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Case of the Week

Pam Fry, MD
June 23, 2010
Objectives:

- Review an interesting case or 2 seen in the ER
- Discuss management of an acutely ill patient in the ER
- Discuss etiology of patient’s illness
- Pimp an intern(s)
On a midnight shift…

• You just hang up the phone with the ME after a cardiac arrest in the ER when you hear…
• “…Code Blue 7 East…”
• …The charge nurse then comes running up to you stating “that’s a nurse working on 7 East, our code team is responding and bringing the patient to you”…
15-20 minutes later…

• The code team arrives with OA:
  ▪ 35 year-old AA woman

• Pt had a witnessed generalized tonic-clonic seizure

• Code team interventions:
  ▪ Ativan 1mg IM
  ▪ Started IV and gave ativan 1mg IV
  ▪ Seizure aborted
  ▪ Placed in full spine precautions
  ▪ Ventilatory assistance with BVM
  ▪ Lost IV in transit to ER
ABC’s & IV/O2/
Monitor
CT Scan
CXR
Differential Dx
DONT
EKG
HPI

Interventions*
Labs
Medications******
MRI
PMH*
Physical Exam
Ultrasound
ABC’s & IV/O2/Monitor

- **Airway:**
  - Spontaneous agonal breathing + BVM
  - RR 20
  - GCS 3

- **Breathing:**
  - Coarse breath sounds, equal bilaterally

- **Circulation:**
  - 2+ pulses throughout

- **IV:** being established

- **O2:** 100% with BVM providing FiO2 100%

- **Monitor:** HR 158 (sinus tach), BP 144/94
Do the DON’T!

- **Dextrose:**
  - Accucheck: 213
- **Oxygen:**
  - BVM with 100% FiO2
- **Nalaxone:**
  - Not given
- **Thiamine:**
  - Not given
Intervention:
Intubation Successful, But…
Nitroglycerin
HPI:

- Pt came to work this evening and was feeling and acting normal.
- A fellow RN heard a scream “like a manic patient” and several thuds and turned to find the patient stumbling down the hall. The pt then fell and started seizing.
- Possible seizure in the past, unknown if pt is on any medications.
Past Medical History:

Source Undetermined
Magnesium

DePiep, [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Magnesium.png)
Sodium Bicarbonate

\[
\text{Na}^+ - \text{O} - \text{C}\text{O}_2\text{H}
\]

Source Undetermined

Tszrkx, [Wikimedia Commons](https://commons.wikimedia.org)
Lasix

Intropin, 
Wikimedia Commons

Ambernectar 13, Flickr
PTU/Steroids
Calcium Gluconate

Benjah-bmm27, Wikimedia Commons

School of Veterinary Medicine and Science University of Nottingham, UK, Flickr
Past Medical History:

- **PMH:**
  - Grave’s Disease
  - Seizure 2009
  - G3P2, currently pregnant about 12 weeks

- **PSH:** None

- **Allergies:** NKDA

- **Medications:**
  - PTU 100 mg BID (recently changed from methimazole)
  - Vitamin C
  - Folic acid 0.4 mg Daily

- **Social:** No tobacco, ETOH, or drug use. Married with 2 children at home. RN at this hospital

- **Family:** No seizures or heart disease
Physical Exam:

- VS: T 98.2, HR 158, BP 159/97, RR 20, O2 100% BVM
- General: Pt on backboard with c-collar in place receiving BVM ventilation support, unresponsive.
- HEENT: NC/AT, PERRL 4mm-2mm, blood and frothy sputum present in nares, no trauma noted in mouth
- Neck: C-collar in place, no thyromegaly
- Chest: Agonal respirations, coarse breath sounds present & equal bilaterally
- Heart: Tachycardiac rate, regular rhythm, no m/r/g
- Abdomen: Soft, distention of BLQ, NT, no masses or organomegaly
- Extremities: No deformities or edema noted
- Neuro: Unresponsive, GCS 3, no seizure movements
Labs:

