Hyponatremia Case

Section 1: Case Summary

Scenario Title:	**Hyponatremia**
Keywords:	Hyponatremia, Seizure, Cancer, SIADH
Brief Description of Case:	43 F with first time generalized seizure undergoing treatment for breast cancer. Presents to the ED with no history of trauma or fever. Currently undergoing new chemotherapy for breast cancer, and no other collateral available such as recent oncology notes nor spouse. Recent diagnosis of breast cancer, and degree of metastases not known (e.g. to brain). Default recommendation is full code treatment/eligible for LST (life-sustaining therapies).

Goals and Objectives	
Educational Goal:	Prioritize cessation of seizure and identify causal factor(s) in patient with probable metastatic breast cancer.
Objectives: (Medical and CRM)	<u>CRM Objectives:</u> 1. Empathetic communication with spouse in terms of what the seizure may mean. 2. Exploration of goals of care with partner in regards to new medical development (seizure requiring intubation for airway protection). <u>Medical Objectives:</u> 1. Stabilize patient with first time seizure. 2. Prioritize investigations and treatments in the context of possible metastatic breast cancer. 3. Provide a differential diagnosis for seizure in patient with query metastatic breast cancer.
EPAs Assessed:	

Learners, Setting and Personnel				
Target Learners:	☒ Junior Learners	☒ Senior Learners		☐ Staff
	☒ Physicians	☒ Nurses	☒ RTs	☐ Inter-professional
	☐ Other Learners:			
Location:	☒ Sim Lab	☐ In Situ		☐ Other:
Recommended Number of Facilitators:	Instructors:1			
	Confederates:1			
	Sim Techs:1			

Scenario Development	
Date of Development:	08/01/2021
Scenario Developer(s):	Dr. David Williscroft

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Section 2A: Initial Patient Information

A. Patient Chart					
Patient Name: Sue Bird			Age:43	Gender:43	Weight:
Presenting complaint:Seizure					
Temp:37	HR:105	BP:105/75	RR:22	O_2Sat:90	FiO_2:room air
Cap glucose:6			GCS: 5 (E1 V 1M 3)		
Triage note: Seizure, query still seizing, brought in by EHS after being found down by spouse. No history of trauma, fever, overdose known. Undergoing treatment for breast cancer.					
Allergies: NKDA					
Past Medical History: Breast cancer			Current Medications:		

Section 2B: Extra Patient Information

A. Further History	
Include any relevant history not included in triage note above. What information will only be given to learners if they ask? Who will provide this information (mannequin's voice, confederate, SP, etc.)? 1. *Recent diagnosis of breast cancer, within months. First chemotherapies since mastectomy. Has been largely well otherwise, though has been nauseated and some emesis and diarrhea since starting her chemotherapy last week.* 2. *Level of intervention is not established at this time, default is full medical therapy according to EHS. Spouse not immediately available at the time of first presentation.*	
B. Physical Exam	
List any pertinent positive and negative findings	
Cardio: tachy no murmur	Neuro: post ictal with some occasional lid flickering
Resp: breathing on own	Head & Neck: neck supple. No sign of BS # or boggy skull #. Pupils 5 mm, reactive, symmetrical.
Abdo: soft, non tender, no ascites	MSK/skin: No sign of trauma, no rash.
Other:	

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Section 3: Technical Requirements/Room Vision

A. Patient
☒ Mannequin *(specify type and whether infant/child/adult)*
☐ Standardized Patient
☐ Task Trainer
☐ Hybrid
B. Special Equipment Required
Monitors ETT/BVM/OPA
C. Required Medications
Benzodiazepines Phenytoin or other anticonvulsant Dexamethasone Hypertonic Saline
D. Moulage
E. Monitors at Case Onset
☒ Patient on monitor with vitals displayed ☐ Patient not yet on monitor
F. Patient Reactions and Exam
Include any relevant physical exam findings that require mannequin programming or cues from patient (e.g. – abnormal breath sounds, moaning when RUQ palpated, etc.) May be helpful to frame in ABCDE format. A: no stridor, tongue bitten, no bleeding B: breathing on own C: HD stable, IV access obtained peripherally D: GCS 5, glucose 6, likely post ictal with some bursts E: no trauma, no focal CNS deficit, normothermic

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Section 4: Confederates and Standardized Patients

Confederate and Standardized Patient Roles and Scripts	
Role	*Description of role, expected behavior, and key moments to intervene/prompt learners. Include any script required (including conveying patient information if patient is unable)*
Paramedic	Information in regards to patient as listed above. Essentially a 'scoop and run' scenario. Recent breast cancer diagnosis and treatment (mastectomy, chemo) with further investigations ongoing (PET, CT). Conveys that spouse is 'in shock'.
Spouse	Available in delayed presentation, after patient is intubated (for airway protection). Outlines that she would wish for LST available to her. Worried that this could be an effect of the new chemotherapy "Is she dying?"

