

Author(s): Pamela Fry, 2011

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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

One night at St. Joe's...

- 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 the patient:
 - 35 year-old African American 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

Now what?

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



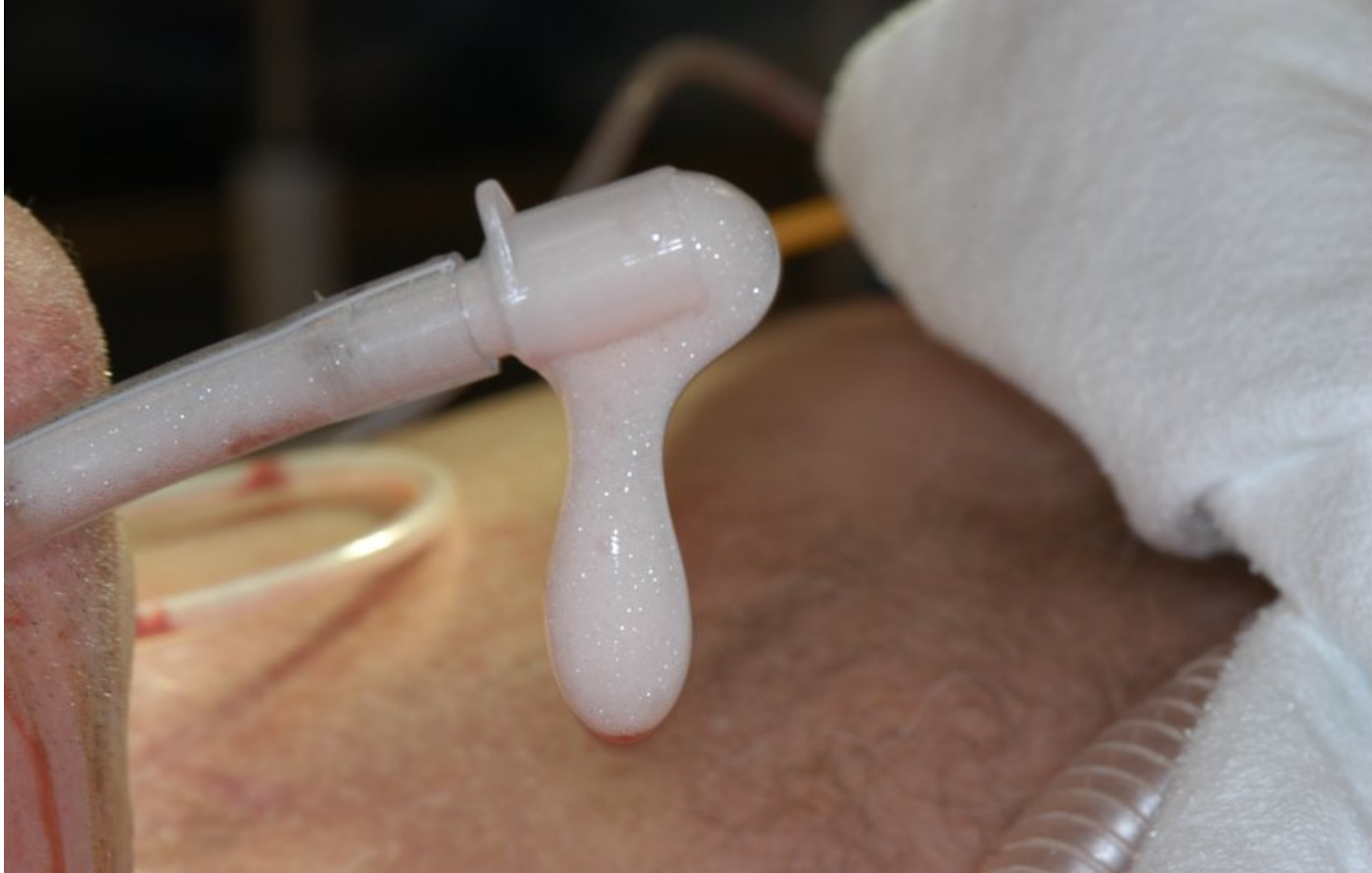
Do the DON'T!

- Dextrose:
 - Accucheck: 213
- Oxygen:
 - BVM with 100% FiO₂
- Nalaxone:
 - Not given
- Thiamine:
 - Not given

Intervention:



Intubation Successful, But...



