

EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

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The Global Initiative on Obstructive Lung Disease (GOLD) defines chronic obstructive pulmonary disease (COPD) as "a disease state characterized by progressive airflow limitation that is not fully reversible, associated with an abnormal inflammatory response of the lungs to noxious particles and gases."

EM CASE OF THE WEEK

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.



Acute COPD Exacerbation

A 64 year old female presents to the ED with 1 week of shortness of breath and worsening productive cough with yellow sputum. She was diagnosed with COPD 10 months ago. She admits she was doing well on inhaled albuterol prior to her current complaint. She denies associated symptoms of fever, sore throat, nausea, or vomiting.

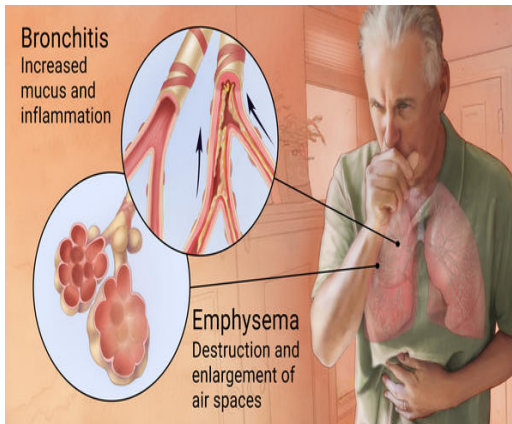
Her vitals are T 98.4, HR 98, RR 28, BP 142/86, O2 sat 86%. Her medications also include atenolol 50 mg for hypertension and atorvastatin 10 mg for hypercholesterolaemia. She has no other medical illnesses, and has no known allergies. Upon further questioning, the patient admits to smoking 1 pack of cigarettes per day for 30 years. Findings on physical exam include labored breathing, mild intercostal retractions and wheezes without crackles bilaterally. She is able to speak in whole sentences and there is no central cyanosis present.

Treatment of acute COPD exacerbation may include:

- A. Bronchodilators
- B. Oral or systemic corticosteroids
- C. Antibiotics
- D. Bilevel positive airway pressure
- E. All of the above



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Chronic Obstructive Pulmonary Disease (COPD)

The correct answer is E. Combined inhaled bronchodilators, such as short acting beta2 adrenergic agonists (albuterol) and an anticholinergic (tiotropium) will improve pulmonary function and dyspnea in COPD. Oral steroids have been shown to be effective for outpatient therapy, while intravenous steroids are recommended in most patients with moderate to severe COPD exacerbations requiring hospitalization. Broad spectrum antibiotics (amoxicillin, cephalosporins, doxycycline, macrolides, trimethoprim/sulfamethoxazole) are a mainstay to treat severe purulent conditions. Severe cases benefit from noninvasive ventilation with bilevel positive airway pressure (BiPAP).

Take Home Points

- Cigarette smokers make up 80% of patients with COPD.
- Three million people died from COPD in 2005, which corresponds to 5% of all deaths globally.
- Currently, COPD is the fourth leading cause of death worldwide.
- By 2020, COPD is predicted to become the third most common cause of death.
- COPD kills someone every 15 seconds.

Discussion:

The American Thoracic Society defines COPD as a disease process involving progressive chronic airflow obstruction because of chronic bronchitis, emphysema, or both. Chronic bronchitis is defined clinically as excessive cough and sputum production on most days for at least three months during at least two consecutive years. Emphysema is characterized by chronic dyspnea resulting from destruction and dilation of interalveolar septa. This disease process occurs in the distal or terminal airways and involves both airways and lung parenchyma.

In the United States, age-standardized death rate amongst persons with COPD doubled from 1970 to 2000. COPD is now the 4th leading cause of death worldwide, and the only leading cause of death for which the mortality rate is increasing. The strongest predictors of mortality are older age and a decreased forced expiratory volume per second (FEV₁). Sixty year old smokers with chronic bronchitis have a 10 year mortality rate of 60 percent, which is four times higher than the mortality rate for age-matched asthmatics.

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and click on the "Conference" link. All are welcome to attend!

Cigarette smoking is implicated in 80% of COPD cases and primarily affects centrilobular regions. Alpha₁-antitrypsin deficiency should be suspected when COPD develops in patients younger than 45 years who do not have a history of chronic bronchitis or tobacco use, or when multiple family members develop lung disease at an early age. It primarily affects panlobular regions.

Evaluation:

Symptoms of COPD are minimal until the disease has progressed. Patients may present with the "barrel chest," accessory chest muscle use, jugular-vein distention (JVD), end-expiratory wheezing, and decreased breath sounds.

For emergent cases of acute COPD exacerbation, the evaluation should include the following:

- Assessment of pulse oxygen saturation
- A chest radiograph to exclude pneumonia, pneumothorax, pulmonary edema, pleural effusion
- Laboratory studies (eg, complete blood count and differential, serum electrolytes and glucose)
- Arterial blood gas analysis, if acute or acute-on-chronic respiratory acidosis is suspected or if ventilatory support is anticipated.
- B-type natriuretic peptide (BNP) can be used to help distinguish heart failure from other causes of dyspnea. Use of BNP in the ED for patients with dyspnea and a history of pulmonary disease can decrease the likelihood of admission (81% vs 91%) and decrease time spent in the hospital (9 days vs 12 days), as well as overall decreased cost of care (\$4841 US vs \$5671 US).

As discussed previously, the disease process has two different presentations:

- Emphysema: Patients may present with dyspnea, pursed lips, minimal cough, decreased breath sounds, late hypercarbia/hypoxia and a thin appearance.
- Chronic bronchitis: Patients may present with cyanosis, dyspnea, productive cough, peripheral edema, rhonchi, early signs of hypercarbia/hypoxia and an overweight appearance.

Treatment:

COPD is treatable at any stage of the illness. However, there is no cure for COPD currently, and no treatments can completely reverse its destructive effects. Without treatment, COPD will gradually worsen, debilitating the lives of those who suffer from it.

The goals of COPD treatments include smoking cessation, risk reduction, improve exercise tolerance, improved health status and quality of life, and minimization of the frequency and severity of acute exacerbations.

A management strategy consisting of combined pharmacotherapy and non-pharmacotherapeutic interventions can effectively improve symptoms, activity levels and quality of life at all levels of disease severity. The major components of in-hospital management of exacerbations include reversing airflow limitation with inhaled short-acting bronchodilators and systemic glucocorticoids, treating infection, and ensuring adequate oxygenation.

The goal for oxygen saturation should be 90-92% as aggressive supplementation of oxygen can suppress the hypoxic drive and result in hypercapnia.

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4. U.S. Preventive Services Task Force. Screening for chronic obstructive pulmonary disease using spirometry: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2008.



ABOUT THE AUTHOR:
This month's case was written by Trevine Albert. Trevine is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in January 2016. Trevine plans on pursuing a career in Sports Medicine after graduation.