Severe COPD Exacerbation in CHF patient

Section I: Scenario Demographics

Scenario Title:	Severe COPD Exacerbation in CHF Patient
Date of Development:	(11/07/2022)(revision)
Target Learning Group:	Juniors (PGY 1 – 2) Seniors (PGY ≥ 3) All Groups

Section II: Scenario Developers

Scenario Developer(s):	Jeanne MacLeod,
Affiliations/Institution(s):	UBC
Contact E-mail (optional):	

Section III: Curriculum Integration

Learning Goals & Objectives	
Educational Goal:	To provide learners with the opportunity to manage a patient with a severe COPD Exacerbation and CHF
CRM Objectives:	
Medical Objectives:	1. Recognise signs and consequences of COPD exacerbation 2. Acute management of COPD exacerbation 3. Recognise signs and symptoms of pneumothorax post intubation 4. Acute management of pneumothorax including chest tube insertion

Case Summary: Brief Summary of Case Progression and Major Events

The team are called to trauma bay for a CTAS Level 1 patient. The patient is a 70-year-old male with SOB, in distress and unable to speak in full sentences. The team is expected to perform an A-E assessment and take a history from the paramedics. The PMH, A-E assessment and physical examination will be consistent with acute COPD exacerbation with a previous diagnosis of CHF. The team is expected to manage the acute presentation with appropriate interventions and prepare for the potential deterioration of the patient. The patient will deteriorate, and the team are expected to perform rapid sequence intubation and monitor appropriately. The patient subsequently develops a pneumothorax, and a chest tube will need to be placed.

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References

1. Chest: Mediastinum, Heart and Vessels. Congestive Heart Failure. Radiology Tutorials. Accessed on Nov 30, 2014 from http://www.radiologytutorials.com/main.cgi?tut=/main.cgi&frame=main&tt=1&s=1&t=10&mod=all
2. Management of exacerbations of chronic obstructive pulmonary disease. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/management-of-exacerbations-of-chronic-obstructive-pulmonary-disease
3. Furosemide: Drug information. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/furosemide-frusemide-drug-information?source=search_result&search=lasix&selectedTitle=1~150#F174846
4. Noninvasive positive pressure ventilation in the emergency department. Emergency Medicine Clinics of North America. 2008; 26 (): 835-847.
5. Rapid sequence intubation in adults. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/rapid-sequence-intubation-in-adults
6. Succinylcholine: Drug information. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/succinylcholine-suxamethonium-drug-information?source=see_link#F223434
7. Rocuronium: Drug information. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/rocuronium-drug-information?source=see_link
8. Weeakkody Y, Gaillard F. Tension Pneumothorax. Radiopaedia. Accessed on Nov 30, 2014 from http://radiopaedia.org/articles/tension-pneumothorax
9. Lidocaine: Drug information. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/lidocaine-systemic-drug-information?source=see_link
10. Placement and management of thoracostomy tubes. UpToDate. Accessed on Nov 30, 2014 from http://www.uptodate.com/contents/placement-and-management-of-thoracostomy-tubes?source=see_link
11. https://emsimcases.com/2015/11/24/dka/normal-post-intubation-cxr/ Accessed on July 14, 2022

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Section IV: Scenario Script

A. Clinical Vignette: To Read Aloud at Beginning of Case
You are called to trauma bay for a CTAS Level 1 patient. They are a 70-year-old male with SOB, in distress and unable to speak in full sentences. The paramedics report the patient has been unwell for a week with increasing SOB, fever, cough, and scant sputum production. They have gotten worse today

B. Scenario Cast & Realism			
Patient:	**Computerized Mannequin**	Realism: *Select most important dimension(s)*	**Conceptual**
	Mannequin		Physical
	Standardized Patient		Emotional/Experiential
	Hybrid		Other:
	Task Trainer		N/A