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Nitroglycerin



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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:

Menu

- Patient Information
- Insurance
- Allergies
- Diagnoses & Problems
- Histories-Past & Family
- Orders + Add
- Results Review
- Flowsheet
- Laboratory
- Microbiology
- Anatomic Pathology
- Radiology
- Vital Signs/Measurements
- Notes Review
- Document Viewing + Add
- Patient Care Review
- Forms Review
- Intake & Output
- Med Profile
- MAR
- MAR Summary
- Encounter Review
- ED Summary

Laboratory Print 5 minutes ago

Flowsheet: LAB Level: LAB More Table Group List

01 March 2010 23:05 EST - 15 May 2010 23:05 EDT (Clinical Range)

Navigator

- ☒ Chemistry-General
- ☒ Chemistry-Misc

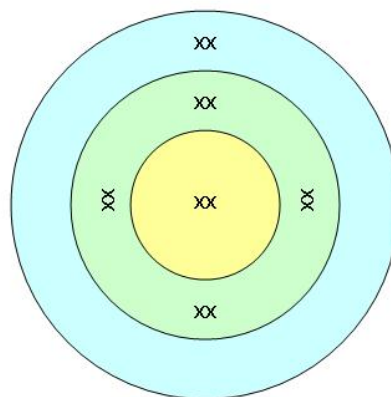
LAB	Sodium Level	Potassium Level	Chloride Level	Carbon Dioxide Level	Glucose Level	BUN
3/29/2010 14:02 EDT	135 mEq/L	5.0 mEq/L	102 mEq/L	25 mEq/L	88 mg/dL	7 mg/dL
Chemistry-General	Creatinine	GFR Estimated Altizi	GFR Estimated Non	Calcium Total	Alkaline Phosphatase	ALT/SGPT
5/6/2010 13:12 EDT						
3/29/2010 14:02 EDT	0.38 mg/dL	233 mL/min/1.73 m2	193 mL/min/1.73 m2	9.3 mg/dL	74 IU/L	21 IU/L
Chemistry-General	AST/SGOT	Bilirubin Total	Bilirubin Direct	Albumin Level	Protein	
5/6/2010 13:12 EDT	19 IU/L	0.4 mg/dL	0.0 mg/dL	3.2 gm/dL	5.8 gm/dL	
3/29/2010 14:02 EDT	19 IU/L	0.2 mg/dL		3.5 gm/dL	6.2 gm/dL	
Chemistry-Misc	HCG Quantitative	T3 (Triiodothyronine)	T4 (Thyroxine) Free	Thyroid Stimulating H		
5/6/2010 13:12 EDT		8.4 Picogram/ml	3.13 Nanogram/dL	<0.01 mIU/L		
4/14/2010 14:47 EDT		7.5 Picogram/ml	2.77 Nanogram/dL			
4/11/2010 16:45 EDT	47,903 mIU/ml					
3/29/2010 14:02 EDT		9.8 Picogram/ml	3.40 Nanogram/dL	0.00 mIU/L		

Magnesium

Elements – Atomic Structure

	Shell #	Sub-shell	Orbitals
Increasing Energy Level ↑	4	p	<div></div> <div></div> <div></div>
	4	s	<div></div>
	3	p	<div></div> <div></div> <div></div>
	3	s	<div>xx</div>
	2	p	<div>xx</div> <div>xx</div> <div>xx</div>
	2	s	<div>xx</div>
	1	s	<div>xx</div>

x = Electrons (e)

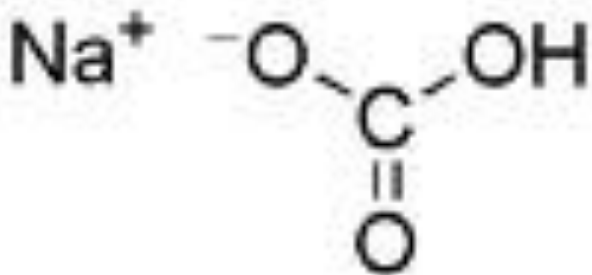


Magnesium (Mg)

$P^+ = e^- = 12$

Atomic #(Z) = 12

Sodium Bicarbonate



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Lasix



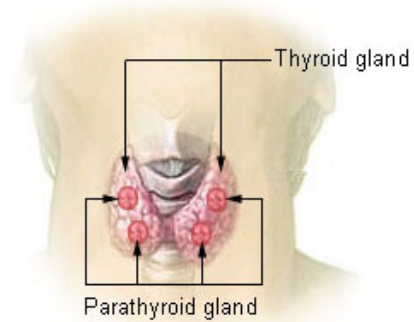
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
PTU/Steroids

Thyroid and Parathyroid Glands




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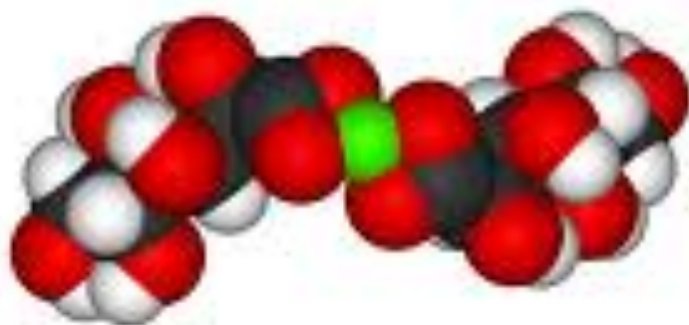


