Asthma Exacerbation

Updated by Christopher Phillips, MD

Keywords: Asthma, respiratory distress, pulmonary, SOB
Procedures: None

LEARNING OBJECTIVES

1. Recognize when an adult has an immediate life-threatening condition
2. Diagnose asthma exacerbation
3. Manage a severe asthma exacerbation
4. Create a broad differential for a patient with shortness of breath

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 asthma history, including previous intubations
- ✓ Ask for and interpret appropriate labs (eg, CBC, blood gas, etc.)
- ✓ Request a CXR
- ✓ Administer appropriate escalating interventions for severe asthma exacerbation
- ✓ Reassess pain and vital signs
- ✓ Call appropriate consultations (pulmonary/MICU)
- ✓ Closed loop communication
- ✓ Summarize the case
- ✓ Disclose appropriate information to the patient/family

CASE ONE-LINER

28-year-old female with a history of asthma presents with acute shortness of breath

PRESENTATION

SETTING	Hospital ED
ADDITIONAL ROLES	Sim operator, sim RN, debrief manager **CONSULTANTS:** MICU, Pulmonary
PATIENT	28yo female
CHIEF COMPLAINT	"I can't breathe well!"
Hx of PRESENTING ILLNESS	A 28-year-old female history of asthma presenting to ED with SOB for 3 days. Spouse reports patient developing a "cold" that has symptoms of rhinorrhea, cough, and wheezing. She has been using her albuterol inhaler 5 times daily in addition to her nebulized treatment 3 times daily without any benefit. She has had 2 nighttime awakenings, which is unusual for her. Has previously been intubated.
ROS	(+) Dyspnea, cough, nasal congestion, increase from baseline asthma hx (-) Chest pain, orthopnea, PND, fevers, chills
PMH/PSH	Asthma
MEDICATIONS	Albuterol
ALLERGIES	NKDA
SOCIAL Hx	Dancer; does not smoke; social alcohol use; no drugs

INITIAL VITAL SIGNS

HR	BP	RR	PULSE OXIMETRY	TEMP	WEIGHT
124	133/90	35	85% on room air	98.9F	80 kg

PHYSICAL EXAM

Items in red need to be verbalized

PRIMARY SURVEY

- **AIRWAY:** Patent, able to speak some words
- **BREATHING:** Tachypnea, extracostal muscle use, no cyanosis
- **CIRCULATION:** 2+ pulses

GENERAL: AAOx3, respiratory distress
HEENT: Normal
NECK: No JVD, no crepitus
CV: Tachycardic; no murmurs, rubs, or gallops
PULM: Tachypnea, diffuse inspiratory and expiratory wheezes , shallow respirations, extracostal muscle use
ABD: Soft, non-tender/non-distended, +BS
EXT: No edema, moving symmetrically
SKIN: No rashes, mottled
NEURO: Normal

PHASE 1: INITIAL PRESENTATION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
00:00-03:00	28-year-old female presents to the ED with acute shortness of breath	• Order full set of vital signs, cardiac monitors, continuous pulse oximetry • Order large bore IV access • Conduct a primary survey • Place on BiPAP • Obtain a focused history and physical examination • Introduce self to the patient • Order duonebs (albuterol and ipratropium), steroids, magnesium • Place on continuous end-tidal capnography	• RN prompts, "Do you want vitals/patient on the monitor/ IV access?" if not requested • RN prompts, "Did you want to do anything for the O2 sat?" if no BiPAP ordered • RN prompts, "Did you want any other treatment?" if no magnesium ordered	**Obtained a complete set of vital signs?** I P N **Ordered 2-large bore IVs?** I P N **Recognized abnormal VS?** I P N **Placed on BiPAP?** I P N **Placed on EtCO2 monitoring?** I P N **Obtained a focused history?** I P N **Performed a focused physical exam?** I P N **Ordered albuterol/ ipratropium?** I P N **Ordered steroids?** I P N **Ordered magnesium?** I P N

PHASE 2: REASSESSMENT AND SECONDARY INTERVENTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
3:01-6:00	Tachypnea continues **Repeat Vital Signs (after Mg + steroids + nebs)** BP: 125/85 HR: 128 RR: 22 Pox: 98% on BiPAP **Repeat Vital Signs (if no Mg)** BP: 100/60 HR: 124 RR: 35 Pox: 98% on BiPAP **Repeat Vital Signs (if no BiPAP)** BP: 100/60 HR: 128 RR: 40 Pox: 82% on NC/NRB	• Order STAT labs (CBC, BMP, troponin, VBG, UPT) • Order STAT EKG • Order STAT CXR • Order IV fluids • Make patient NPO • Discuss code status	• RN to prompt, "Did you want any imaging/labs?" if none ordered. • RN to prompt, "Do you want repeat vitals?" if not rechecked after treatment	**Ordered STAT labs?** I P N **Ordered STAT EKG?** I P N **Ordered STAT CXR?** I P N **Reassessed vitals after treatment?** I P N **Ordered IV fluids?** I P N **Made patient NPO?** I P N **Discussed possibility of intubation?** I P N

