

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

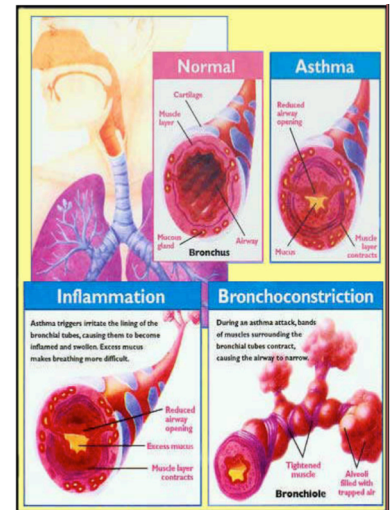
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June 2017 | Vol 3 | Issue 41

Pediatric Asthma Exacerbation

A 5-year-old female with a past medical history of asthma presents to the ED with dyspnea and wheezing for the past 2 hours. This episode is similar to her prior asthma attacks. She is short of breath when walking down the hall to the exam room. She denies recent illness, cough, fever, nausea, vomiting and diarrhea. Her parents report hearing wheezing. They administered her albuterol inhaler at home with no relief. Using her peak flow meter, her parents measured a peak expiratory flow (PEF) of 50% of her personal best. On physical exam, patient is in acute distress, using accessory muscles while breathing. Her lips are not cyanotic. On auscultation, there is diffuse wheezing. She is afebrile, normotensive. She is found to be tachycardic, with a heart rate of 130 bpm and hypoxic with an O₂ saturation of 90%. Which of the following is the next best step for this patient's condition?

- A. Order PA and lateral chest radiographs
- B. Obtain arterial blood gas
- C. Administer a 12.5mg chewable Benadryl tablet
- D. Initiate ipratropium/albuterol nebulizer treatment
- E. Give patient 4mg chewable Montelukast tablet



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Asthma pathophysiology is based on 1) Inflammation of the bronchial tubes accompanied by mucous and 2) Bronchoconstriction due to the constriction of muscles surrounding the bronchiole tubes

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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Warriors

Classifications of Severity of an Asthma Exacerbation			
Degree of severity	Signs/Symptoms	Initial PEF	Clinical Course
Mild	Dyspnea only with activity	PEF \geq 70 percent of predicted or personal best	Usually treated at home Prompt relief with inhaled SABA Possible short course of oral steroids
Moderate	Dyspnea interferes with or limits usual activity	PEF 40 to 69 percent of predicted or personal best	Usually requires office or emergency department visit Relief from frequent inhaled SABA Oral steroids; some symptoms last for one to two days after treatment begins
Severe	Dyspnea at rest; interferes with conversation	PEF < 40 percent of predicted or personal best	Usually requires emergency department visit and likely hospitalization Partial relief from frequent inhaled SABA Oral steroids; some symptoms last for more than three days after treatment begins Adjunctive therapies are helpful
Life threatening	Too dyspneic to speak; perspiration	PEF < 25 percent of predicted or personal best	Requires emergency department visit/hospitalization; possible intensive care unit Minimal or no relief from frequent inhaled SABA Intravenous corticosteroids Adjunctive therapies are helpful

The correct answer is D. Combination ipratropium/albuterol (Duoneb) dilates the bronchioles and decreases mucous production.

Discussion

Asthma is a common condition in childhood, which can become chronic and is seen in all ages. It is classified based on the severity of the symptoms. **There are 4 types; intermittent, mild persistent, moderate persistent and severe persistent.** Asthma exacerbations, or asthma “attacks” can be brought on by multiple triggers, including allergies, upper respiratory infections, pollution and exercise. Exacerbations occur when the patient’s at home treatment regime does not improve symptoms and it requires immediate medical attention. Exacerbations are also classified into different levels of severity. See the table above for severity classification. Early treatment is the most effective strategy in management. In the ED, the goals of treatment are correction of hypoxemia, rapid reversal of airflow obstruction, and reduction of the risk of relapse by intensifying therapy and carefully monitoring response

Treatment

Treatment of an asthma exacerbation in children is made up of 4 components; oxygen, ipratropium/albuterol, steroids, and magnesium.