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Calcium Gluconate



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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 St. Joe's
- 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:



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To Summarize

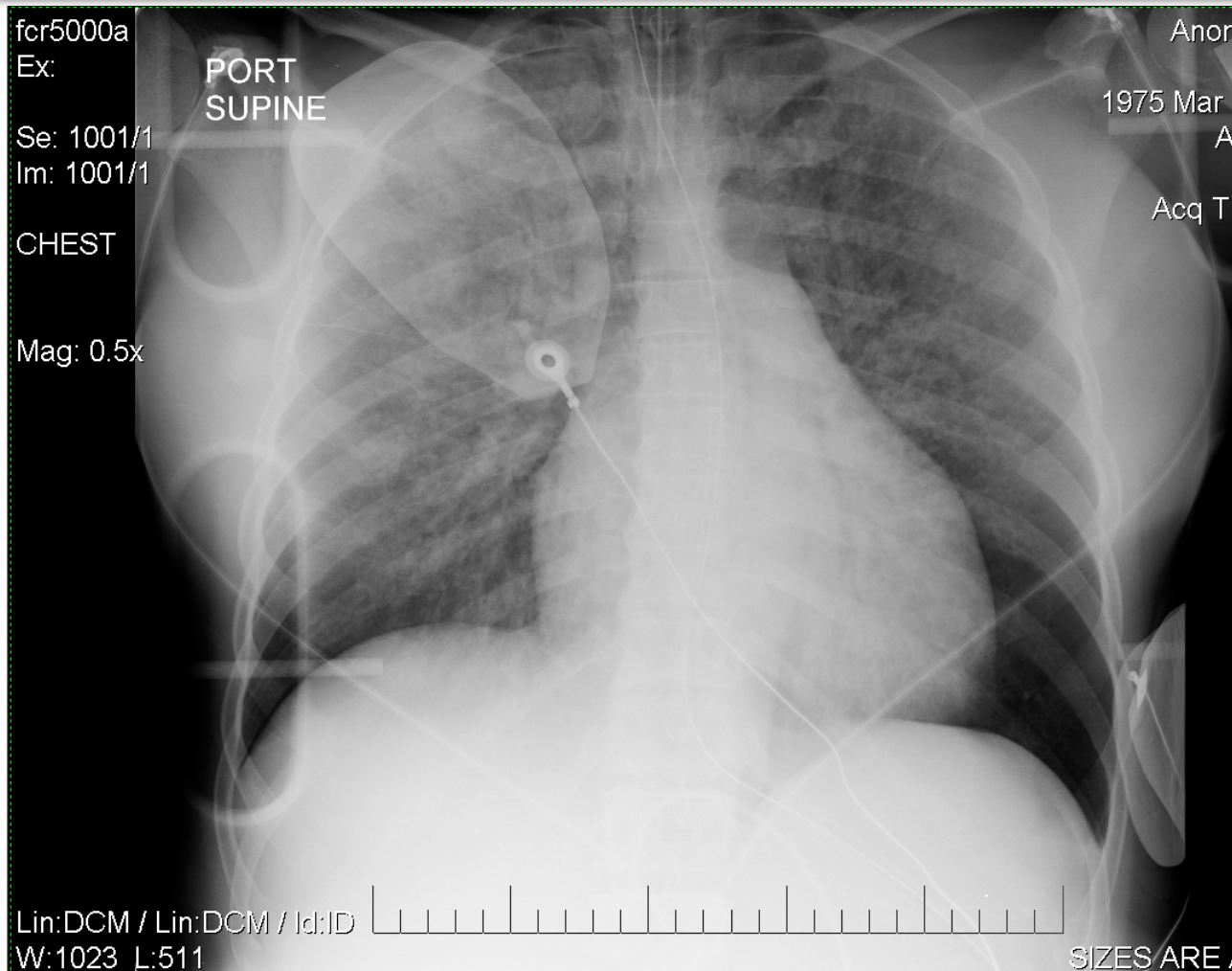
- 35 YO woman 12-14 weeks pregnant with a history of hyperthyroidism and ? prior seizure presents to the ER after screaming, stumbling, collapsing and seizing.
- GCS on arrival is 3 & pt intubated for airway protection & agonal respirations.
- Severe pulmonary edema present.
- Pt with hypertension and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