PHASE 3: REASSESSMENT, TERTIARY INTERVENTION, RESULTS, RESOLUTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
6:01-10:00	Patient now more comfortable on BiPAP	• Call consultant • Formulate differential including: anaphylaxis, pulmonary embolus, pulmonary edema, pneumothorax, ACS, foreign body, pneumonia • Update the patient/family on results and plan • Made disposition clear (ADMIT ICU)	• Labs result at 6:30 • 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 • Dr. MICU to request a CXR if none ordered	**Called 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 **Admitted to appropriate level of service?** 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 diagnosis for shortness of breath • Pharmacologic management for asthma exacerbation. • Airway adjuncts and appropriate escalation in asthma exacerbation • What to consider if intubation required for asthma exacerbation • Blood gas interpretation in asthmatics

ORAL BOARDS PEARLS

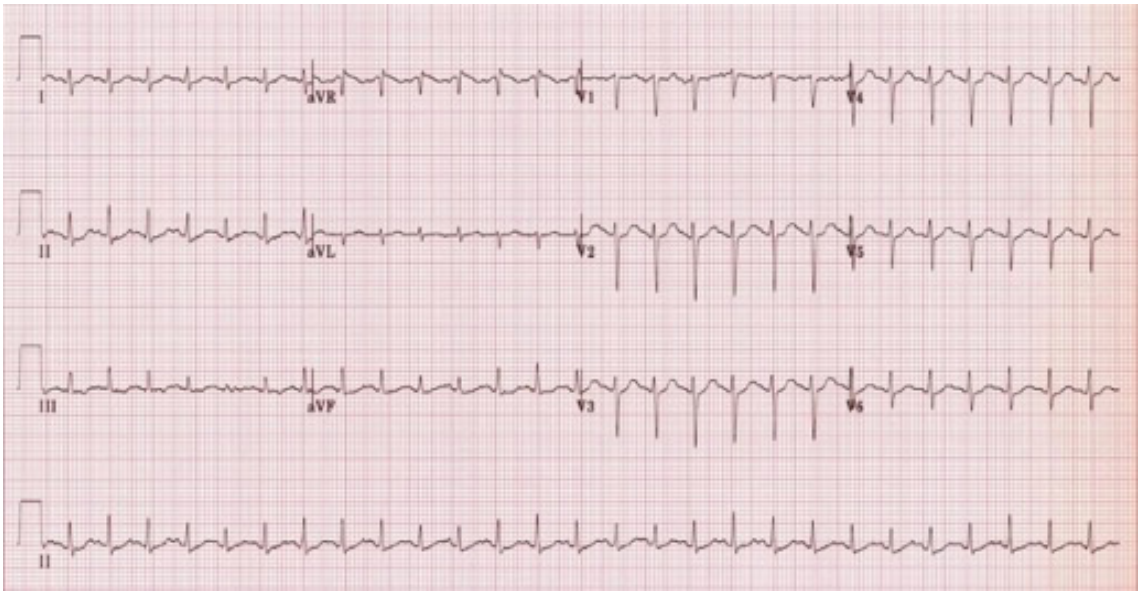
- Have a format for how you would like to approach each case
- Remember to make the patient NPO, re-assess the vital signs, re-assess after each intervention, and follow up on any studies
- Remember to explain to the patient/family the same way you would in real life
- Make sure you conduct a thorough skin and extremity exam. You don't want to miss an anaphylaxis or pulmonary embolism case
- 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	10.0 (Normal 5.0 - 14.5 x 10^3/mL)	PT	12 (Normal 11-13.5 seconds)
Hemoglobin	12 (Normal 11.5-15.5 gm/dL)	PTT	30 (Normal 25-35 seconds)
HCT	36 (Normal 35%-45%)	INR	1.0 (Normal 0.8-1.1)
Platelets	220 (Normal 150-450 x 10^3/mL)		
MCV	84 (Normal 76-90 fL/red)		
Basic Metabolic Panel		**VBG**	
Sodium	140 (Normal 136-145 mEQ/L)	pH	7.29
Potassium	3.2 (Normal 3.5-5.5 mEQ/L)	pCO2	14
Chloride	100 (Normal 95-105 mEQ/L)	pO2	82
CO_2	23 (Normal 17-29 mEQ/L)	HCO3	26
BUN	14 (Normal 5-20 mg/dL)	pO2	35
Creatinine	0.9 (Normal 0.5-1.1 mg/dL)	SO2	37
Glucose	95 (Normal 70-110 mg/dL)	Lactate	2.7
		ADDITIONAL	
		Troponin I	<0.02 (Normal <0.08 ng/mL)

IMAGING

Representative EKG



Interpretation: sinus tachycardia

Representative CXR