Simulation 2: New Brain Mass and Status Epilepticus

Major Clinical Objectives:

- ☐ Initiate a history and physical appropriate for the workup of subacute neurologic deficits
- ☐ Respond to acute onset seizure
- ☐ Recognize status epilepticus in the ED and implement the guideline recommended treatment for status epilepticus
- ☐ Review indications for intubation in patients with status epilepticus
- ☐ Formulate a differential diagnosis of first-time seizure
- ☐ Recognize significant, symptomatic edema

Behavioral Objectives:

- ☐ Avoid being flustered or forced to call for an intubation, if not appropriate

Environment and Persons:
Environment: ED
Persons: Patient (SP vs. Mannequin w/ video), ED RN (Embedded Person)

Patient Demographics/PMH :

Age	56	Allergies	None	Social	Architect
Gender	F/M (dependent on SP)			PMH	Hypothyroidism Hyponatremia TIA HTN Depression
Height/Weight	70kg	Ethnicity		Medication	Sertraline Levothyroxine Amlodipine
Labs	None	X-ray		Other History	

Room Setup :

- No need for medical record
- Patient will already have IV access
- Patient will not be hooked up to the monitor until the resident requests it
- Drugs needed:
  - Lorazepam x2 syringes
  - Levetiracetam / VPA / fosphenytoin
- Images needed:
  - NCHCT Brain with large R frontal lobe lesion

CASE SCENARIO:
Case begins with resident being paged:
"ED CONSULT: 56 yo woman with behavioral changes for 24 hours, can you eval?"

PART ONE: H&P
RN at bedside relays what the family had told her:

HISTORY
"Are you the neurology consultant? The family just left. But here's what they told me. This is a 56 yo F with a history of HTN, hypothyroidism on levothyroxine, depression on sertraline who presents with several days of altered mental status. The family told me that over the last month or so she has been more forgetful and distractible. She had episodes of urinary incontinence and was treated for a UTI last week, but did not seem to improve even though she got antibiotics."

[Resident should ask why the family brought her in today.]

"Family brought her into the emergency department today because she went to the grocery store and then was missing for several hours, they eventually found her on the side of the highway 10 miles in the other direction from the store with no recollection of how she got there. She's not really able to tell me much more about what happened. Maybe you can ask her about it, she wasn't able to tell me much. Her chart is open on the computer"

[Resident should talk to the patient]

If asked what she remembers the patient is very vague and abulic – "I don't really know. I meant to go to store. I pulled over the car because I didn't remember how to get there. It doesn't really matter."

Any other questions will elicit similarly vague answers, mainly with "yes" or "no"

PHYSICAL:
Vitals: HR 72, BP: 128/82, **afebrile,** RR 12
Mental status: Abulic. Flat affect
- Oriented to city and area.
- Disoriented to time. (Thinks it is Wednesday the 2nd or 3rd of November, 2017. Says "I don't care who the president is." Or "I don't care [about whatever the resident asks]")
- Registration of memory: Registers 4/4 but recalls 0/4 at 5 minutes.
- Attention: normal. Concentration: decreased.
- Speech: speech is normal
- Level of consciousness: alert
- Able to name object. Able to repeat. Normal comprehension

CN: Unremarkable
MOTOR: very subtle pronator drift in the LUE
Reflexes: Babinski on the L
When the junior attempts to get the patient up to walk, patient's eyes will deviate to the left and she will come become unresponsive. She will have generalized convulsions. These then resolve into a subtle twitch of the left upper extremity.

NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:
- ☐ Interview the patient
- ☐ Confirm the patient is afebrile
- ☐ Complete a focused neurologic exam focusing on mental status
- ☐ Check for nuchal rigidity