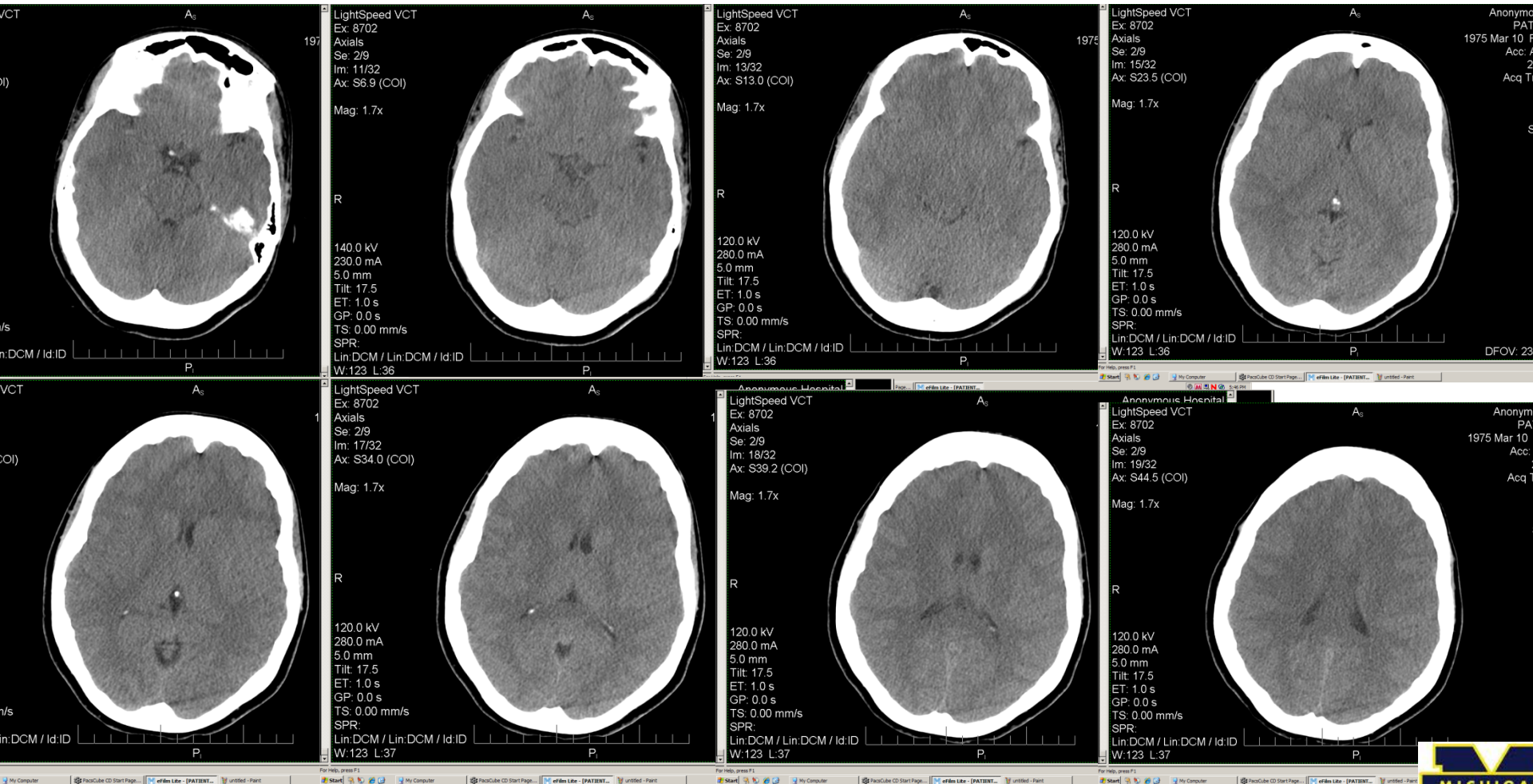
CXR



EKG



CT



MRI

FOR RADIOLOGIST USE ONLY:

Preliminary results:

No dural venous sinus thrombosis
No acute infarct
Since CT done 3 hours ago, interval improvement in
subcal effacement with some residual minimal
gyral swelling. Given rapid improvement, this may be a seizure
No ICH or mass effect

Radiologist name (PLEASE PRINT): M. DAVENPORT

Pager: 734-670-0128

Radiologist signature: MD

Date: 5/16/2010

☒ REPORT CALLED ☒ NOT CALLED Reason: ☐ Answering Old Phone ☒ Training Box ☐ Other:

☒ REPORT FAXED To: Code - team physician

At: 06:20 a.m. / p.m.

☒ REPORT FAXED To: ER-72

At: 06:20 a.m. / p.m.

Always / Before Transmittal check to the ASP / Through Pager 734-670-7722

☐ REPORT FAXED To: (location)

At: a.m. / p.m.



