and rhythmic jaw clenching
 - **Eyes:** Eyes closed, when opened, rightward gaze deviation, pupils equal, round, and reactive to light.
 - **Ears:** within normal limits
 - **Nose:** within normal limits
 - **Throat:** within normal limits
- **Neck:** within normal limits
- **Heart:** Tachycardic, regular rate and rhythm. No murmurs, rubs, or gallops.
- **Lungs:** within normal limits
- **Abdominal/GI:** within normal limits
- **Genitourinary:** within normal limits
- **Rectal:** within normal limits
- **Extremities:** Rhythmic jerking of all 4 extremities, tonic-clonic. No cyanosis, clubbing, or edema. 2+ Pulses in all 4 extremities
- **Back:** within normal limits
- **Neuro:** un-responsive, eyes with rightward gaze deviation, rhythmic jerking of all 4 extremities, tonic-clonic movement
- **Skin:** within normal limits
- **Lymph:** within normal limits
- **Psych:** within normal limits



INSTRUCTOR MATERIALS

Results:

Complete Blood Count

White Blood Cell – 14.3 x 1000/mm³

Hemoglobin – 13.7g/dL

Hematocrit – 40.4%

Platelets – 417 x1000/mm³

Complete Metabolic Panel

Na- 135 mEq/L

K- 3.3 mEq/L

Cl- 104 mEq/L

CO₂- 20 mEq/L

BUN – 5mg/dL

Creatinine – .6mg/dL

Glucose- 124 mEq/L

Liver Function Test

Albumin – 4.0 g/dL

Protein – 8.0 g/dL

Total Bilirubin 1.0 mg/dL

AST – 90 U/L

ALT – 42 U/L

Alkaline Phosphatase – 33 U/L

Lipase – 15 U/L

Urine Toxicology – Negative

Urinalysis

Color: dark yellow

Protein- trace

Leukocytes- negative

Nitrites- negative

White blood cells- negative

Red Blood Cells – 0-2 RBCs

Bacteria - negative



INSTRUCTOR MATERIALS

Other Labs

Keppra - <10.0 mg/L

EtOH – 217 mg/dL

Lactate- 9.9 mg/dL

Point of care glucose- 122 mg/dL

Chest X-ray status post intubation





OPERATOR MATERIALS

SIMULATION EVENTS TABLE:

| Minute (state) | Participant action/ trigger | Patient status (simulator response) & operator prompts | Monitor display (vital signs) |
|--------------------|---|--|--|
| 0:00 (Baseline) | Paramedics bring patient into the room. | Pt having tonic-clonic seizure, on back board. Pt non-responsive. | HR 111 BP 115/78 RR 18 100% SpO2 on non-rebreather Temp 37.3 |
| 1:00- 2:00 | Obtain focused history and physical from paramedics. Assess airway, breathing and circulation, continue non-rebreather. Start 2 large bore IVs. Monitors (cardiac and pulse ox). | Pt having tonic-clonic seizure. Pt non-responsive. | HR 113 BP 110/68 RR 18 100% SpO2 on non-rebreather Temp 37.3 |
| 3:00 | Labs are ordered. Intravenous (IV) benzodiazepines ordered and multiple doses given. IV fluids ordered | Pt having tonic-clonic seizure. Pt non-responsive. No change after IV benzos. | HR 107 BP 96/63 RR 18 100% SpO2 on non-rebreather Temp 37.3 |



