



Adult Asthma Case Studies

MDCH Asthma Educator Sharing Day

10/18/2019

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Jane Doe #1

- ▶ 49 year old female
- ▶ History of heavy tobacco use and asthma
- ▶ Patient has been feeling somewhat poorly over the last few weeks and her roommate reports that she has been using her nebulizers quite heavily - despite this, she also has continued to smoke quite heavily
- ▶ The patient's roommate said that the patient was in her room and called out to them - when they went in to check on her, she was unresponsive and they contacted EMS



Past Medical History

PAST MEDICAL HISTORY:

1. Asthma. I note no history of prior intubation for asthma, though she has been admitted to the hospital several times, most recently last August.
2. History of alcohol and substance abuse, though reportedly sober for years.
3. Tobacco abuse, ongoing.
4. Depression and anxiety.
5. Neuropathy.
6. ADHD.
7. Tubal ligation.
8. History of cocaine induced myocardial infarction.

HOME MEDICATIONS:

1. Adderall.
2. Albuterol via nebulizer.
3. Albuterol HFA.
4. Singulair 10 mg daily.
5. DuoNeb.
6. She has also apparently been prescribed Incruse and Symbicort, though it is unclear whether she is actively taking these or not.



EMS Arrival

- ▶ Upon EMS arrival, she was in cardiac arrest (PEA)
 - ▶ She was successfully resuscitated and intubated
 - ▶ Pulseless time was reported at 15 minutes
- 



ED Arrival

- ▶ Tube changed from King tube to ET tube
- ▶ Ruled out MI
- ▶ Patient had bronchospasm with profound difficulty with air entry

Labs

Arterial Blood Gases	pH ABG	pCO2 ABG	pO2 ABG	Bicarbonat...	Base Exces...	Base Defici...	O2 Saturati...	O2 Saturati...
03/28/2019 15:50 EDT	7.42 units	43 mmHg	69 mmHg (L)	27 mmol/L	2.6 mmol/L		93 % (L)	
03/28/2019 10:05 EDT	7.44 units	41 mmHg	92 mmHg	27 mmol/L	2.9 mmol/L		97 %	
03/28/2019 9:25 EDT	7.29 units (L)	65 mmHg (H)	274 mmHg (H)	27 mmol/L	2.6 mmol/L		99 %	
03/28/2019 5:02 EDT	7.43 units	43 mmHg	79 mmHg	28 mmol/L	3.8 mmol/L		95 %	
03/27/2019 4:55 EDT	7.49 units (H)	36 mmHg	102 mmHg (H)	28 mmol/L	4.2 mmol/L (H)		98 %	
03/26/2019 12:25 EDT	7.46 units (H)	35 mmHg	123 mmHg (H)	26 mmol/L	1.8 mmol/L		98 %	
03/26/2019 4:44 EDT	7.57 units (H)	30 mmHg (L)	137 mmHg (H)	29 mmol/L	5.5 mmol/L (H)		98 %	
03/25/2019 15:45 EDT	7.57 units (H)	30 mmHg (L)	74 mmHg (L)	30 mmol/L	6.2 mmol/L (H)		97 %	
03/25/2019 8:50 EDT	7.48 units (H)	41 mmHg	61 mmHg (L)	30 mmol/L	6.3 mmol/L (H)		94 %	
03/24/2019 22:24 EDT	7.17 units * (!)	88 mmHg * (!)	120 mmHg (H)	24 mmol/L		0.2 mmol/L	98 %	
03/24/2019 18:03 EDT	6.98 units * (!)	142 mmHg * (!)	318 mmHg (H)	20 mmol/L (L)		5.8 mmol/L (H)	98 %	97 %
03/24/2019 15:36 EDT	6.75 units * (!)	172 mmHg * (!)	371 mmHg (H)	11 mmol/L * (!)		17.9 mmol/L (H)	98 %	97 %
03/24/2019 15:22 EDT	6.70 units * (!)	122 mmHg * (!)	350 mmHg (H)	7 mmol/L * (!)		26.3 mmol/L (H)	97 %	97 %
03/24/2019 15:16 EDT	6.68 units * (!)							

Labs

General Chemistry	<input type="checkbox"/> Lactic Acid,...
03/28/2019 14:48 EDT	
03/28/2019 10:06 EDT	
03/28/2019 4:30 EDT	
03/27/2019 18:44 EDT	
03/26/2019 9:53 EDT	
03/24/2019 18:16 EDT	
03/24/2019 18:04 EDT	
03/24/2019 15:16 EDT	13.1 mmol/L * (!)



