

OhioHealth Emergency Medical Services Podcast Series
February 2021 Episode: Shortness of Breath Presentations

Objectives:

1. Review the presentation and treatment of asthma and COPD.
2. Review the presentation and treatment of heart failure.
3. Review ventilation and oxygenation strategies in patients with metabolic acidosis.

Podcasters

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Session 1

- 57 YM – Shortness of Breath and Wheezing
 - Shortness of breath definition
 - Also referred to as dyspnea or breathlessness
 - Subjective and objective descriptions
 - Respiratory rate and oxygen saturations
 - Possible causes are extensive
 - Initial evaluation
 - Evaluate vital signs and overall appearance of the patient
 - Increased work of breathing
 - Accessory muscle use
 - Abdominal breathing
 - Pursed lips (“auto-PEEP”)
 - Shark finning on capnograph suggests obstructive (COPD/asthma)
 - Past medical history and recent events may be informative
 - Not all wheezing should be attributed to COPD/asthma
 - Lungs Sounds
 - Wheezing from lungs
 - Stridor from upper airways
 - Possible causes of wheezing
 - Asthma and COPD
 - Recognition should be based on past medical history and medication review
 - Actual diagnosis is complicated and usually cannot be accomplished in the emergency setting
 - Suspicion should be high and treatment initiated empirically
 - Pulmonary edema
 - Foreign body
 - Initial stabilization

- Oxygen supplementation
 - Ventilatory support if needed
 - BVM or CPAP
 - Breathing Treatments (albuterol + ipratropium)
 - Improves bronchospasm and inflammation
 - Consider ECG to evaluate for cardiac causes
- Important prehospital treatment concepts for undifferentiated chief complaints
 - Sometimes treatment needs to be initiated before clear understanding of underlying etiologies
 - Sometimes initial treatment can also be diagnostic
 - Reassessment is important to delineate correct management pathway
- Respiratory physiology: ventilation, perfusion and diffusion (O₂ and CO₂ exchange)
 - Ventilation: asthma/COPD
 - Diffusion: pneumonia, heart failure, acute lung injury
 - Perfusion: pulmonary embolism
 - External pressure: pneumothorax
 - Internal pressure: foreign body/airway edema
- COPD pathophysiology
 - Chronic inflammation in lungs that change function of lungs
 - Most commonly from smoking but several other causes are possible
- COPD treatment
 - Oxygen if not already initiated (remember appropriate goals)
 - Albuterol is a beta 2 agonist (causes bronchodilation)
 - Ipratropium is an anti-cholinergic (relaxes smooth muscles and mucous)
 - Can be combined with albuterol (“Duoneb”)
 - Non-invasive positive pressure ventilation (CPAP)
 - Definitive therapy vs. pre-oxygenation
 - Steroids
 - May improve how well albuterol works
 - May have delayed benefit

Session 2

- 24 YF – Shortness of Breath and Wheezing with History of Asthma
 - Asthma pathophysiology
 - Bronchospasms and wheezing
 - Typically, more reversible than COPD
 - There will be some overlap clinically
 - Treatment of asthma
 - Initial treatment is similar with albuterol and ipratropium
 - Steroids are indicated if your protocol
 - Magnesium can help reduce need for hospital admissions
 - IM epinephrine can be an option for severe patients
 - Intubation and RSI for asthmatics
 - Try to avoid intubation if possible
 - Ketamine is a nice induction agent because it promotes bronchodilation
 - Slower respirations allow for longer expiration times which facilitates the lungs to empty. This prevents breath staking and barotrauma
 - Intubated asthmatic patients
 - Sudden decompensation should make you suspect barotrauma/pneumothorax
 - Disconnect the BVM and/or ventilator and pushing on the chest can facilitate improvement
- 53 YM – Shortness of Breath and Dyspnea on Exertion with History of Heart Disease
 - Congestive Heart Failure
 - There are several different classification systems
 - Left sided vs. right sided
 - Systolic vs. diastolic
 - Acute vs. chronic with acute decompensation
 - Preserved ejection fraction vs. reduced ejection fraction
 - Hypertensive vs. Normotensive vs. Hypotensive
 - Physical examination may be helpful
 - Murmurs
 - JVD
 - Edema
 - Lungs Sounds
 - ECG may detect an arrhythmia or cardiac ischemia
 - Treatment
 - Hypertensive
 - Non-invasive positive pressure ventilation (NIPPV) and Nitroglycerin
 - Normotensive
 - NIPPV and Nitroglycerin (if blood pressure tolerates)
 - Hypotensive

- IVF in small aliquots with frequent reassessments
 - Vasopressors if available
 - Consider other causes of shock in addition to cardiogenic shock
 - Lasix can be considered but is often considered secondary treatment
- 23 YM – Shortness of Breath with History of Diabetic Ketoacidosis (DKA)
 - Respiratory failure associated with metabolic acidosis
 - Common causes include DKA, aspirin toxicity, septic shock
 - Vital Signs
 - ETCO₂ will likely be low (respiration compensation for metabolic acidosis)
 - Fast respiratory rate and deep breaths
 - Hyperventilation associated with metabolic acidemia is dangerous
 - Intubation does not fix the underlying cause
 - Be careful with induction agent and sedation
 - Post-intubation management is especially important
 - Respiratory rate should match rate before intubation to assure appropriate compensation of metabolic acidosis
 - Use ETCO₂ as a goal for ventilation