Confederates	Brief Description of Role
ED RN	Acts as an experienced RN

C. Required Monitors		
EKG Leads/Wires	**Temperature Probe**	Central Venous Line
NIBP Cuff	**Defibrillator Pads**	**Capnography**
Pulse Oximeter	Arterial Line	Other:

D. Required Equipment		
Gloves	**Nasal Prongs**	**Scalpel**
Stethoscope	**Venturi Mask**	**Tube Thoracostomy Kit (24 or 28 Fr)**
Defibrillator	**Non-Rebreather Mask**	Cricothyroidotomy Kit

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IV Bags/Lines	Bag Valve Mask	Thoracotomy Kit
IV Push Medications	**Laryngoscope**	Central Line Kit
PO Tabs	**Video Assisted Laryngoscope**	Arterial Line Kit
Blood Products	**ET Tubes**	Other: **Nebuliser**
Intraosseous Set-up	**LMA**	Other: **BiPaP** **Suction** **Stylet** **Bougie** **Straight scissors** **Drainage system**

E. Moulage

F. Approximate Timing

Set-Up:	5 min	Scenario:	20 min	Debriefing:	20 min

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Section V: Patient Data and Baseline State

A. Patient Profile and History					
Patient Name: Jeff Orchard		Age: 70		Weight: 70kg	
Gender: **M** F		Code Status: Full			
Chief Complaint: Respiratory distress					
History of Presenting Illness: one week increasing SOB, fever, cough, scant sputum production. worsened					
Past Medical History:	Smokes: 55-year pack history	Medications:	ASA		
	COPD: several previous admissions for exacerbations		Atenolol		
	Coronary artery disease		Lasix		
	CHF		Flovent		
	Peripheral vascular disease		Ventolin		
	TIAs		Atrovent		
			Prednisolone		
			Nitro		
			Amoxicillin prescribed by GP for last 3 days		
Allergies: No known allergies					
Social History: Not known					
Family History: Not known					
Review of Systems:	CNS:	Distressed			
	HEENT:	Nil			
	CVS:	"Heart racing"			
	RESP:	SOB, cough, scant sputum production, unable to complete full sentences			
	GI:	Nil			
	GU:	Nil			
	MSK:	Nil	INT:	Nil	
B. Baseline Simulator State and Physical Exam					

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No Monitor Display	Monitor On, no data displayed	Monitor on Standard Display

HR: 140/min	BP: 180/100	RR: 40/min	O_2SAT: 88% on high flow
Rhythm: NSR	T: 38^{o}C	Glucose: 6.2 mmol/L	GCS: 15 (E4 V5 M6)

General Status: Distressed, unable to speak in full sentences			
CNS:	A+O x3. No focal deficits		
HEENT:	Decreased laryngeal height, accessory muscle use		
CVS:	Decreased heart sounds		
RESP:	Increased AP chest diameter, Hyperresonance to percussion, bilateral expiratory wheeze		
ABDO:	Nil		
GU:	Nil		
MSK:	Nil	SKIN:	Pitting oedema to knees

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Section VI: Scenario Progression

Scenario States, Modifiers and Triggers			
Patient State	Patient Status	Learner Actions, Modifiers & Triggers to Move to Next State	
1. Baseline State Rhythm: NSR HR: 140/min BP: 180 /100 RR: 40/min O_2SAT: 88% T: 38^{o}C	70-year-old man in respiratory distress Airway is patent and patient is able to speak but there is obvious tachypnoea and accessory muscle use. He cannot talk in full sentences.	<u>Learner Actions</u> - ABCs, oxygen, IV access, cardiorespiratory monitoring, sit patient up - Vital signs - HPI, PMHx, Meds, Allergies -Physical exam - Order Labs and imaging (CBC and diff, lytes, CR, troponin, ABGs, CXR, ECG) - Administer Lasix, Antibiotics, Ventolin, Ipratropium, systemic corticosteroid, [4]BiPAP - Prepare for patient deterioration, set up intubation equipment Dosage: [2]Ventolin (Albuterol) 2.5 mg diluted to 3mL via nebs [2]Ipratropium 500 mcg via nebs [2]Methylprednisolone 60-120mg IV [2]Levofloxacin 750 mg IV or Ceftriaxone 2g IV. [3]Lasix 40mg IV over 1-2min. May repeat dose.	<u>Modifiers</u> *Changes to patient condition based on learner action* <u>Triggers</u> *For progression to next state* - All actions complete or 10 minutes into case -> **2. Deterioration**

