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Chronic Obstructive Pulmonary Disease (COPD)

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Chronic Obstructive Pulmonary Disease

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Introduction

The overall incidence of chronic obstructive pulmonary disease (COPD) is increasing and negatively affecting the quality of life of the patient.

Chronic obstructive pulmonary disease is associated with a high morbidity and mortality rate and is currently the 4th leading cause of death in the United States and is projected to be the 3rd by 2020 (Schnell, K., et al., 2012).

Due to the high incidence and chronicity of COPD, patients frequently present for treatment, often face hospital admissions related to acute exacerbations, and require life-long treatment for disease management (Han, Dransfield, & Martinez, 2017). Because of this, the family nurse practitioner (FNP) will without a doubt encounter and provide treatment for a patient with COPD.

This is further supported by Yawn, Wollan, Trexter, and Yawn (2016) who state COPD is common and most patients diagnosed with COPD receive care from their primary care providers and most recently from nurse practitioners and physician's assistants. Due to the prevalence of COPD and those presenting for treatment, the FNP will need to have an understanding of the disease process to better serve the patient.

Rennard et al. (2013) states COPD is said to be unappreciated with half of the COPD patients being undiagnosed or undertreated.

Chronic Obstructive Pulmonary Disease (COPD)

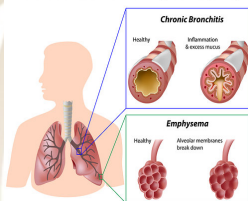


Image retrieved from
<https://asthmafoundation.org>

Pathophysiology What is COPD

Chronic obstructive pulmonary disease is said to be a preventable and treatable disease; not reversible (Halldin, Doney, & Hnizdo, 2015).

A description of COPD is provided by the Centers for Disease Control and Prevention (CDC) as a group of lung diseases which causes a progressive blockage of expiratory air flow. The subtypes of COPD is inclusive of: asthma, chronic bronchitis, and emphysema.

Asthma

- A variable inflammation of the airways with hypersecretion of mucous and bronchial constriction causing airflow obstruction.
- Exposure to irritants is the primary trigger of asthma and avoidance of these irritants is key.
- Large familial incidence of asthma.
- IgE is thought to be a contributor to the pathophysiologic characteristics of asthma.
- Exposure to antigens cause epithelial damage, basement membrane thickening, and eosinophil infiltrates into the walls of the airways.
- There is an influx of neutrophils, eosinophils, mast cells, and tumor necrosis factor- alpha.
- Inflammatory and pro-inflammatory mediators cause epithelial damage, mucous plugging, and increased endothelial permeability causing airway edema. (Lugogo & MacIntyre, 2008).
- The presence of CD4+ T-lymphocytes, eosinophils, and increased interleukin (IL)-4 and IL5 is characteristic of the bronchial inflammation seen in asthma (Han, Dransfield, & Martinez, 2017).
- The individual signs and symptoms of asthma are: sporadic chest tightness, cough, wheezing, and shortness of breath with fluctuating and reversible airflow obstruction; not all wheezing is asthma and not all asthma wheezes (Halldin, Doney, & Hnizdo, 2015).

Chronic Bronchitis

- The pathophysiologic process of bronchitis is triggered by irritants which cause airway inflammation; the largest contributing factor being cigarette smoke.
- Inflammation and thickening of the bronchial tubes with a hypersecretion of mucus.
- There is an overproduction of mucous due to an increased amount and size of goblet cells and enlarged submucosal glands.
- The individual signs and symptoms of bronchitis are: activity intolerance, shortness of breath, and chronic cough lasting for a minimum of three months in two consecutive years. (Han, Dransfield, & Martinez, 2017).

Emphysema

- Destruction of structures distal to the terminal bronchial which include the respiratory bronchial, alveolar ducts, sacs, and alveoli; collectively the acinus.
- Abnormal, irreversible enlargement of the terminal airspaces which accompanies destruction of the alveolar walls. The elasticity of the lung is lost resulting in airflow obstruction.
- The individual signs and symptoms of emphysema are: weight loss- thought to be due to the increased metabolic demands of breathing with use of accessory muscles, shortness of breath with activity eventually advancing to shortness of breath while at rest, non-productive cough, and a prolonged period of expiration. (Han, Dransfield, & Martinez, 2017).
- Major contributing factor of the development of emphysema is cigarette smoke.
- Genetic risk factor identified in emphysema: Alpha 1-antitrypsin (ATT) deficiency. (Bauldoff, 2012).

Signs and Symptoms of COPD

The changes associated with COPD are primarily seen in the airways, lungs, and pulmonary vasculature. The changes and their pathologic processes are dependent upon the underlying disease, susceptibility to, and severity of the disease.

Collectively, the signs and symptoms of COPD include: dyspnea, activity intolerance, chronic productive or non-productive cough, wheezing, and chest tightness.

Gradual onset of the symptoms tend to contribute to the underdiagnosis of COPD as these symptoms are often common in presentation of other diseases. (Han, Dransfield, & Martinez, 2017).

Risk Factors for COPD

- Cigarette smoking and second hand exposure to cigarette smoke.
- The most significant factor of the development and progression of COPD.
- Air pollution
- Reduced lung development or frequent and severe lung infections during childhood.
- History of asthma
- Lower socioeconomic status
- Poor nutrition
- Genetic risk factor of ATT deficiency



Image of healthy lungs
retrieved from
<http://meddean.luc.edu>

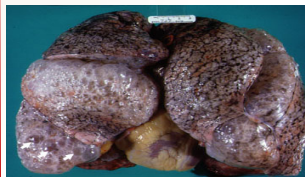


Image of emphysema
retrieved from
<http://stritch.luc.edu>



Image of chronic
bronchitis retrieved from
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Significance of Pathophysiology and Its Implications for Nursing Care

For the ANP to know the manifestations and progression of COPD, there needs to first be an understanding of its pathophysiology to guide the correct diagnosis and appropriate treatment to prevent disease progression and complications.

- Provide risk reduction education:
 - Smoking cessation and avoidance of other irritant exposures
 - Vaccines against respiratory infections
 - Appropriate nutrition
 - Medication compliance and proper use
 - Self care and symptom management (Garvey, 2011).
- For all COPD patients, short acting beta agonists and/or anticholinergic bronchodilator use is recommended to improve symptoms and lung function
- Long acting beta agonists are used for more symptomatic patients (Ferguson, 2017).

The management of COPD is difficult. The advanced nurse practitioner (ANP) will need to maximize each patient visit to provide education of proper medication compliance and inhaler use while assisting and providing education where needed.

The nurse will be involved in the diagnosis of COPD by performing spirometry and testing; patient education is key to obtaining accurate results.

Since smoking is the major contributing factor, smoking cessation and support is an integral part of care.

Exacerbations are common and the patient will need to be educated of the signs and symptoms and when to present for treatment to avoid a hospital admission.

Exercise and nutrition should be included in the care of the COPD patient. Obesity will increase the work load of the patient while those who are underweight have shown to have a poor prognosis.

Anxiety and depression are common, the APN will need to provide support and education to the patient and family.

Conclusion

Most patients with COPD will be diagnosed and treated in the primary care setting. As nursing accounts for the largest segment of the healthcare workforce, APNs have a key role in the diagnosis and management of the patient with COPD. Because COPD is a chronic disease requiring life-long treatment, patient education and compliance is a large factor of that treatment. The APN will need to help guide and support their patient in taking responsibility for their care.

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