ICU Orders

- SPAD protocol
- Ketamine then later propofol
- Thiamine
- Pressure control ventilation due to inability to ventilate
- Continuous albuterol 15 mg/hour (add atrovent)
- IV steroids
- Empiric antibiotics
- GI and DVT prophylaxis
- Sliding scale insulin



Ventilator settings

- ▶ The patient was originally placed on the following settings:
 - ▶ (3/24/2019, 15:02) A/C, RR 18, VT 550 cc, Peep 5 cwp, FiO2 100
 - ▶ (3/24/2019, 16:00) A/C, RR 30, VT 200 cc, Peep 5 cwp, FiO2 100
 - ▶ (3/24/2019, 16:40) PCV, RR 24, PIP 45, Peep 5 cwp, FiO2 80
 - ▶ (3/26/2019, 9:14) SIMV, RR 12, VT 500 cc, PS 10 cwp, Peep 5 cwp, FiO2 40
 - ▶ (3/27/2019, 13:00) Ceases to breathe over set rate of 12



3/25/2019

- GCS 3
- GOL notified
- Neurology consulted
- Tube feeding started
- Good urine output
- Increased temperature and heart rate



3/26/2019

- ▶ GCS 3
- ▶ Still tachycardic
- ▶ No BM, tube feeds with high residuals
- ▶ Tmax 38
- ▶ Fixed and dilated pupils
- ▶ EEG done
- ▶ CT – diffuse cerebral and cerebellar edema, descending transtentorial herniation
- ▶ Off sedation and pain medication
- ▶ Dysconjugate gaze
- ▶ No response to pain or gag
- ▶ EEG suggestive of herniation



3/27/2019

- ▶ GCS 3
- ▶ No sedation
- ▶ Tachycardic with high blood pressure
- ▶ Tube feeding discontinued due to high residuals (>400cc)
- ▶ No respiratory effort noted, no gag, no corneal reflexes
- ▶ Cold caloric consistent with brain death
- ▶ Family consents to DCD or organ donation



3/28/19

- ▶ Brain death confirmed via apnea test at 9:38 am
 - ▶ 16:48 Honor walk with EMS to transport to Ann Arbor for organ donation
- 



Honor walk

- ▶ Hospitals across the United States are holding honor walks to show respect to patients at the end of life who are donating organs to others. With the consent of loved ones, hospital leadership invites all staff members to participate. The honor walk takes place at an odd pause between life and death: Either brain death has been declared already in a donor whose heart still beats, or the donor's heart will soon stop beating (DCD).
- ▶ An honor walk is a powerful act of community. Something solemn, even sacred, happens in those 15 minutes in the hallway. We wait and talk with people from all professions and all walks of life. Together, we honor a great sacrifice. We give thanks. We hope to help a grieving family in a moment of fathomless loss.



Discharge Summary

- ▶ Acute on chronic hypoxic and hypercapnic respiratory failure
 - ▶ Acute exacerbation of very severe Asthma/COPD
 - ▶ Anoxic brain injury
 - ▶ Staphylococcus aureus lower respiratory tract infection
 - ▶ Steroid induced hyperglycemia
- 



John Doe #2

- ▶ 30 year old man with a history of PTSD, asthma, chronic low back pain and methamphetamine abuse and addiction who generally does not follow with doctors
- ▶ The patient was fine until this evening when he abruptly became dyspneic, stumbling into the bathroom where his wife was located and then collapsing (albuterol inhaler found in sink)
- ▶ His wife initiated CPR and continued for approximately 10 minutes before EMS arrived
- ▶ Patient smokes 1-2 packs of cigarettes per day



Past medical history

PAST MEDICAL HISTORY:

1. Asthma.
2. PTSD.
3. History of substance abuse, details uncertain.

Home medications include:

1. Albuterol p.r.n.
2. Norco p.r.n.



EMS arrival

- ▶ Patient was found to be pulseless
 - ▶ Full ACLS was initiated and maintained enroute for approximately 30 minutes
- 



ED arrival

- ▶ Patient was administered bicarbonate and defibrillated with return of spontaneous circulation
- ▶ Patient had fixed and dilated pupils with no response to painful stimuli
- ▶ Discussion regarding therapeutic hyperthermia occurred and although it was clinically not indicated, due to his young age and extended resuscitation efforts it was initiated
- ▶ Central line placed
- ▶ Head CT done – diffuse cerebral edema with global hypoxia
- ▶ Pulmonary consult ordered
- ▶ Neurology consult ordered upon rewarming

Labs

Arterial Blood Gases	<input type="checkbox"/> pH ABG	<input type="checkbox"/> pCO2 ABG	<input type="checkbox"/> pO2 ABG	<input type="checkbox"/> pH, ABG Te...	<input type="checkbox"/> pCO2, ABG ...	<input type="checkbox"/> pO2, ABG T...	<input type="checkbox"/> Bicarbonat...	<input type="checkbox"/> Base Excess...
09/07/2019 10:30 EDT	7.22 units (L)	66 mmHg (H)	191 mmHg (H)				23 mmol/L (L)	
09/07/2019 9:48 EDT	7.43 units	39 mmHg	90 mmHg				25 mmol/L	1.1 mmol/L
09/07/2019 5:25 EDT	7.41 units	40 mmHg	105 mmHg (H)				25 mmol/L	0.7 mmol/L
09/06/2019 7:09 EDT				7.42 units	43 mmHg	101 mmHg	27 mmol/L	
09/06/2019 1:12 EDT				7.39 units	41 mmHg	75 mmHg	24 mmol/L	
09/05/2019 16:20 EDT				7.33 units	37 mmHg	148 mmHg	19 mmol/L (L)	
09/05/2019 9:35 EDT				7.32 units	30 mmHg	122 mmHg	17 mmol/L (L)	
09/05/2019 5:11 EDT				7.34 units	32 mmHg	102 mmHg	18 mmol/L (L)	
09/05/2019 3:13 EDT	7.28 units (L)	41 mmHg	155 mmHg (H)				18 mmol/L (L)	
09/05/2019 0:16 EDT	6.70 units * (!)	>95 mmHg * (!)	437 mmHg (H)				7 mmol/L * (!)	