• CBC: WBC **22**, Hgb 13.5, Plt 347
• Basic: Na **135**, K 4.6, Cl 102, CO2 **17**, BUN 10, Cr 0.74, glucose **217**, iCal **3.6**, Mag **2.6**, Phos 10.4; LFT’s: normal
• UA: protein **2+**, RBC 19, WBC 3, nitrite neg, LE neg; UDS: negative
• Coags: PTT **37.8**, INR 1.05
• ABG: **6.99/83/290/19/99%**
• BNP **177**, Myoglobin **189**, Troponin 0.05
• TSH **0.29**, Free T4 1.37
• Beta-hcg **32516**
Ultrasound: Source Undetermined
To Summarize

- 35 YO woman 12-14 weeks pregnant with a history of hyperthyroidism and ? prior seizure presents to the ER after screaming, stumbling, collapsing and seizing.
- GCS on arrival is 3 & pt intubated for airway protection & agonal respirations.
- Severe pulmonary edema present.
- Pt with hypertension and tachycardia.
Differential Diagnosis:

- SAH
- Venous Sinus Thrombosis
- Brain Tumor
- Eclampsia
- Electrolyte abnormalities
- Thyrotoxicosis
- PE
- Cardiomyopathy
- Pheochromocytoma
- Infection
  - Meningitis
  - UTI
  - Pneumonia
- Status Epilepticus
- Stroke
- MI
- DKA
- Hypoglycemia
- Toxins
Source Undetermined
MRI

Source Undetermined
LP

Brainhell, [Wikimedia Commons](https://commons.wikimedia.org)
Hospital Day 1

- Pt admitted to MICU: HR 110, BP 110/75
- Neurology: s/p tonic-clonic seizure, CT/MR -
  - LP performed given ?bleed on flair MR images
  - Neurogenic pulmonary edema from seizure
  - Neurology: Recommended EEG and anti-epileptics, husband refused anti-epileptics given pregnancy
- Cardiology: Pt developed hypotension, remained tachycardiac
  - Troponin elevated 4.66
  - TTE: Severe global LV hypokinesis, mild MR, moderate TR, moderated pulmonary hypertension, EF 20-25%
  - Cardiology: Tachycardia secondary to pump failure, TTE most c/w Tako-Tsubo syndrome
Hospital Day 1 Continued…

- Given cardiogenic shock with WMA on TTE pt taken emergently to cath lab
  - Clean coronary arteries
  - Intra-aortic balloon pump placed
  - Swan-Ganz catheter placed
  - Pt transferred to CCU
- Repeat thyroid studies: TSH <0.01 (0.29), FT4 2.22 (1.37), FT3 7.8
  - Endocrine consulted: PTU and Hydrocortisone started
- Formal fetal USN: Normal limited fetal survey, EGA 14 5/7 weeks
Hospital Day 2

- **Endocrine:** HR and BP improved with PTU and hydrocortisone tx
  - FT4 2.55 (2.22, 1.37)
- **Neuro:** Pt alert, following simple/complex commands, no recurrent seizures
  - EEG: normal
- **Cardiology:** Pt continues on IABP
  - TTE: slight improvement to no change from previous TTE; EF 30%
- **Respiratory:** Improved FiO2, Tachypnea with spont trials
  - Keep intubated until IABP removed
Hospital Day 3

- **Endocrine:** Pt continues on PTU & Hydrocortisone
  - FT4 2.39 (2.55, 2.22, 1.37) FT3 3.9 (7.8)
- **Neuro:** Still refusing anti-epileptics, no recurrent seizures
- **Cardiology:** IABP removed without incident
- **Respiratory:** Pt extubated after removal of IABP
Hospital Days 4 & 5

- **Day 4:**
  - PO Metoprolol started given HTN
  - PTU and Hydrocortisone continued
  - Pt declined anti-convulsants, will reconsider at end of 2nd trimester

- **Day 5:**
  - PO Metoprolol dose increased given HTN
  - FT4 2.59 (2.39), FT3 5.5 (3.9)
Hospital Day 6

- TTE: Severe Apical Hypokinesis, EF 33%
- Pt discharged home!
  - Discharge Diagnosis:
    - Graves Disease with thyrotoxic storm
    - Grand Mal Seizure
    - Cardiomyopathy
    - Acute Respiratory Failure
  - Discharge Medications:
    - Metoprolol 25 mg PO BID
    - PTU 200 mg PO QID
  - Outpatient follow-up
HA & Collapse in Pregnancy