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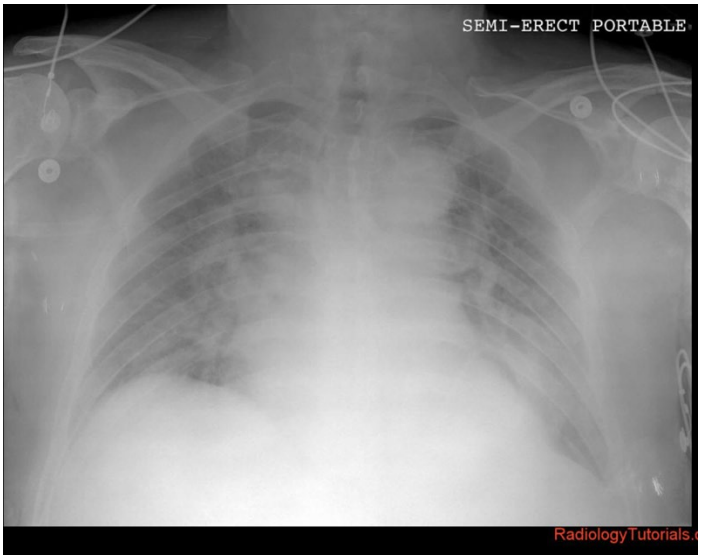
Stage 2. Deterioration Rhythm: NSR HR: 140/min BP: 150/80 RR: 45/min O_2SAT: 85% T: 38°C	Patient deteriorates, not tolerating BiPaP, unable to speak	Learner Actions - Rapid Sequence Intubation ([5]wait 45 sec if Succ used or 60 sec if Roc used before laryngoscopy) *[5]Pre-oxygenation with nonrebreather facemask* *[5]Ketamine 70-140mg IV for induction (1-2 mg/kg), or Etomidate 21mg IV (0.3 mg/kg)* *[6]Succinylcholine 70-105 mg IV (1-1.5mg/kg) or [7]Rocuronium 42-84 mg IV (0.6-1.2 mg/kg).* - Confirmation of ETT placement *watch chest rise, auscultate bilaterally, **end tidal CO2 monitoring**, and CXR to confirm ETT in trachea vs in mainstem bronchi*	Modifiers If need for intubation not recognised to be prompted to Nurse Triggers - ET tube placed, 3 minutes later -> **Stage 3. Pneumothorax** -If intubation unsuccessful after 10 minutes -> end scenario
Stage 3. Pneumothorax Sudden fall in BP to 60/40, HR up to 160 and SpO2 down to 80%	Markedly reduced air entry on right, right lung tympanic to percussion, tracheal deviation to left, distended neck veins	- Vital signs - Re-evaluate ABCs, auscultate chest - Call Anesthesia and ICU - May order repeat XR, but react before XR done *[8]CXR: Left tension pneumothorax* - Lidocaine at 4th or 5th intercostal space *[9]Lidocaine 1% 300mg max* - Immediate thoracostomy tube placement *[10]Or needle decompression followed by chest tube placement ASAP* *Insert chest tube via incision at 4th or 5th intercostal space in*	Use DOPE mnemonic to assess post intubation deterioration. Modifiers Development of pneumothorax that evolves into tension pneumothorax. If not recognised → rapid deterioration and VFib followed by PEA arrest. -> **End scenario** Triggers All actions complete or 10 minutes into the scenario -> **End scenario**

		anterior axillary or mid-axillary line, directing tube superiorly and anteriorly - Confirm tube placement with CXR - Patient transferred to ICU	