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Section 5: Scenario Progression

Scenario States, Modifiers and Triggers				
Patient State/Vitals	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State		Facilitator Notes
1. Baseline State Rhythm: sinus HR: 105 BP: 105/70 RR: 22 O_2SAT: %92 T: ^oC 37 GCS: 5	*Is the patient alert? In distress? Seizing? What symptoms do they currently have?* *Appears unresponsive, no gag, not protecting airway*	Expected Learner Actions ☐ IV ☐ Monitor ☐ Confirm glucometer ☐ Lab draw ☐ CT head/c spine (?) ☐CXR post intubation ☐Anticonvulsants	Modifiers *Changes to patient condition based on learner action* -accepts OPA -easy to bag Triggers *For progression to next state* -not waking to stimulus -discussion around airway protection for CT	Participant(s) should stabilize patient, discuss airway options, and be able to discuss plans for workup for cause of seizure in a patient undergoing breast cancer treatments.
2. Patient continues to deteriorate, likely not protecting airway, BT seizures. Glucose: 6 VS otherwise unchanged	*Likely having some BT seizures*	Expected Learner Actions ☐ Discuss with team reasons to intubate: failure of airway protection, anticipated course, hypoventilations ☐ Attempt to gather information from others regarding goals of care	Modifiers -colleague (RN/ERP) discovers that she is full code based on GOC documentation on CERNER	
3. The patient is intubated using RSI drugs following administration of anticonvulsants (s)	*No airway issues, patient bagged easily*	Expected Learner Actions ☐Airway assessment ☐Discusses plan with team in terms of reasons to intubate ☐Discusses what could be going on to cause seizures	Modifiers If airway is not secured, patient continues to deteriorate, sats drop into low 90's, high 80's.	

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4. Lab results after airway is secured	*Recognition of need to correct for profound hyponatremia in the face of seizures/status*	Expected Learner Actions ☐administration of stat hypertonic saline ☐Consideration of dexamethasone in case of intracranial mets as cause for new seizure	Modifiers Lab calls stat down with results to resus room Triggers Recognition of need to emergently treat hypernatremia	

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Appendix A: Laboratory Results

CBC WBC 7.8 Hgb 121 Plt 223 Lytes Na 113 K 4.1 Cl 98 HCO_3 AG 15 Urea 11 Cr 98 Glucose 7 Extended Lytes Ca 2.2 Albumin 33 VBG pH 7.25 pCO2 39 pO2 30 HCO_3 28 Lactate 4	Cardiac/Coags Trop neg INR 1 Tox EtOH neg ASA N Tylenol N Other B-HCG <1