OPERATOR MATERIALS

| Minute (state) | Participant action/ trigger | Patient status (simulator response) & operator prompts | Monitor display (vital signs) |
|----------------|---|---|---|
| 4:00 | <p>Further anti-epileptics given.</p> <p>Return of labs.</p> | <p>Pt having tonic-clonic seizure. Pt non-responsive.</p> <p>No change after anti-epileptics.</p> <p>If the learner continues to use benzo's the nurse can prompt for additional medications.</p> <p>Labs available: CBC, CMP, lipase, lactate, alcohol level, levetiracetam level.</p> | <p>HR 111 BP 111/76 RR 18 100% SpO2 on non-rebreather Temp 37.3</p> |
| 6:00 - 8:00 | <p>Recognize that seizure is not stopping, decide to intubate patient to protect airway.</p> <p>Consider computed tomography or lumbar puncture.</p> | <p>Pt's seizure stops after paralytics given. Non-responsive. GCS 3.</p> <p>If patient not intubated after multiple doses of anti-epileptics then the patient will begin to vomit and desaturate making it difficult to bag or intubate.</p> | <p>HR 111 BP 115/78 RR 18 100% SpO2 on non-rebreather Temp 37.3</p> <p>Or</p> <p>75% SpO2 on non-rebreather</p> |
| 9:00 | <p>Recognize that paralytics used in intubation may mask seizure activity. Consider placing the patient on EEG monitoring while consulting neurology for ICU admission.</p> | <p>If the patient was given a neuromuscular blocker, seizure activity will appear to stop. EEG monitoring is indicated to detect any masked seizure activity.</p> <p>If patient was intubated with benzodiazepines, seizure activity is less likely to be masked, but continuous EEG monitoring is still recommended.</p> | <p>HR 105 BP 114/76 RR 17 100% SpO2 on non-rebreather Temp 37.3</p> <p>Or</p> <p>75% SpO2 on non-rebreather</p> <p>Case ends</p> |

Diagnosis:

Status Epilepticus secondary to medication non-compliance and increased alcohol consumption.



OPERATOR MATERIALS

Disposition:

Status Epilepticus secondary to medication non-compliance and increased alcohol consumption.



DEBRIEFING AND EVALUATION PEARLS

Status Epilepticus

Epidemiology

- Status epilepticus has an incidence of about 7-41 per 100,000 every year.
- The incidence presents in a U-shaped distribution, with a high proportion of patients under 1-year-old as well as over 60-years-old.
- In a lifetime, up to 10% of adults diagnosed with epilepsy will have one or more episodes of status epilepticus. Up to 20% of children diagnosed with epilepsy will have one or more episodes of status epilepticus.

Etiology

- The three most common cause of status epilepticus are as follows:
 - Acute structural brain injury (for example, stroke, cerebral anoxia, head trauma)
 - Longstanding brain injury (for example, prior brain injury, prior neurosurgery, benign tumor)
 - Non-adherence of anti-seizure medication in a patient with known diagnosis of epilepsy.

Presenting Sign and Symptoms

- The four major forms of convulsive status epilepticus are generalized convulsive, focal motor, myoclonic, and tonic.
- Status epilepticus is a dangerous complication of seizures.
- An acceptable operational definition for generalized convulsive status epilepticus (GCSE) consists of the following parameters.⁴
 - ≥ 5 minutes of continuous seizures, or
 - ≥ 2 discrete seizures between which there is incomplete recovery of consciousness
- Treatment should begin as soon as possible due to the clinical urgency of status epilepticus.

Diagnosis

- GCSE is a clinical diagnosis. It is confirmed in most cases by the presence on exam of sustained and rhythmic generalized or focal tonic and clonic motor activity lasting for ≥ 5 minutes.
- Rapid evaluation and treatment can prevent cardiovascular morbidity and refractory status.



DEBRIEFING AND EVALUATION PEARLS

- Imaging is not necessary to diagnose status epilepticus; however, computed tomography (CT) or magnetic resonance imaging (MRI) can reveal acute hemorrhage, ischemia, or underlying mass lesions.
- MRI is the gold standard for identifying structural lesions and can be used when the patient is stabilized and the seizure is under control.

Treatment

- Airway, breathing and circulation assessment.
- First line treatment for status epilepticus is benzodiazepines, although in special circumstances, such as eclampsia or Isoniazid (INH) overdose, first line treatment is magnesium sulfate or pyridoxine, respectively.
- If status epilepticus is unable to be controlled with benzodiazepines, often phenytoin or phenobarbital is used.
- In some cases, drug-induced coma with continuous EEG may be indicated.
- Patients who do not respond to first and second line anti-epileptics may require intubation and mechanical ventilation.
- Although neuromuscular blocking agents are often used for rapid intubation, they can decrease the motor manifestations of seizures, masking ongoing status epilepticus.
 - Alternative agents, such as midazolam or thiopental, are therefore preferred to facilitate rapid intubation.
- EEG monitoring in the ICU is necessary to rule out ongoing non-convulsive seizures

