COPD Exacerbation

Updated by Matthew Alfarano, MD

Keywords: COPD, tachypnea, respiratory distress, shortness of breath
Procedures: Intubation

LEARNING OBJECTIVES

1. Recognize when an adult has an immediate life-threatening condition
2. Manage a patient with impending respiratory distress
3. Create a broad differential for a patient with shortness of breath
4. Order appropriate studies in a short of breath patient
5. Recognize what imaging is most appropriate for the unstable patient

CRITICAL ACTIONS

- ✓ Establish large bore IV access
- ✓ Place patient on monitors with continuous oxygen saturation and vitals
- ✓ Place patient on continuous end-tidal CO2 monitoring
- ✓ Procure a detailed patient COPD history including previous intubations
- ✓ Ask for and interpret appropriate labs (e.g. CBC, blood gas, etc.)
- ✓ Request a CXR
- ✓ Administration of appropriate escalating interventions for severe COPD exacerbation
- ✓ Reassessment of patient's pain and vital signs
- ✓ Appropriate consultations called
- ✓ Closed loop communication
- ✓ Synthesis of the case
- ✓ Disclose appropriate information to the patient/family

CASE ONE-LINER

67-year-old male presents with progressive SOB

PRESENTATION

SETTING	Hospital ED
ADDITIONAL ROLES	Sim operator, sim RN, debrief manager **CONSULTANTS:** MICU, Pulmonary
PATIENT	67yo male
CHIEF COMPLAINT	Shortness of breath
Hx of PRESENTING ILLNESS	A 67-year-old man history of HFrEF (EF 35%), COPD (on 2L NC at baseline), and 80-pack year smoking history who presents to the EC with progressive SOB over 2 weeks. Associated with cough productive of thick yellow sputum. O2 requirement has increased to 4-6L NC. No sick contacts or recent travel. Denies chest pain, fevers, chills, orthopnea, PND. Brought in by son.
ROS	(+) Productive cough, change in sputum, dyspnea, increasing oxygen requirement (-) Chest pain, fevers, chills, PND, orthopnea, leg swelling, sick contacts, recent travel
PMH/PSH	COPD and HFrEF (EF 35%)
MEDICATIONS	Tiotropium Budesonide Formoterol Albuterol prn Furosemide
ALLERGIES	Penicillin (hives)
SOCIAL Hx	Denies drugs; social alcohol use 80 pack/year former smoker Fully immunized against COVID-19 (Pfizer) and influenza

INITIAL VITAL SIGNS					
HR	BP	RR	PULSE OXIMETRY	TEMP	WEIGHT
74	100/67	40	84% on 2LNC	99.8F	80 kg

PHYSICAL EXAM	
Items in red need to be verbalized	**PRIMARY SURVEY** • **AIRWAY:** Patent, unable to speak in full sentences • **BREATHING:** Tachypnea, extracostal muscle use • **CIRCULATION:** 2+ pulses, cap refill delayed **GENERAL:** AAOx3, respiratory distress, agitation **HEENT:** PERRL, normocephalic, atraumatic **NECK:** No JVD, no crepitus **CV:** Tachycardic; phys S1/S2, no murmurs, rubs, or gallops **PULM:** Diffuse wheezes throughout, shallow respirations, no rales. Using accessory muscles to breathe **ABD:** Soft, non-tender/non-distended, +BS **EXT:** 2+ pulses throughout, no edema or cyanosis **SKIN:** No rashes, no wounds **NEURO:** Normal

PHASE 1: INITIAL PRESENTATION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
00:00-03:00	67-year-old male presents with shortness of breath	• Order full set of vital signs, cardiac monitors, continuous pulse oximetry • Order end-tidal CO2 monitoring • Order large bore IV access • Obtain a focused history and physical examination • Initiate BiPAP • Administer duonebs • Administer steroid	• RN prompts, "Do you want vitals/patient on the monitor/ IV access?" if not requested • RN prompts, "Did you want to give any meds?" if none ordered • RN prompts, "Should I call respiratory therapy?" if no BiPAP ordered	**Obtained a complete set of vital signs?** I P N **Obtained a focused history?** I P N **Performed a focused physical exam?** I P N **Ordered 2-large bore IVs?** I P N **Recognized abnormal VS?** I P N

PHASE 2: REASSESSMENT AND SECONDARY INTERVENTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
3:01-6:00	Respiratory distress continues **Repeat Vital Signs (after BiPAP)** BP: 110/70 HR: 70 RR: 36 Pox: 90% on BiPAP; agitated and fighting BiPAP **Repeat Vital Signs (if no BiPAP)** BP: 85/30 HR: 35 RR: 52 Pox: 84% on NRB; tiring and agitated	• Order STAT labs • Order STAT EKG • Order STAT VBG • Order STAT CXR • Prepare for RSI including asking for medications and equipment • Confirm code status (FULL) • Cover for possible CAP with antibiotics. Obtain cultures	• RN to prompt, "Did you want any imaging/labs?" if none ordered. • RN to prompt, "I'm worried about his breathing; what should we do if BiPAP doesn't work?" if no RSI set up • RN to prompt, "Does he need antibiotics?" if none ordered	**Ordered STAT labs/cultures?** I P N **Ordered STAT EKG?** I P N **Ordered STAT CXR?** I P N **Prepared for RSI?** I P N **Ordered antibiotics?** I P N **Confirmed code status?** I P N