WHITE - Neuro CT - CANARY - Body CT

USPAP (2004) R 10/20/04



LP



Beta-blocker



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Hospital Day 1

- Pt admitted to ICU: 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 (IABP) placed
 - Swan-Ganz catheter placed
 - Pt transferred to Cardiac ICU
- 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 spontaneous 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

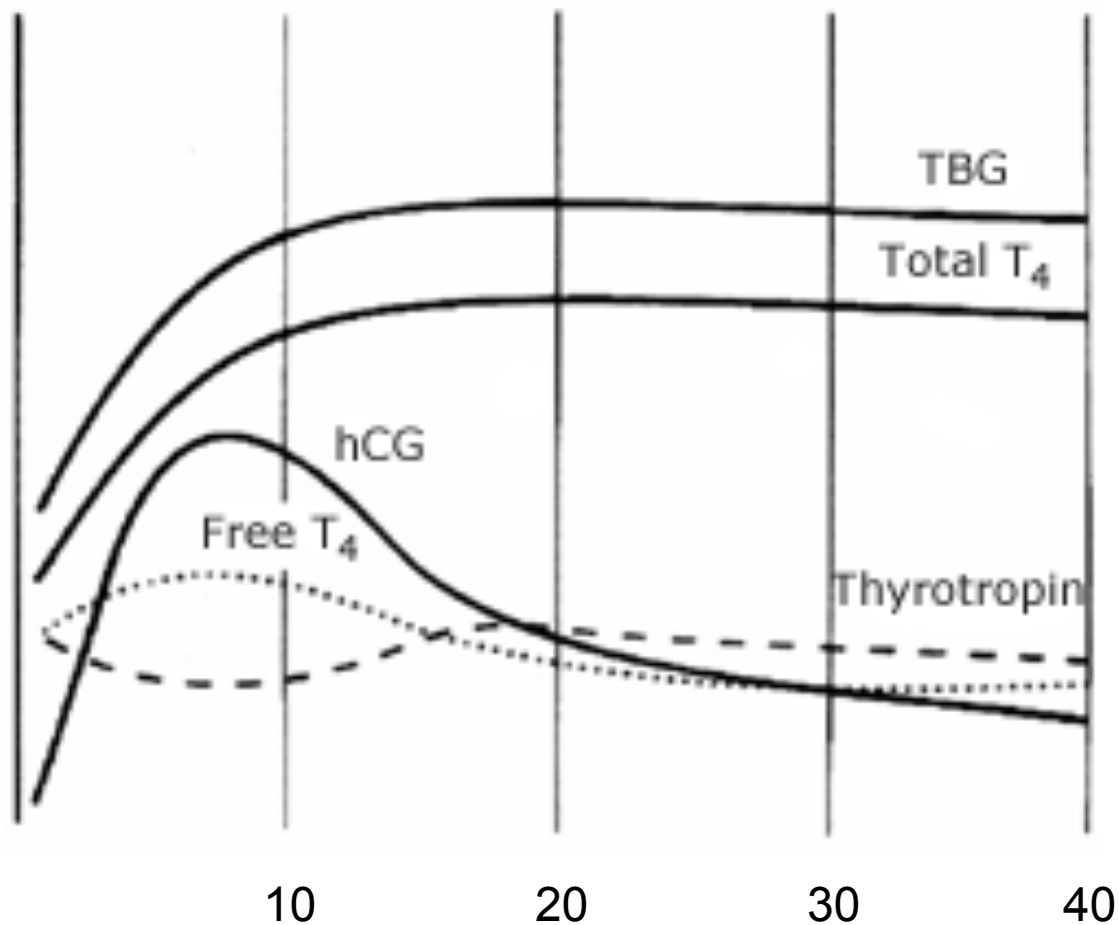
HA & Collapse in Pregnancy

- 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

Temperature	
99-99.9	5
100-100.9	10
101-101.9	15
102-102.9	20
103-103.9	25
≥104	30