Section VII: Supporting Documents, Laboratory Results, & Multimedia

Laboratory Results						
Na: Not back	K: Not back	Cl: Not back	HCO_3: Not back	BUN: Not back	Cr: Not back	Glu: Not back
Ca: Not back	Mg: Not back	PO_4: Not back	Albumin: Not back			
ABG	pH: 7.20	PCO_2: 60	PO_2: 58	HCO_3: 20	Lactate: 2.5mmol/L	
WBC: 13	Hg: 135g/L	Hct: 40%	Plt: 150			
Troponin: <0.02						

Images (ECGs, CXRs, etc.)



1. Patchy infiltrates of CHF vs diffuse bilateral PNA secondary to COPD exacerbation. Difficult to tell.

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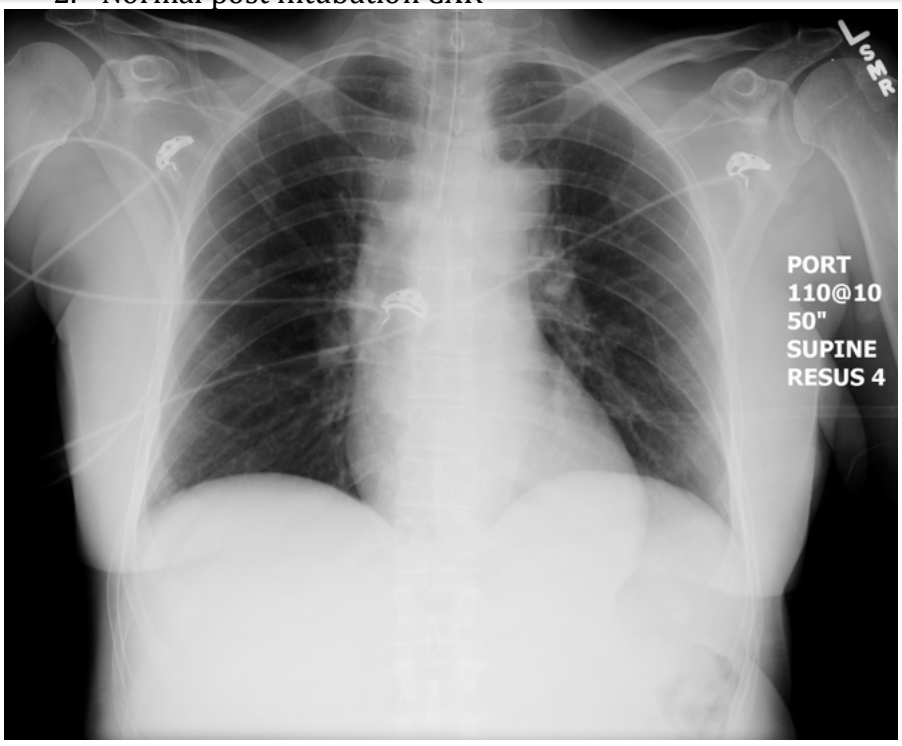
2. Normal post intubation CXR[11]