Oxygen: Oxygen should be administered to reverse hypoxia, and titrated to achieve oxygen saturation of at least 94%.

Ipratropium/albuterol: Ipratropium, an anticholinergic medication acts on the glands in the bronchioles to decrease mucous production and relaxes the smooth muscle surrounding the bronchiole. Albuterol, a short acting beta agonist acts to also relax the smooth muscle causing airway constriction. The combination has been shown to decrease hospitalization and improve lung function.

Steroids: Giving steroids within 1hr of ED presentation has been shown to decrease hospitalizations in all ages. Of note, a 2-day course of oral dexamethasone is as effective as a 5-day course of oral prednisone w/ fewer side effects.¹

Magnesium Sulfate: IV magnesium sulfate has been shown to decrease hospitalizations and increase lung function in children with an acute asthma exacerbation.²

Finally, if the asthma exacerbation is severe enough, intubation and mechanical ventilation may be necessary.

Discharge

Patients should be counseled on how to use a peak flow meter and given an asthma action plan. This plan gives patients specific steps of what to do when they feel symptoms, their treatment isn’t improving their symptoms and their PEF is less than their personal best. Patients need to follow up with their primary care physician after discharge. It is likely that additional maintenance medications need to be added to their regular regimen.

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and click on the “Conference” link.

All are welcome to attend!

Asthma Action Plan


 Asthma and Allergy
Foundation of America www.aafa.org

Name	Date
Doctor	Medical Record #
Doctor's Office Phone #: Day	Night/Weekend
Emergency Contact	
Doctor's Signature	



The Colors of a traffic light will help you use your asthma medicines.

Green means Go Zone!
Use preventive medicine.

Yellow Means Caution Zone!
Add quick-relief medicine.

Red means Danger Zone!
Get help from a doctor.

Personal Best Peak Flow _____

GO

You have **all** of these:

- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can work and play

Peak flow from _____
to _____

CAUTION

You have **any** of these:

- First signs of a cold
- Exposure to known trigger
- Cough
- Mild wheeze
- Tight chest
- Coughing at night

Peak flow from _____
to _____

DANGER

Your asthma is getting worse fast:

- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well

Peak flow reading below _____

Use these daily preventive anti-inflammatory medicines:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

For asthma with exercise, take:

Continue with green zone medicine and add:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

CALL YOUR PRIMARY CARE PROVIDER.

Take these medicines and call your doctor now.

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

GET HELP FROM A DOCTOR NOW! Do not be afraid of causing a fuss. Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room. **DO NOT WAIT.**

Make an appointment with your primary care provider within two days of an ER visit or hospitalization.



ABOUT THE AUTHOR

This month's case was written by Andrew Bohn. Andrew is a 4th year medical student from FIU-HWCOM. He did his emergency medicine rotation at BHMC in January 2017. Andrew plans on pursuing a career in Family Medicine after graduation.

Take Home Points

- An inhaler with a spacer is equivalent to nebulized short-acting beta agonist therapy.
- The administration of oxygen to maintain saturation of at least 94 percent is recommended in all patients presenting with a moderate to severe asthma exacerbation.
- Inhaled anticholinergic medication improves lung function and decreases hospitalization in children with asthma exacerbations - when multiple doses are used in combination with a short-acting beta agonist (Duonebs).
- IV magnesium sulfate increases lung function and decreases hospitalizations in children with an acute asthma exacerbation.
- The use of steroids within 1hr of ED presentation decreases the need for hospitalization, in all ages.
- There is insufficient evidence to recommend the use of inhaled corticosteroids in place of, or in conjunction with oral steroids at the time of discharge from the ED.
- Some tests that may be useful include CBC, and basic chemistries.
- CXR is not routinely recommended.
- Measurement of ABGs may be considered if hypoventilation is suspected.

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