Precipitant	
No	0
Yes	10

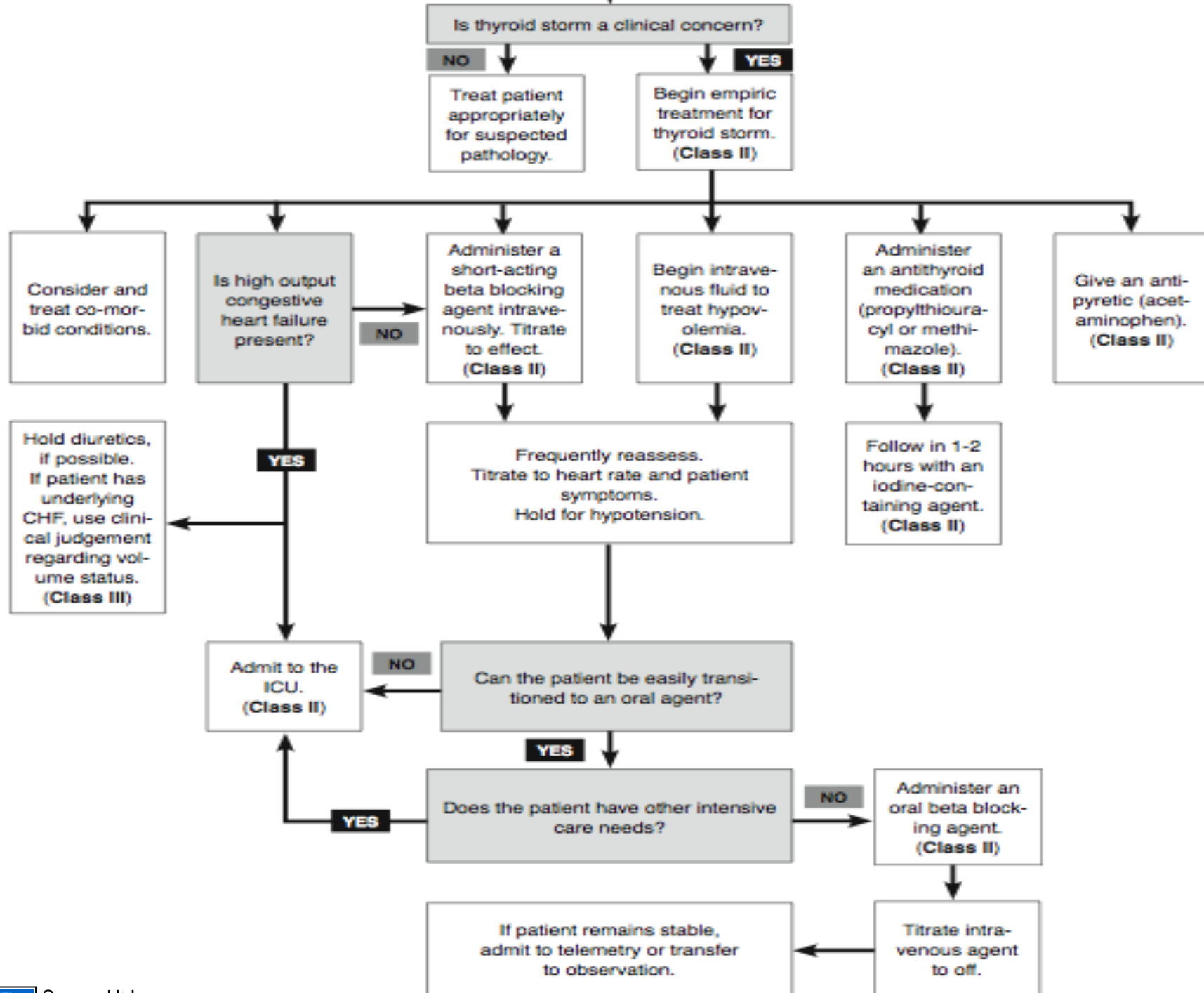
CNS Effects	
Agitation	10
Delirium, psychosis, extreme lethargy	20
Seizure, coma	30

CHF	
Pedal edema	5
Bibasilar rales or a-fib	10
Pulmonary edema	15

GI symptoms	
Diarrhea, n/v, abdo pain	10
Unexplained jaundice	20

Tachycardia	
99-109	5
110-119	10
120-129	15
130-139	20
≥140	25

Score Total	
>25	Storm
<25	No Storm



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:



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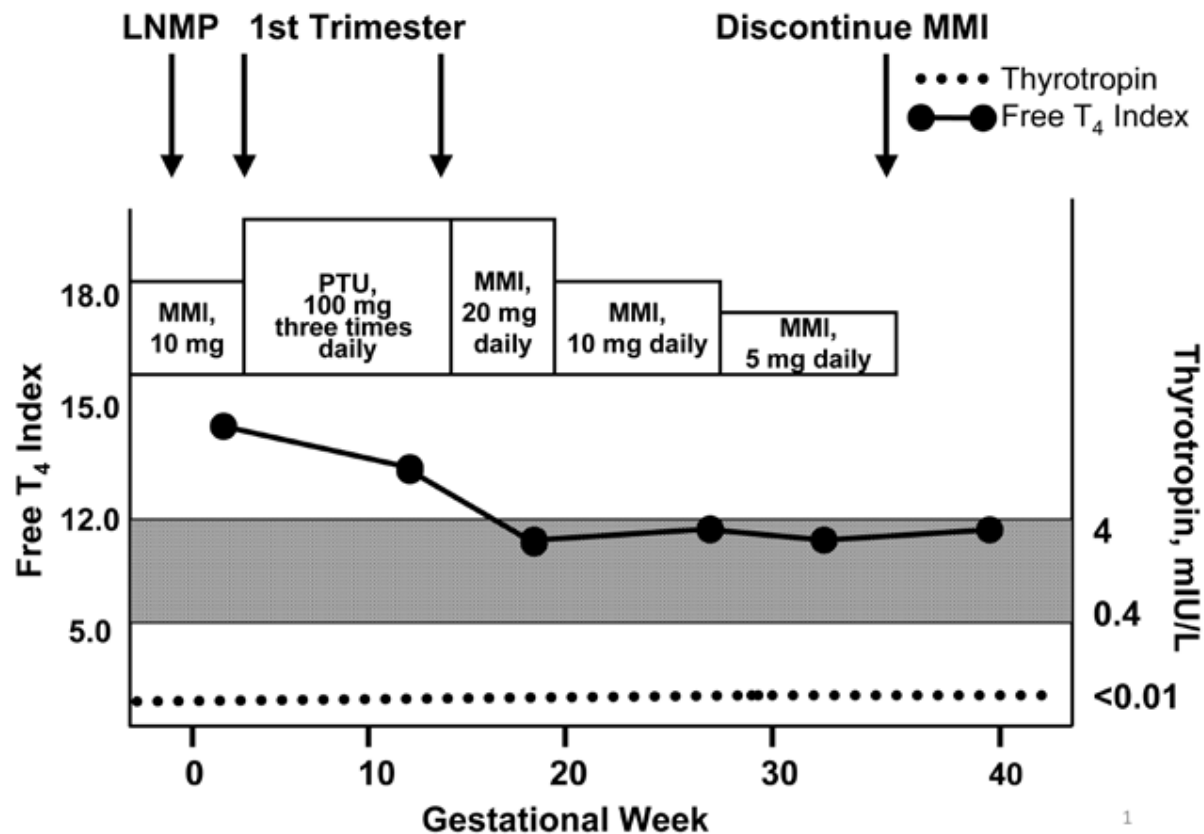
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Management of Hyperthyroidism in Pregnancy:



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
- Inotropes:
 - 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