References/Further Reading:

1. Chen JW, Wasterlain CG. Status epilepticus: pathophysiology and management in adults. *Lancet Neurol*. 2006 Mar;5(3):246-56. doi: [10.1016/S1474-4422\(06\)70374-X](https://doi.org/10.1016/S1474-4422(06)70374-X).
2. Trinka E, Cock H, Hesdorffer D, et al. A definition and classification of status epilepticus—Report of the ILAE Task Force on Classification of Status Epilepticus. *Epilepsia*. 2015;56(10):1515.
3. Delanty N, Vaughan CJ, French JA. Medical causes of seizures. *The Lancet*. 1998;352(9125):383-390. doi:10.1016/S0140-6736(98)02158-8.
4. Lowenstein, D. H., Bleck, T. & Macdonald, R. L. It's time to revise the definition of status epilepticus. *Epilepsia* 40, 120–122 (1999).
5. Appleton R, Macleod S, Martland T. Drug management for acute tonic-clonic convulsions including convulsive status epilepticus in children. *Cochrane Database Syst Rev*. 2008;(3):CD001905. doi:10.1002/14651858.CD001905.pub2.



DEBRIEFING AND EVALUATION PEARLS

6. Glauser T, Shlomo S, Gloss D. Evidence-Based Guideline: Treatment of Convulsive Status Epilepticus in Children and Adults: Report of the Guideline Committee of the American Epilepsy Society. *Epilepsy Currents* 16, 48–61 (2016).
7. Tarabar AF, Ulrich AS, D’Onofrio G. Seizures. In: James Adam, ed. *Emergency Medicine: Clinical Essentials*. 2nd Edition. Philadelphia, PA: Elsevier/Saunders; 2013:863.
8. Shearer PL and Jagoda A. In: Allan B Wolfson, ed. *Harwood-Nuss’ Clinical Practice of Emergency Medicine*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins;2019:777.



SIMULATION ASSESSMENT

Status Epilepticus

Learner: _____

Assessment Timeline

This timeline is to help observers assess their learners. It allows observer to make notes on when learners performed various tasks, which can help guide debriefing discussion.

Critical Actions

1. Recognize that patient is in status epilepticus
2. Airway (ultimately resulting in intubation), Breathing, Circulation
3. IV, oxygen, monitor
4. History (obtained from paramedics) and physical exam
5. Order first line anti-epileptics (benzodiazepines)
6. Order appropriate labs and imaging: CBC, CMP, lipase, lactate, levetiracetam level, alcohol level, UA, UTox, post intubation chest X-ray
7. Order and administer second line anti-epileptics (levetiracetam, fosphenytoin, valproic acid)
8. Place the patient on EEG post intubation to monitor seizure activity
9. Consult neurology for EEG and admission to ICU

0:00



SIMULATION ASSESSMENT

Status Epilepticus

Learner: _____

Critical Actions:

- Recognize that patient is in status epilepticus
- Airway (ultimately resulting in intubation), Breathing, Circulation
- IV, oxygen, monitor
- History (obtained from paramedics) and physical exam
- Order first line anti-epileptics (benzodiazepines)
- Order appropriate labs and imaging: CBC, CMP, lipase, lactate, levetiracetam level, alcohol level, UA, UTox, post intubation chest X-ray
- Order and administer second line anti-epileptics (levetiracetam, fosphenytoin, valproic acid)
- Place the patient on EEG post intubation to monitor seizure activity
- Consult neurology for EEG and admission to ICU

Summative and formative comments:

Milestones assessment:

| | Milestone | Did not achieve level 1 | Level 1 | Level 2 | Level 3 |
|---|--------------------------------------|---|---|--|--|
| 1 | Emergency Stabilization (PC1) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Recognizes abnormal vital signs | <input type="checkbox"/> Recognizes an unstable patient, requiring intervention Performs primary assessment Discerns data to formulate a diagnostic impression/plan | <input type="checkbox"/> Manages and prioritizes critical actions in a critically ill patient Reassesses after implementing a stabilizing intervention |