- **Eclampsia**
  - Dx: HTN, seizure, edema, proteinuria, +/- elevated LFT’s & thrombocytopenia
  - Tx: Magnesium + OB

- **SAH**
  - Dx: CT + LP
  - Tx: BP control + Neurosurgery

- **Venous Sinus Thrombosis**
  - Dx: MR
  - Tx: Anticoagulation + Neurosurgery
Thyroid Function in Pregnancy

- Increase in thyroxine-binding globulin
  - Increase in total T4 & T3
- hCG stimulates the TSH receptor
  - Decrease in TSH levels
  - Increase in free T4 & T3
- Hyperthyroidism in pregnancy:
  - TSH <0.01 mU/L +
  - High free T4 level
Changes in maternal thyroid function during pregnancy:
# Thyroid Storm

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Treatment of Thyroid Storm:

- **Step 1: Block peripheral effect of thyroid hormone**
  - IV beta-blocker

- **Step 2: Stop the production of thyroid hormone**
  - PTU or methimazole
  - Dexamethasone or hydrocortisone

- **Step 3: Inhibit hormone release**
  - Iodine 1-2 hours after antithyroid medication
Methimazole embryopathy:

Source Undetermined

Source: Medscape

Source Undetermined

Source Undetermined

Source Undetermined
Management of Hyperthyroidism in Pregnancy:

![Graph showing management of hyperthyroidism in pregnancy with medications and free T4 index over gestational weeks.]

Source Undetermined
Stress-Induced (Takotsubo) CM

- Mayo Clinic Diagnostic Criteria:
  1. Transient hypokinesis, akinesis, or dyskinesis of LV mid segments +/- apical involvement
  2. Absence of obstructive coronary disease
  3. New EKG changes OR modest elevation in cardiac troponin
  4. Absence of pheochromocytoma, neuropathology, or myocarditis
Treatment of HF in Pregnancy

- **Afterload Reduction:**
  - Hydralazine
  - Amlodipine
  - Nitroglycerin
  - Lasix

- **Iontropes:**
  - Dobutamine
  - Dopamine
  - Digoxin

- **Vasopressors:**
  - Dopamine

- **Stable HF:**
  - Beta-blockers

- **Edema:**
  - Loop Diuretics

- **Mild-Moderate HF:**
  - Hydralazine
  - Digoxin

- **Decompensated HF + normal BP:**
  - Nitroglycerine

- **Decompensated HF + hypotension:**
  - Dopamine
Take home points

• ABC’s & IV/O2/Monitor every patient
• Thyroid storm is a clinical diagnosis
• Hyperthyroidism & storm more common in 1st trimester secondary to pregnancy related hormone changes
• Treat thyroid storm in pregnancy with beta-blockers (careful if in decompensated CHF), PTU +/- steroids in the ER
• Treat decompensated HF in pregnancy in the ER as you would any pt
  ▪ Pressor of choice = dopamine
Quick case:

- CF 25 YO man arrives via EMS in respiratory extremis
- History of asthma with increasing SOB over past few days
- Last night pt was partying and smoked MJ and cigarettes
- Awoke at 5 AM with severe respiratory distress
- Used albuterol inhaler 5 times with no improvement and called EMS
- EMS interventions: IV established, Oxygen via NRB, PO prednisone, duoneb NMT’s, and epinephrine 0.3 mg IM
• Vitals: P 117, BP 225/129, RR 38, O2 sat 64%
• General: Pt in respiratory extremis, tripod position, panicking, extremely diaphoretic, pulled out IV, won’t keep oxygen mask on, stating “help me,” bilateral prominent JVD
• Respiratory: In extremis, very faint breath sounds with slight end-expiratory wheezes bilaterally. Extremely diminished breath sounds
Intubate!
Source Undetermined
Needle Decompression/CT

Source Undetermined
CXR

Source Undetermined
References:

• Ernst A. Critical Illness during pregnancy and peripartum. UpToDate. April 24, 2007.