PART TWO: MANAGEMENT OF A PROLONGED SEIZURE

1) **Patient:**
    a. Seizure will continue with convulsions for 1 mins, after 1 min the generalized event will resolve into just tonic stiffing and eyes rolling back which will last 1 min. After that the patient will have a left gaze and left arm twitching
        i. VITALS: HR 110, BP 140/87, sat 91%
        ii. If neurology resident does not put on O2 SpO2 will fall to 88%
        iii. Once O2 is applied the SpO2 increases to 95%
    b. At 5 mins (announced by RN) the patient will persistently have a left gaze deviation and not respond to questions
        i. VITALS: HR 99, BP 135/82, Sat 95%
    c. If residents give 0.1mg/kg up to 4mg of Lorazepam, then the patient's gaze will normalize and they will appear post-ictal and very drowsy, they will grimace to "vigorous stim" and begin to track
        i. VITALS: HR 90, BP 110/82, Sat 94%
    d. If a total dose of 4mg of Lorazepam is not administered, the patient will continue to be in NCSE – persistent gaze deviation and inability to answer questions.
        i. VITALS: HR 90, BP 135/82, Sat 87%
    e. If patient remains in NCSE, Sats will drop and it is appropriate to intubate for airway protection
2) **ED RN:**
    a. Both Lorazepam and Levetiracetam will take some time to arrive (as is the case in real life)
    b. Will tell the residents it's going to take a min to get Lorazepam (patient will seize for >5 mins)
    c. While waiting for Lorazepam to arrive, be panicked and will repeatedly ask **"What is going to be done to treat the seizure?"**
    d. If the participants initially choose to give 4mg of Lorazepam make them second guess their decision by asking, **"Don't you think that's too much?? You're going to depress her mental status so much! Then we'll have to intubate! I think we should only give 1 or 2mg"**
    e. Press the residents to be specific on dosing. It is not enough that they say "give Lorazepam;" ask the dose for both Lorazepam and the ASM of choice (most likely Levetiracetam)
        i. If they only give 1 gram of Levetiracetam, press them **"Do you think that's enough, she's been out of it for a long time!!"**
    f. When the convulsions abate (*either because the participants have given 4mg of lorazepam and thus patient will be post-ictal, or because they have not given enough but the patient is in NCSE (left gaze deviation)*: **"Do you think she is still seizing?? Why isn't she waking up?? Should I check her glucose" (tell them it is 107)**
        i. If the resident does not give a total of 4mg lorazepam (give them a little time to think about it), RN will say **"Do you think we should give more Lorazepam since she still has a gaze deviation? It's been 5 mins of seizures!"**
    g. If the participants don't brainstorm the cause of the seizure or talk about what to do:
        i. Will also prompt the resident **"What else should we do?"** Or "**Why do you think she is seizing."**
    h. Prior to going to the scanner: **"Do you think the patient needs to be intubated? She's still not waking up!"**
        i. If the resident has given a large enough dose of Lorazepam, the patient will be post-ictal but maintaining airway, and should NOT be intubated
        ii. If the patient did not get enough Lorazepam and is in NCSE, they should be intubated

i. **Announce to resident that Levetiracetam has arrived when the patient is about to go to scanner**

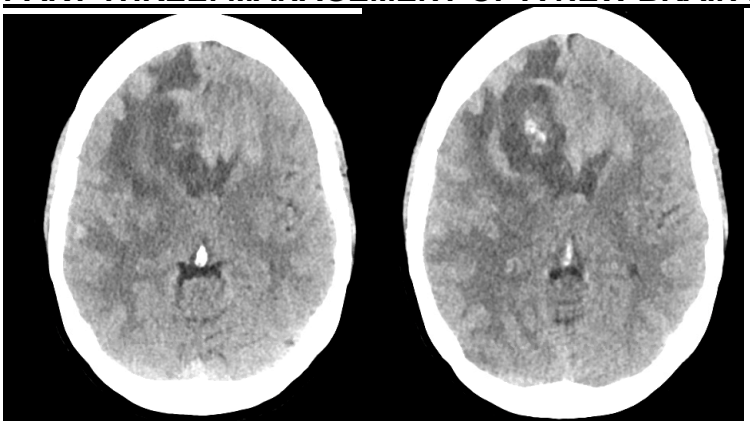
NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:

- ☐ Note the time that the seizure started
- ☐ Ask that patient be hooked up to the monitor for continuous pulse ox and ECG
- ☐ Get an oxygen mask and roll the patient to the side.
- ☐ Ask that a fingerstick glucose be checked
  - RN will tell them it's 107
- ☐ Start ECG and pulse ox monitoring
- ☐ Residents may elect to give a smaller dose of lorazepam prior to the 5 mins point for seizure

At the 5 mins of seizure point:

- ☐ Ask for lorazepam, midazolam or diazepam at the correct doses for status
  - Ideally they will ask for the weight of the patient so that 0.1mg/kg could be calculated as the max dose. They should administer 4mg.
  - Weight is in the patients chart – if the participants ask for this, direct them to the chart
  - *If less than 4mg is given the patient will remain in NCSE*
- ☐ Given ongoing seizure ask for a Phase II agent to be loaded
  - Levetiracetam 60mg/kg, VPA 40mg/kg, or Fosphenytoin 20 PE/Kg all would be acceptable as the patient has no contraindications [obviously most residents will choose Levetiracetam, which is fine]
  - Levetiracetam will take several minutes to come up from the pharmacy
- ☐ Once convulsions stop: re-assess vitals and note patient's airway is maintained, but that there is a forced gaze deviation and the patient is NOT able to state their name or answer any questions.
- ☐ Ask for workup of first seizure
  - Fingerstick, CBC, BMP, LFTs, Utox/Serum Tox, CXR, UA
  - STAT non-con head CT
- ☐ Reassess patient when RN asks if they should intubate before scanner
  - **If in NCSE, the patient sats will drop and they should be intubated.**
- ☐ **Call ED for intubation (if needed)**
  - If gaze has normalized and the patient is able to state their name, the patient should not be intubated
- ☐ Neurology Resident should confirm that Levetiracetam/other AED has been given
- ☐ Transport patient to "ED Scanner" while continuing to assess vitals

PART THREE: MANAGEMENT OF A NEW BRAIN MASS



1) **PATIENT:**
    a. Remains very drowsy
    b. VITALS:
        i. HR 72, BP 107/82, Sat 93%
2) **ED RN:**
    j. Will ask what the team sees to prompt the residents to describe what they have found.
    k. If neurology team does not think about dexamethasone, RN will ask **"do you think she is seizing because of the edema?"**

NEURO RESIDENT BEHAVIOR CHECKLIST

- ☐ Neuro resident will be asked to describe what they are seeing.
    - Should note the mixed density mass in the R frontal lobe with surrounding edema.
    - [hyperdensity internally is dystrophic calcification] however, if the Neuro team thinks it's blood, appropriate to review BP and med list to confirm normotensive and not on a/c
- ☐ Load, or at least discuss, Dexamethasone 10mg IV x1
- ☐ Re-examine the patient to make sure that she is starting to wake up.
- ☐ Sign out the case to the neuro senior who will arrive.

Case ends once the team has passed off the patient.

CASE 2: COMPREHENSIVE RESIDENT BEHAVIOR CHECKLIST

- ☐ Interview the patient
- ☐ Complete a focused neurologic exam focusing on mental status
- ☐ Ask that patient be hooked up to the monitor
- ☐ Get an oxygen mask and roll the patient to the side.
- ☐ Make sure that pulse ox is hooked up.
- ☐ Ask for Lorazepam.
    - Ideally they will ask for the weight of the patient so that 0.1mg/kg could be calculated as the max dose. But asking for 2mg is sufficient for the first dose as that patient is not yet in status epilepticus.
- ☐ Given persistent gaze deviation and concern for NCSE, resident should give a second bolus of lorazepam or another benzodiazepine at the 5 min mark.
    - *If second bolus of lorazepam is not given the patient will remain in NCSE, and sats will drop. Levetiracetam still will not have come up from the pharmacy.*
    - *If a second bolus of Lorazepam is given, gaze will normalized, the patient will grimace with attempt to be awaken, can say "Mary" when asked name, vitals remain stable*
- ☐ Give Phase II agent as a loading dose
    - Levetiracetam 60mg/kg, VPA 40mg/kg, or Fosphenytoin 20 PE/Kg all would be acceptable as the patient has no contraindications
    - Levetiracetam will take several minutes to come up from the pharmacy
- ☐ Once convulsions stop: Residents should re-assess vitals and note patient's airway is maintained, but that there is a forced gaze deviation and the patient is NOT able to state their name or answer any questions.
- ☐ Ask for workup of first seizure
    - Fingerstick, CBC, BMP, LFTs, Utox/Serum Tox, CXR, UA
    - STAT non-con head CT
- ☐ Reassess patient when RN asks if they should intubate before scanner
    - If in NCSE, the patient sats will drop and they should be intubated.
    - Call ED for intubation
    - If gaze has normalized and the patient is able to state their name, the patient should not be intubated
- ☐ Neurology Resident should confirm that Levetiracetam has been given
- ☐ Transport patient to "ED Scanner" while continuing to assess vitals
- ☐ Neuro resident will be asked to describe what they are seeing.
    - Should note the mixed density mass in the R frontal lobe with surrounding edema.
    - [hyperdensity internally is dystrophic calcification] however, if the Neuro team thinks it's blood, appropriate to review BP and med list to confirm normotensive and not on a/c
- ☐ Load, or at least discuss, Dexamethasone 10mg IV x1
- ☐ Discuss mannitol
- ☐ Re-examine the patient to make sure that she is starting to wake up.
- ☐ Sign out the case to the neuro senior who will arrive.