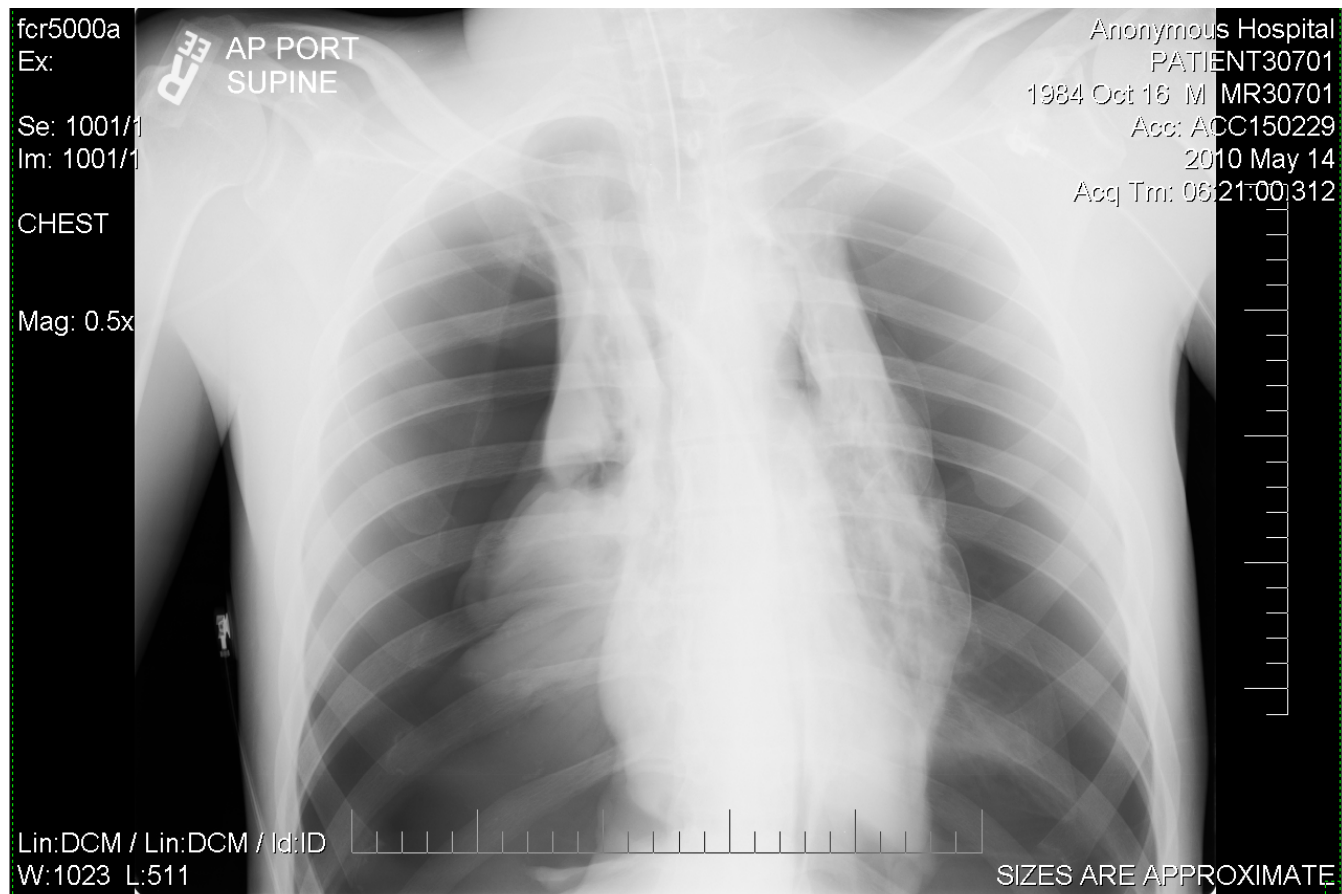
Patient

- 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!



CXR



Needle Decompression/CT

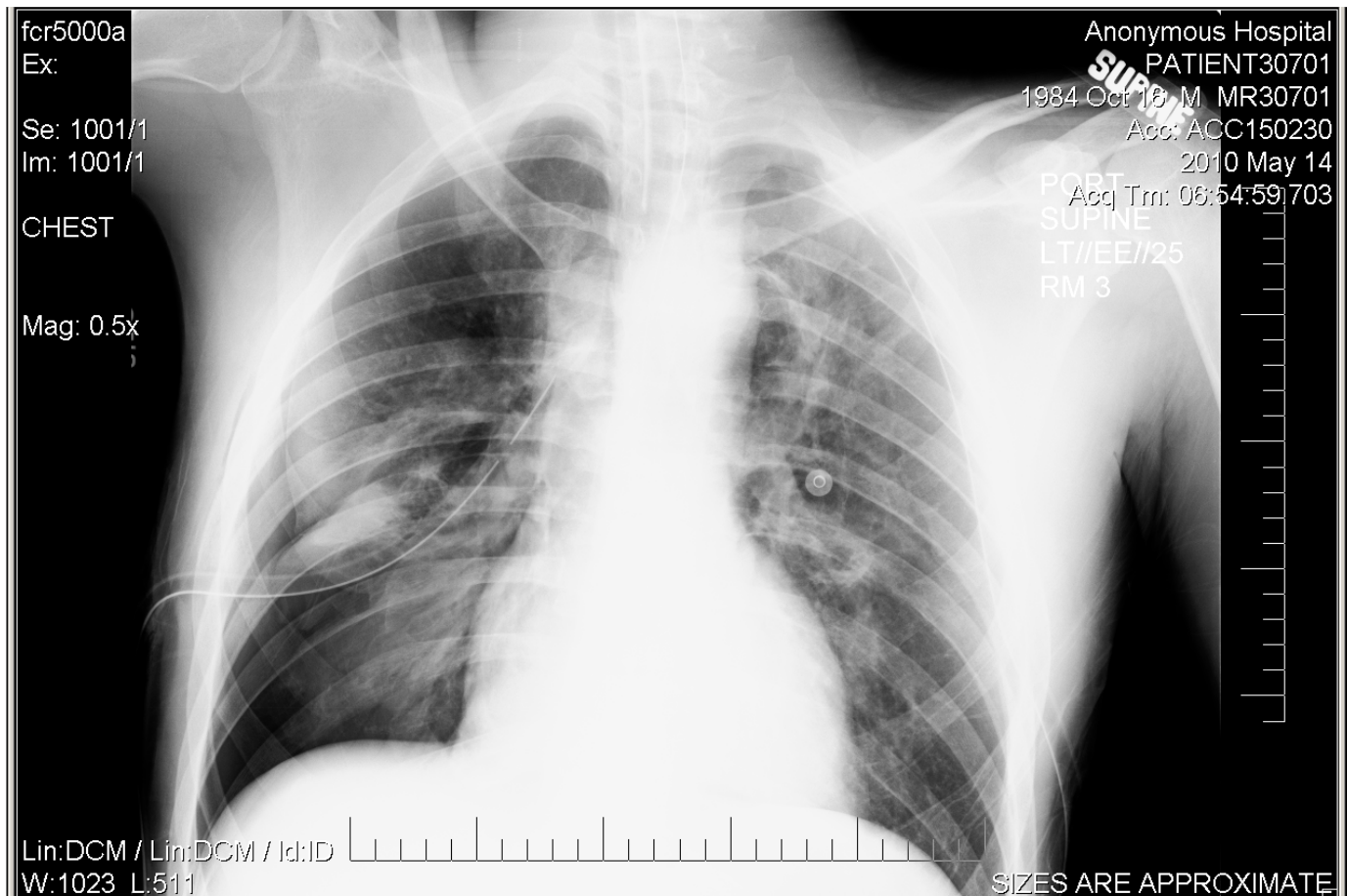


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CXR



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