3. Left tension pneumothorax [8]

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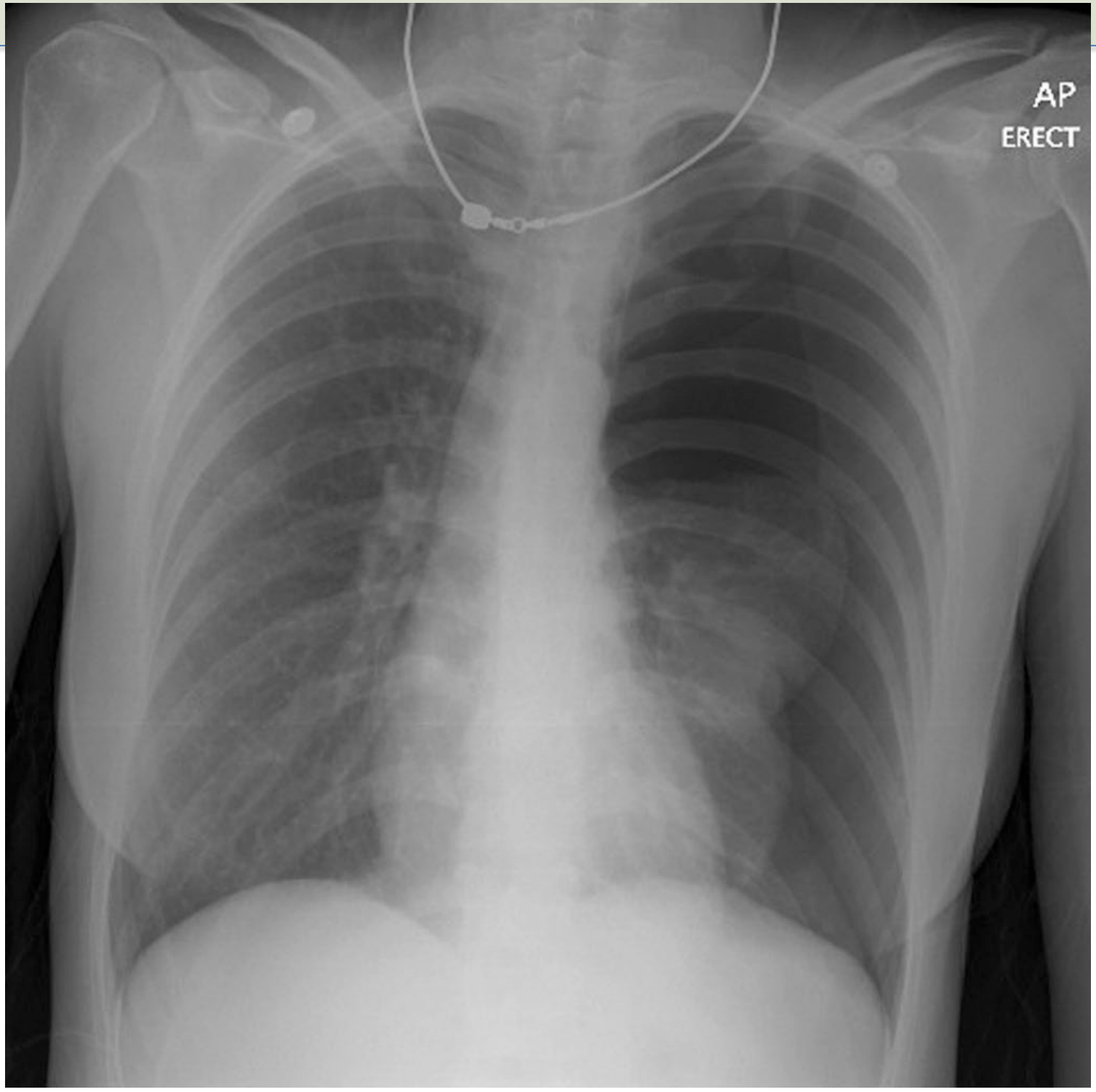

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4. CXR correctly placed chest tube.

Ultrasound Video Files (if applicable)	

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Section VIII: Debriefing Guide

General Debriefing Plan			
Individual	Group	With Video	Without Video

Objectives	
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Sample Questions for Debriefing

1. What are the classic features of COPD, which were present in the patient?
2. What considerations need to be made when giving Oxygen to a patient with COPD?
3. What factors to consider in acute deterioration of a patient that is intubated? DOPE mnemonic.
4. Should this patient be given antibiotic prophylaxis? What other information is needed to make this decision?

Key Moments

1. Recognising patient has a COPD exacerbation
2. Recognise potential for deterioration
3. Recognising and managing pneumothorax
4. DOPE mnemonic: Dislodgment, Obstruction of the endotracheal tube, Pneumothorax, Equipment/Vent Failure