SIMULATION ASSESSMENT

Status Epilepticus

Learner: _____

| | Milestone | Did not achieve level 1 | Level 1 | Level 2 | Level 3 |
|---|--|---|--|--|--|
| 2 | Performance of focused history and physical (PC2) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Performs a reliable, comprehensive history and physical exam | <input type="checkbox"/> Performs and communicates a focused history and physical exam based on chief complaint and urgent issues | <input type="checkbox"/> Prioritizes essential components of history and physical exam given dynamic circumstances |
| 3 | Diagnostic studies (PC3) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Determines the necessity of diagnostic studies | <input type="checkbox"/> Orders appropriate diagnostic studies. Performs appropriate bedside diagnostic studies/procedures | <input type="checkbox"/> Prioritizes essential testing Interprets results of diagnostic studies Reviews risks, benefits, contraindications, and alternatives to a diagnostic study or procedure |
| 4 | Diagnosis (PC4) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Considers a list of potential diagnoses | <input type="checkbox"/> Considers an appropriate list of potential diagnosis May or may not make correct diagnosis | <input type="checkbox"/> Makes the appropriate diagnosis Considers other potential diagnoses, avoiding premature closure |
| 5 | Pharmacotherapy (PC5) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Asks patient for drug allergies | <input type="checkbox"/> Selects an medication for therapeutic intervention, consider potential adverse effects | <input type="checkbox"/> Selects the most appropriate medication and understands mechanism of action, effect, and potential side effects Considers and recognizes drug-drug interactions |



SIMULATION ASSESSMENT

Status Epilepticus

Learner: _____

| | Milestone | Did not achieve level 1 | Level 1 | Level 2 | Level 3 |
|----|---|---|---|--|---|
| 6 | Observation and reassessment (PC6) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Reevaluates patient at least one time during case | <input type="checkbox"/> Reevaluates patient after most therapeutic interventions | <input type="checkbox"/> Consistently evaluates the effectiveness of therapies at appropriate intervals |
| 7 | Disposition (PC7) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Appropriately selects whether to admit or discharge the patient | <input type="checkbox"/> Appropriately selects whether to admit or discharge Involves the expertise of some of the appropriate specialists | <input type="checkbox"/> Educates the patient appropriately about their disposition Assigns patient to an appropriate level of care (ICU/Tele/Floor) Involves expertise of all appropriate specialists |
| 9 | General Approach to Procedures (PC9) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Identifies pertinent anatomy and physiology for a procedure Uses appropriate Universal Precautions | <input type="checkbox"/> Obtains informed consent Knows indications, contraindications, anatomic landmarks, equipment, anesthetic and procedural technique, and potential complications for common ED procedures | <input type="checkbox"/> Determines a back-up strategy if initial attempts are unsuccessful Correctly interprets results of diagnostic procedure |
| 20 | Professional Values (PROF1) | <input type="checkbox"/> Did not achieve Level 1 | <input type="checkbox"/> Demonstrates caring, honest behavior | <input type="checkbox"/> Exhibits compassion, respect, sensitivity and responsiveness | <input type="checkbox"/> Develops alternative care plans when patients' personal beliefs and decisions preclude standard care |



SIMULATION ASSESSMENT

Status Epilepticus

Learner: _____

| | Milestone | Did not achieve level 1 | Level 1 | Level 2 | Level 3 |
|----|--|---|---|---|--|
| 22 | Patient centered communication (ICS1) | <input type="checkbox"/> Did not achieve level 1 | <input type="checkbox"/> Establishes rapport and demonstrates empathy to patient (and family) Listens effectively | <input type="checkbox"/> Elicits patient's reason for seeking health care | <input type="checkbox"/> Manages patient expectations in a manner that minimizes potential for stress, conflict, and misunderstanding. Effectively communicates with vulnerable populations, (at risk patients and families) |
| 23 | Team management (ICS2) | <input type="checkbox"/> Did not achieve level 1 | <input type="checkbox"/> Recognizes other members of the patient care team during case (nurse, techs) | <input type="checkbox"/> Communicates pertinent information to other healthcare colleagues | <input type="checkbox"/> Communicates a clear, succinct, and appropriate handoff with specialists and other colleagues Communicates effectively with ancillary staff |