Labs

General Chemistry	<input type="checkbox"/> Lactic Acid, ...
09/07/2019 20:40 EDT	
09/07/2019 16:14 EDT	
09/07/2019 13:03 EDT	
09/07/2019 9:40 EDT	
09/07/2019 6:50 EDT	2.1 mmol/L (H)
09/07/2019 1:56 EDT	2.3 mmol/L (H)
09/06/2019 19:57 EDT	2.0 mmol/L (H)
09/06/2019 13:53 EDT	2.1 mmol/L (H)
09/06/2019 7:10 EDT	2.1 mmol/L (H)
09/06/2019 1:12 EDT	1.6 mmol/L
09/05/2019 17:47 EDT	2.0 mmol/L (H)
09/05/2019 13:45 EDT	4.7 mmol/L * (!)
09/05/2019 7:47 EDT	9.2 mmol/L * (!)
09/05/2019 5:18 EDT	
09/05/2019 2:33 EDT	7.5 mmol/L * (!)

Labs

38 - 177 normal 0 - .1normal

Cardiac Markers	<input type="checkbox"/> CK total	<input type="checkbox"/> Troponin I
09/07/2019 20:40 EDT		0.11 ng/mL * (!)
09/07/2019 16:14 EDT	2740 U/L (H)	0.15 ng/mL * (!)
09/05/2019 13:45 EDT		0.33 ng/mL * (!)
09/05/2019 7:47 EDT		0.37 ng/mL * (!)
09/05/2019 5:18 EDT		0.34 ng/mL * (!)
09/05/2019 2:33 EDT		0.23 ng/mL * (!)



Labs

- ▶ Positive sputum culture
 - ▶ Opioids detected
- 



Critical Care

- Vented
- IV steroids
- Frequent/continuous nebulized beta agonists/anticholinergics
- Empiric antibiotics
- Ketamine or paralysis as needed
- Bicarbonate drip
- Magnesium if his level drops



Ventilator settings

- ▶ The patient was originally placed on the following settings:
 - ▶ (9/5/2019, 0:45) PCV, RR 26, FiO₂ 60
 - ▶ (9/5/2019, 2:32) A/C, RR 26, VT 500 cc, Peep 5 cwp, FiO₂ 60
 - ▶ (9/5/2019, 16:40) A/C, RR 22, VT 500, Peep 5 cwp, FiO₂ 60
 - ▶ (9/5/2019, 13:00) A/C, RR 16, VT 500 cc, Peep 5 cwp, FiO₂ 50
 - ▶ (9/7/2019, 17:36) A/C, RR 16, VT 500 cc, Peep 5 cwp, FiO₂ 40



9/5/2019

- ▶ Hypothermia protocol
- ▶ Propofol drip
- ▶ Pupils fixed and dilated
- ▶ No response to pain
- ▶ ST elevation, prolonged QT
- ▶ Kayexalate given for K 6.1
- ▶ Calcium chloride for ionized Ca of 4.4 (4.64 to 5.28 milligrams per deciliter)
- ▶ Sedation off at 8 am
- ▶ Hypertensive crisis at 15:45, esmolol given (beta-1 receptor blocker)
- ▶ Electrolytes replaced per protocol



9/6/2019

- 2:33 Rewarming protocol initiated
- Pupils fixed and dilated
- Lab values declining
- Neurology to evaluate on 9/7
- GOL to visit with family on 9/7



9/7/2019

- GOL discussed situation with family
- Apnea test performed around 10:15 am, no breathing noted
- Patient declared brain dead at 10:44 am
- Plan to transfer to U of M for organ donation



9/8/2019

- ▶ Patient left the unit on 9/8 at 0:34 with EMS to transfer to Ann Arbor
 - ▶ Honor walk
- 



Discharge summary

- ▶ Asthma exacerbation
- ▶ Acute respiratory failure with hypoxia and hypercapnia
- ▶ Cardiac arrest
- ▶ Non-ST elevation MI (NSTEMI)
- ▶ Acute kidney failure
- ▶ Acidosis, lactic
- ▶ Hyperkalemia
- ▶ Cerebral edema
- ▶ Anoxic brain damage
- ▶ Brain death
- ▶ Methamphetamine dependence