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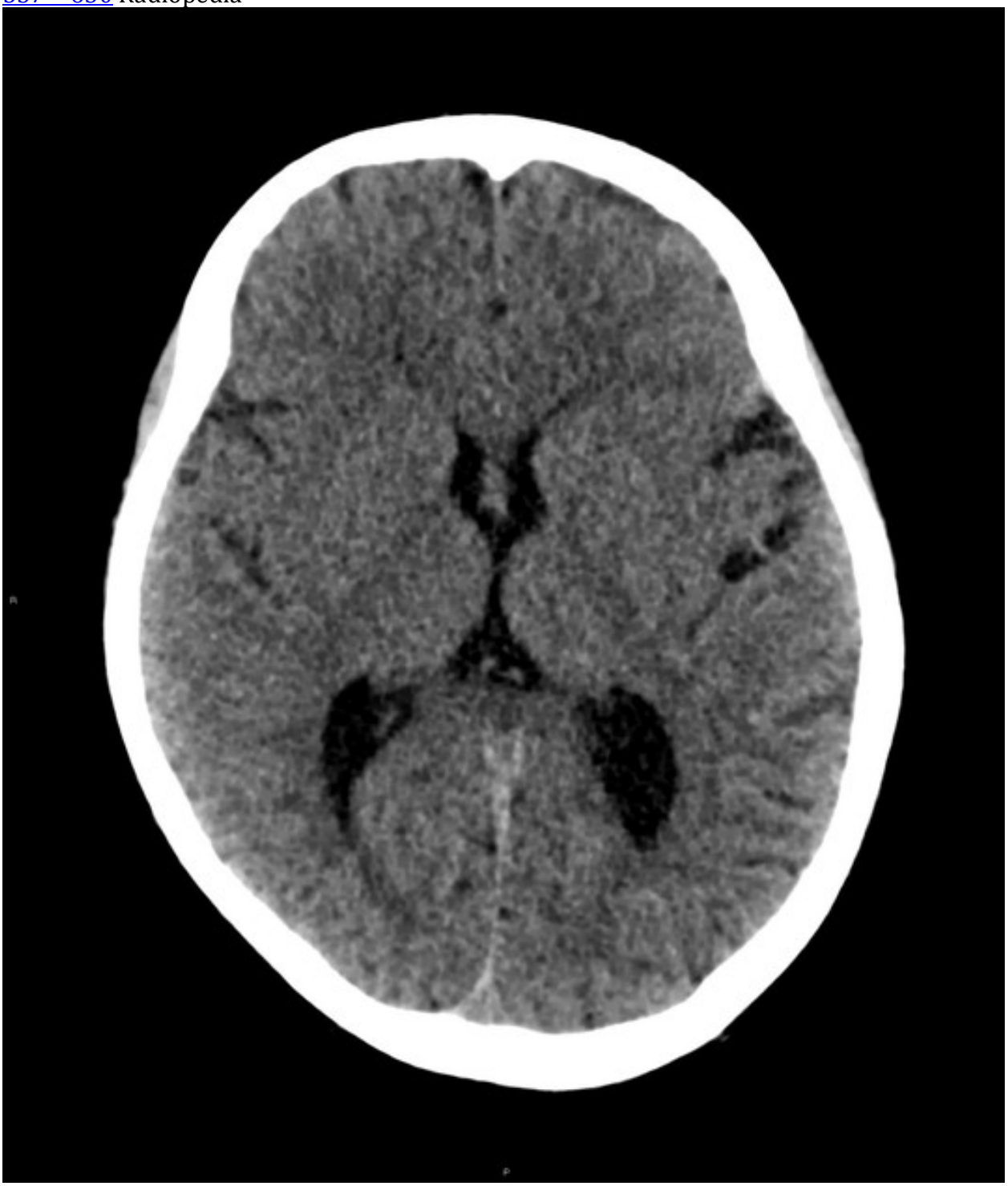
Appendix B: ECGs, X-rays, Ultrasounds and Pictures

Normal CT brain (reference Radiopedia)
537 × 630 Radiopedia



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Appendix C: Facilitator Cheat Sheet & Debriefing Tips

Keys:

1. Workup of patient with first time seizure
2. Differential diagnosis of seizure and cancer treatments (side effects, etc.)
3. Efficient ways of determining goals of care documentation (EMR/Cerner, SW, phone, in person)

Debriefing:

1. Review assessment of adult seizing patient (priorities)
2. How does having the patient w cancer (unknown status) change things?
3. Brief review of reasons to intubate a patient like this (obtundation, not protecting airway, anticipated course, query brain metastases and need for surgical/medical decompression). DDX also includes SIADH.
4. Rapid assessment of reversible causes of this seizure (hyponatremia).

Pathophysiology of case

1. Assessment of severity of hyponatremia/types of hyponatremia esp. seen in cancer (hypovolemic, SIADH). In this case, the patient was undergoing cancer treatment with cyclophosphamide and docorubicin and became hyponatremic due to water intoxication. Antidiuretic effect stems from alkylating metabolites of cyclophosphamide.
2. Treatment options for hyponatremia (hypertonic saline, positioning)
3. Outcomes

Communication/Cognitive

Recognition that not every patient with a cancer diagnosis will be on a palliative trajectory, and it would be appropriate for full medical/critical care management in a case like this. This patient went on to do very well and was extubated the next day with full CNS recovery. Her chemotherapeutic regimen was changed in response to this event and went on to do well with good disease response.

References

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