PHASE 3: REASSESSMENT, TERTIARY INTERVENTION, RESULTS, RESOLUTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
6:01-10:00	Patient tiring on BiPAP; worsening respiratory failure **Repeat Vital Signs (post-intubation)** BP: 115/75 HR: 70 RR: 20 Pox: 100% sat on 100% FiO2	• Perform RSI • Post-intubation sedation • Post-intubation CXR • Call consultant • Formulate differential including: COPD exacerbation, infectious, pulmonary embolism, pneumothorax, pleural effusion, pulmonary edema, anaphylaxis, etc. • Update the patient's family of plan of care • Make disposition clear (ADMIT)	• Labs result at 6:30 • RN to prompt, "Anything to help keep the patient comfortable after intubation?" if no interventions ordered • RN to prompt, "What did the imaging/labs show?" if no interpretation shared • RN to prompt, "Who's admitting the patient?" if no consult called • RN to prompt, "Do you want me to get the son from the waiting room?" if no family update provided	**Recognized impending respiratory failure and performed RSI?** I P N **Called MICU consultant?** I P N **Presented case to specialist succinctly and directly?** I P N **Formulated broad DDx?** I P N **Interpreted test results accurately?** I P N **Updated patient at any point?** I P N

PHASE 4: CONCLUSION & DEBRIEFING	
TIME	**ACTIONS**
10:00-20:00	Debrief Q&A Session/Teaching Evaluations

DEBRIEFING POINTS

GENERAL POINTS	SCENARIO-SPECIFIC POINTS
• What went well? • What are some opportunities for improvement? • Did you identify any gaps in knowledge? • Was there any delay in treatment? • How was communication between team members?	• Differential for shortness of breath • Pharmacologic management of COPD • Airway adjuncts and management in severe COPD exacerbation • Interpretation of end-tidal CO2

ORAL BOARDS PEARLS

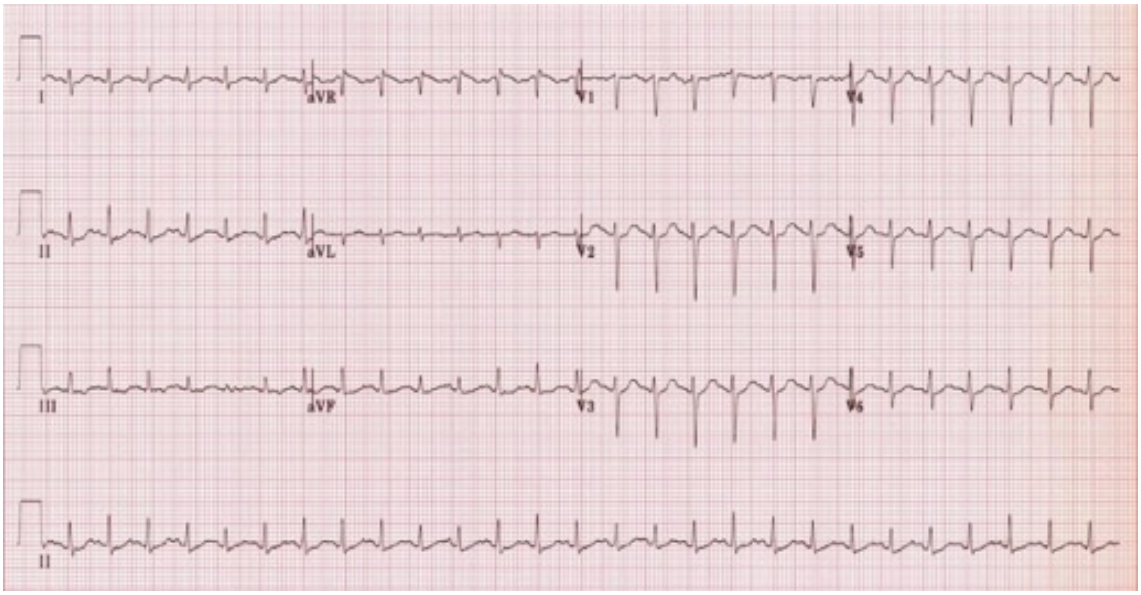
- Have a format for how you would like to approach each case
- Remember to make the patient NPO, re-assess the vital signs, re-assess after each intervention, and follow up on any studies
- Remember to explain to the patient/family the same way you would in real life
- Ensure a thorough skin and extremity exam is conducted to rule out alternative causes of respiratory distress
- If the examiner attempts to cue you or ask "anything else", take a moment to synthesize what has been done to help organize your thoughts (this may be your final chance to correct something you forgot!) and ensure the examiner recorded all of your intended actions

SCENARIO STIMULI

Complete Blood Count		Coagulation Profile	
WBC	14.0 (Normal 5.0 - 14.5 x 10^3/mL)	PT	12 (Normal 11-13.5 seconds)
Hemoglobin	11 (Normal 11.5-15.5 gm/dL)	PTT	25 (Normal 25-35 seconds)
HCT	34.5 (Normal 35%-45%)	INR	1.0 (Normal 0.8-1.1)
Platelets	220 (Normal 150-450 x 10^3/mL)		
MCV	80 (Normal 76-90 fL/red)		
Basic Metabolic Panel		**VBG**	
Sodium	136 (Normal 136-145 mEQ/L)	pH	7.21
Potassium	4.0 (Normal 3.5-5.5 mEQ/L)	pCO2	165
Chloride	105 (Normal 95-105 mEQ/L)	pO2	55
CO_2	67 (Normal 17-29 mEQ/L)	HCO3	35
BUN	14 (Normal 5-20 mg/dL)	pO2	35
Creatinine	0.9 (Normal 0.5-1.1 mg/dL)	Lactate	3.2
Glucose	95 (Normal 70-110 mg/dL)	**ADDITIONAL**	
		Troponin I	<0.02
		Type/Cross	Type A Negative
		D-dimer	Pending
		Cultures	Pending (blood, sputum, urine)

IMAGING

Representative EKG



Interpretation: sinus tachycardia

Representative CXR